

Imitation in the context of play with a child with deafblindness and her parents

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ABSTRACT

Children who suffer from dual sensory impairment have to overcome many challenges, for example, how to communicate with others as well as their parents. It can be difficult for them to make a contact or understand each other's expressions as the use of typical sensory communication is hampered. Children with deafblindness need the same kind of interaction with their parents that seeing and hearing, so called typical children do, so that they can develop their communication and language skills. Imitation is one of the typical characteristics of early interaction between infants and their parents. It has been found to strengthen reciprocity in communication. Based on these findings, researchers have begun to explore the effects of imitative responses during interactions between persons having severe communicative impairments and others, such as their parents. As a result, many positive findings regarding communication and social skills have been reported.

In this master's project two studies were performed, a literature study and a case study. In the literature study imitation was explored from different theoretical perspectives, namely neurological theory, cognitive psychology, transactional theory, dialogism and communicative interventions. In the case study characteristics of imitation were observed and evaluated.

The case study involved a three-year-old child with deafblindness and her parents. The purpose of the study was to explore characteristics of imitation during free-play sessions as well as during play sessions where the parents were to use imitation intentionally as part of their response. The imitative answers were analysed for frequency, length and communication modes used. One of the aims was also to find out whether the parents' imitative answers have an effect on the child's behaviour. Three different behaviours were explored: emotional expression, physical expression illustrated by the placing of hands on parent's mouth and stopping activity. The data were collected through video recordings.

Results from this study show that the parents exhibited notably more imitative answers than the child. In free-play interaction the mother imitated the child more than the father, but the frequency of imitative answers from the parents was equal in sessions where they used imitation intentionally. Most of the imitative bouts had a length of one round. The longest imitative bouts were exhibited in the sessions where the parents used imitation intentionally in their answers. The parents mainly used vocal and gestural communication modes during free-play sessions, whilst tactile modes were used infrequently. The use of tactile modes of communication was significantly increased during the sessions where the parents used imitation intentionally in their answers. The communication modes used in the imitative answers from the child were vocal and gestural throughout the sessions.

Only some of the imitative answers given by the parents had an effect on the child's behaviour during free-play sessions. Up to half of the imitative answers the parents gave had an effect on the child's behaviour during sessions where imitation was intentionally used. Of all the reactions smiling occurred most often. The action of placing hands on the parent's mouth was noted frequently. The results suggest that the parents' intentional use of imitation and especially the use of tactile modes of communication might have been associated with the increased number of changes in the child's behaviour. The implications for the development of children with deafblindness are discussed.

PREFACE

It has been my dream to do a Masters degree in Communication and Congenital Deafblindness at the University of Groningen since I first heard about it. Last year many things fell into the right place and I finally got the opportunity to participate in the program. The time that I spent in Groningen during October 2010 was very inspiring and I want to thank all the lecturers for sharing their knowledge. I enjoyed the open atmosphere which allowed us all to think aloud and ask many questions. I also want to thank my fellow students for sharing enthusiasm for studying and for the great times spent together. It was lovely to see that there are so many people from different countries who are interested in the same topic.

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Proverbs 16:9

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1. INTRODUCTION

Imitation is a phenomenon that can be defined and discussed in many ways (Caldwell, 2006; Nadel, Revel, Andry & Gaussier, 2004; Prinz & Meltzoff, 2002; Rizzolatti, Fadiga, Fogassi & Gallese, 2002; Uzgiris, 1981; Zeedyk & Heimann, 2006). The development of imitation has been studied and described and the traditional view of imitation focuses on an infant's ability to learn new skills through reproducing previously performed actions. When imitation is explored from this perspective, it brings up the question of what kind of behaviour can be defined to be genuinely imitative. Imitative exchanges between an infant and a parent are key to forming reciprocity and social-affective basis for language development. The third aspect focused on in the literature is the role of imitation in communicative interventions. To consider all three aspects of imitation, a broad definition is needed (Nadel et al., 2004; Uzgiris, 1981; Zeedyk, 2006). This study defines imitation from this wide perspective.

Caldwell (2006) uses the term "learning the language of our partner" when talking about imitation as part of a therapeutic approach. By doing this she draws attention to the ability of a communication partner to focus on the form of expression that is meaningful for individuals with communicative difficulties. When the partner accesses that language through imitation, it can be used for building up a relationship. Imitation can be studied in different ways depending on the perspective of the researchers. The positive effect of imitation as a way of interacting with children with severe communicative impairments has been illustrated over recent years. Imitation has been found to support the use of eye contact, spontaneous imitations, pretend play skills, and joint attention behaviours (Barton & Wolery, 2010; Dawson & Galpert, 1990; Ingersoll & Gergans, 2007; Ingersoll & Schreibman, 2006; Sanefuji, Yamashita & Ohgami, 2009). Also in the literature of deafblindness, imitation is considered an efficient way of responding by the communication partner (Hart, 2006; Rødbroe & Souriau, 1999).

The Nordic definition of deafblindness is "a distinct disability". "Deafblindness is a combined vision and hearing disability. It limits activities of a person and restricts full participation in society to such a degree that society is required to facilitate specific services, environmental alterations and/or technology." Children and parents of children with a dual sensory impairment will come across many challenges when trying to interact and communicate (Daelman, Nafstad & Rødbroe, 1993; Hart, 2006). It can be difficult for a parent to perceive

and understand the behaviour and expressions of the child and respond to them. This can hinder the development of the child. There are studies described in deafblind literature concerning adults suffering from the disability which report positive results when imitation is used as a way of responding by the communication partner (Caldwell, 2006; Hart, 2006). However, there are no studies on imitation and deafblind children which involve their parents. There is a need to get more scientific data on the spontaneous use of imitation as well as the possible changes which occur when imitation is used intentionally by the parent. An important part of clinical work is the work with parents because they are normally the most important people for the child and it is the quality of parent-child interaction which plays the most crucial role in language development for a child (Preisler, 2005; Yoder & Warren, 1998). Therefore, more knowledge is needed to support the guidance that is given to the parents.

The main purpose of this study is to describe the characteristics of imitation which are present in the responses given by a child with deafblindness and her parents in interactive play. Another purpose is to explore the characteristics of the child's behaviour when the parents use imitation intentionally in their responses. The context for studying imitation is play because play itself is natural for a child and it is a context in which new communication skills can be easily learned. Moreover, the imitative exchanges between a parent and a child are often imitative games by nature (Rødbrøe & Souriau, 1999). In this study the terms "immediate imitation" and "imitation" are both used when referring to imitation that is demonstrated immediately after the partner's output.

The main research question is: What are the characteristics of imitation in interaction between a deafblind child and her parents? The sub-questions are:

1. What are the characteristics of imitation of a child with deafblindness and her parents during free-play?
2. What are the characteristics of imitation of a child with deafblindness and her parents in play sessions where the parents are instructed to use imitation intentionally as part of their responses?
3. Does the child react to the parents' imitative answers during or after the answers?

The present study exists of two parts. In order to get a comprehensive picture of imitation a literature study was done to illustrate different theoretical perspectives. Essential characteristics of imitation have also been derived from literature. The case study was done to illustrate the characteristics of imitation observed and evaluated in order to find recommendations for clinical practice.

This thesis is divided into six chapters. The first chapter is an introduction to the thesis. Results of the literature study are presented in the second and third chapters. The second chapter explores imitation from different perspectives, whilst the third chapter focuses on issues related to communication and deafblindness. The method used to carry out the study is presented in chapter four and the results of the study are presented in chapter five. Finally, chapter six includes a discussion and reflection on the results.

2. IMITATION

The literature used to form the literature study was collected from the electronic databases of the University of Groningen and the University of Helsinki. The different databases used were EBSCOhost COMPLETE, Educational Resources Information Center (ERIC), Medline, PubMed, Web of Science and PsycINFO. Several search terms were used in the literature study. The search terms regarding imitation were “imitation development”, “imitation and intervention”, “imitation and mirror-neurons”, “imitation recognition”, “parent-child imitation”, “newborns and imitation” and “imitation and play”. The search terms regarding deafblindness were “deafblindness and communication”, “deafblind children and play”, “deafblindness and imitation”, “dual sensory loss and communication”, “deafblind children and their parents” and “children with visual and hearing impairment and their parents”.

The total number of references used for the literature study was 122, including 92 scientific articles and 21 books. The literature study also includes five other references which consist of surveys, conference proceedings and NUD publications. The core content of the literature study was collected from the literature list and other materials of the master’s program in communication and congenital deafblindness. This literature includes 17 references.

Theories define a framework for our thinking and we also use them to understand imitation and language development in general. Therefore, it is natural for theories to be visible in clinical applications (Meltzoff, 1999). It is important to explore literature regarding imitation that is written by people from many different scientific fields in order to gain a comprehensive picture of the topic and to be able to understand it from different theoretical perspectives. This is the aim of the following chapters. In the first chapter, the neural basis of imitation is explored. This perspective is discussed as part of the literature study because neuroscientific research regarding mirror-neurons has widened knowledge about how the brain functions and this knowledge is an important basis for understanding imitation and the possible effects of imitation when used as a strategy to enhance communication.

Imitation is also explored from the traditional point of view, which provides a cognitive perspective of imitation. This perspective was included in the literature study because it gives important knowledge regarding the development of imitation. In the following chapter the role of imitation in early parent-infant interaction is discussed. This perspective is consistent with theories such as the Transactional Model (Sameroff & MacKenzie, 2003) or Dialogism (Linell, 2001, 2009; Marková, 2006). The role of imitation in early parent-infant interaction is discussed in the literature study because it enables one to understand the function of imitation in reciprocal communication. The last perspective concentrates on aspects of imitation in communication interventions. This perspective is used as part of the literature study because it gives knowledge as to why and how imitation has been used as a strategy to enhance communication and what the results have been.

There have been attempts to explore and also combine information related to the above mentioned theoretical perspectives on imitation. For example, it has been questioned whether or not the different forms of imitation have the same mechanisms (Nagy, 2006, see also Piaget, 1951, p. 11). It has been proposed that the mechanism is the same and that there is a continuum in imitative behaviours of infants (Nadel et al., 2004). However, it is good to keep in mind that there is still some clear controversy regarding the theoretical understanding of imitation (Heyes, 2001), and this makes unifying the different perspectives difficult in some respects. There is indeed, a need to get more data from longitudinal studies about the changes and features of imitation in early childhood to enable a deeper understanding of the origins and functions of different kinds of imitative acts (Nagy, 2006). Increasing the number of neurological studies will also widen knowledge regarding imitation in the future.

2.1. The neural basis of imitation

When Meltzoff and Moore (1977) made the remarkable discovery that infants' in fact did have the ability to imitate facial gestures, it was in contradiction with that time's prevailing understanding of imitation and child development (see Piaget, 1951, p. 19). It was thought that infants are not able to imitate, and the ability of imitation develops gradually as the child grows up (Meltzoff, 2002). Instead, Meltzoff and Moore (1977) showed in their study that 12 to 21-day-old infants were able to imitate tongue protrusion, mouth opening, lip protrusion and sequential finger movement. This suggested that there was an innate ability to imitate. The discovery caused speculation and criticism (see Heyes, 2001; Jacobson, 1979) and encouraged other fields of science to do further research.

Later on, another significant finding connected to imitation was discovered by neuroscientists di Pellegrino, Fadiga, Fogassi, Gallese and Rizzolatti (1992). It has also been suggested that this finding contributed to the understanding of how a newborn baby learns the ability to imitate (Iacobono et al., 1999; Nagy, 2006; Rizzolatti et al., 2002). Di Pellegrino et al. (1992) found that monkeys have specialized neurons in their premotor cortex that are called "mirror-neurons". Mirror-neurons became active if the ape made goal directed movements by hand. Similarly, the mirror-neurons discharged if the monkey only observed the experimenter performing meaningful hand movements such as grasping, placing and manipulating objects (Rizzolatti et al., 2002). However, mirror-neuron activation after observing an action didn't necessarily lead to the execution of the action (Rizzolatti, Fadiga, Gallese & Fogassi, 1996).

Also humans have a similar mirror neuron system which codes observed and executed actions. Even though direct evidence is lacking, there are numerous neurophysiological and brain imaging studies which indirectly illustrate the existence of a mirror-neuron system in humans (Rizzolatti, Fabbri-Destro & Cattaneo, 2009). The human mirror-neuron system has been found to have more specialized features than the ones in monkeys. Mirror-neurons activate in humans when meaningless actions or movements forming the action are perceived, unlike in apes. The mirror mechanism is found in areas of the brain which code observing and the feeling of emotions (Dapretto et al., 2006) as well as in Broca's area of the brain, which is responsible for language processing (Fadiga, Craighero, Buccino & Rizzolatti, 2002).

In summing up the previous findings, mirror-neurons make it possible to relate to each other on a neural basis without cognitive efforts. The actions of the other communication partner are automatically coded as messages in each individual's brain (Rizzolatti & Craighero, 2004). This kind of "resonance" makes it possible to code pictorial or kinematic information of the perceived action as internal motor representations. There has also been speculation and studies regarding other functional meanings of mirror-neurons. Researchers have suggested the functional role of mirror-neurons is related to action understanding, imitation, and automatic understanding of actions and intentions of other people (Dapretto et al., 2006; Gallese, 2006; Iacoboni et al., 1999; Rizzolatti & Craighero, 2004; Rizzolatti et al., 1996). In children with autistic spectrum disorders functioning of the mirror neuron system, found in the frontal component, has been found to be abnormal (Dapretto et al., 2006; Rizzolatti et al., 2009). This abnormality has been suggested to be one of the core deficits of autism, because the frontal component of the mirror-neuron system is considered to make emotional understanding possible when it interacts with the limbic system (Dapretto et al., 2006).

How could the concept of mirror mechanisms be understood and used in interventions? Some results already give hints about the possibilities. For example, it has been found that activity within the brain is larger when an individual makes an action and observes another person making an identical action than when he or she makes only the action without observation (Iacoboni et al., 1999). There have been positive results found in motor rehabilitation studies where the concept of observing movement has been taken as part of the training protocol. The results suggest that the mirror neurons play an important part in recovery and motor learning (Ertelt et al., 2007). From a communications point of view, it has been found that imitation as a way of response has many positive effects on interaction (Astell & Ellis, 2006; Caldwell, 2006; Dawson & Galpert, 1990; Hart, 2006; Sanefuji et al., 2009; Zeedyk, Caldwell & Davies, 2009). It has been suggested that in children with autism spectrum disorders the experience of being imitated could help activate the mirror neurons, which leads to improvements in interaction (Sanefuji et al., 2009). More studies are needed to gather a deeper understanding of mirror neuron functioning where imitation is used as a way of response in communication.

2.2. Traditional view: Imitation as a developing ability

The traditional view of imitation as a developing ability refers to the theory and findings of Piaget (1951) among others. According to this view imitation is a skill that children learn. This means that it is absent in newborn babies (Heyes, 2001; Jacobsen, 1979; Piaget, 1951, pp. 5-6). Imitation is understood to be intentional and linked to the understanding of the model. Piaget (1951) concentrated on describing the changes that emerge when an infant develops the skill of imitating. His focus was on the child rather than the parent-infant dyad. After Piaget, others such as Nadel et al. (2004) studied developmental changes in imitative skills from a wider theoretical perspective which sees imitation not only as learning but also as communication (see also Nadel, 2002).

Piaget (1951) argues that the skill of imitation develops through stages and these stages interact with the development of sensory-motor intelligence. He found that his own infants made first attempts to imitate at the age of two months, after he had imitated the sounds of the infants. Piaget calls this kind of imitative behaviour mutual imitation. Similarly, Nadel et al. (2004) found that infants of two-months-old were able to imitate their mothers and most of the imitations were head movements. The authors did not describe if the imitative acts occurred after mothers' imitative answers. Later on, three-month-old infants imitated different head positions and face movements of their parents.

Piaget (1951, pp. 18-19) found that infants between four and eight months old could imitate an adult's actions, however, the imitated sounds or hand movements were always part of the infants existing repertoire. In the study of Nadel et al. (2004) infants were able to imitate not only familiar actions (pushing and pulling an object, rolling etc.) but also unfamiliar actions (tearing paper etc.) after six months of age. Instead, Piaget (1951, pp. 32-34) found that infants were only able to imitate new actions from about the age of nine or ten months. Later on children demonstrated that they had improved their ability to imitate as it was now possible for them to imitate when the model had been absent for some considerable time. Piaget (1951, p. 62) calls this kind of imitative behaviour *deferred imitation*.

Nadel et al. (2004) suggest that as infants are imitators from the start, they are also imitation recognisers. They found that reciprocal imitations produced by two-month-old infants were the first sign of being imitated by the mother. At the age of five months, infants reacted to the

parent's imitations by laughing. By the age of seven months, infants showed their attention of being imitated by stopping their own activity and alternating attention between themselves and the communication partner and waiting for the partner's activity while they were still. From the age of nine months on infants were able to monitor imitative acts and they test adult's intentions. They also started taking a more active role in initiating imitative rounds with their parents.

Imitation is widely recognised as an efficient way to learn new skills. Similarly, imitation has been seen as an element of teaching from different theoretical perspectives. One of the well-known theories using imitation as a method of teaching is behaviourism. One principle of behaviourism is stimulus-response. This means that the behaviour of a person is affected by the environmental stimuli, and changes in the stimuli causes also changes in behaviour (Skinner, 1972, p. 26-27). For example, a child can be asked to imitate the actions of an adult and if she or he makes an appropriate matching response, the child is rewarded. This is considered to support learning (Bandura, 1971). This behaviouristic perspective of imitation is narrow and therefore it cannot be considered as an ideal way to illustrate the role imitation plays in learning. Rather, the role of imitation in pedagogical methods and therapeutic approaches should be explored from wider theoretical perspectives. This way imitation can be used in the most appropriate way.

2.3. The role of imitation in forming reciprocity and the basis for language development

Newborn babies have an innate capacity to relate to other human beings. It has been found that they have a preference to look at human face-like pictures rather than other pictures (Umiltà, Simion & Valenza, 1996) and they listen more eagerly to the voices of their mothers than to other female voices (DeCasper & Fifer, 1980). Infants do not only observe adults, they also make initiative expressions and respond to their parents. This can be found in their actions from the start (Nagy, 2006; Trevarthen, 2011). The responses given by infants can be, for example, an increase in sucking behaviour (DeCasper & Fifer, 1980), patterns of body expressions, (Trevarthen, 1979) or imitations of an adult's facial gestures (Heimann, 1989; Melzoff & Moore, 1977). Nagy and Molnar (2004) found that besides responses, newborns made also initiatives by producing previously imitated gestures and waited for an adult to respond. The human being as a newborn is already an active partner in interaction and having an intersubjective mind (Trevarthen, 2011).

How a parent acts with an infant has a significant effect on the development of the child. Normally parents intuitively know how to do this in an appropriate way. Parents interpret immature actions and responses of an infant as intentional and having motives (Stern, 1985, p. 43). Parents also use a gentle voice, repetitions and musical elements when they talk to their child, known as so called “baby talk”. When capturing the infant’s attention parents become attentive and they often observe more about their baby than talk (Trevvarthen, 1979). This is important because by giving infants an active role in interaction, parents support the development of reciprocal communication.

In reciprocal communication both of the partners can be initiators and responders (Bronfenbrenner, 1977; Rødbroe & Souriau, 1999). Their behaviours complement each other and a change in either of the partner’s behaviour can affect the behaviour of the other (Green, Gustafson & West, 1980). Infants have been described as being very sensitive to their mothers’ responses. In a study by Tronick, Als, Adamson, Wise and Brazelton (1978) infants between 2 and 20-weeks-old were very sensitive to perceive changes in parent behaviour. If the adult acted in an unresponsive way by posing still face during interaction, the infant reacted by showing distress or tension.

Parents also support the active role of the infant by imitating the actions and sounds of the child (Trevvarthen, 1979). In these imitative games infants learn about another person and see that this person is similar to them (Meltzoff, 1999; Zeedyk, 2006). The likeness helps the communicators relate to each other and in this way imitation also makes it possible to receive and express sympathetic awareness. One of the most important functions of imitation in the early phases of human life is that it enhances sensitivity to social cues (Heimann, 1989) and enables reciprocal mental and emotional relating for both the parent and child (Nagy, 2006; Papousek & Papousek, 1989; Trevvarthen, 2005). Zeedyk (2006) calls this kind of mental relating “emotional intimacy”. She argues that emotional intimacy has transformative effects on the development of the child, because it is through emotional intimacy that the sense of self arises. The shared emotional experiences are also crucial for more advanced skills such as joint attention to develop (Hobson, 2005).

Thus, imitation seems to be an innate capacity for both infant and the parent, giving them the ability to express and respond to each other. It also seems to be very intersubjective in its nature in terms of connecting individuals to each other. Being an innate capacity, imitation

places itself as one of the main and foundational elements of human psychological, social, and language development. Imitation can also be considered as a form of parent sensitivity towards their child's expressions, because it is the expression of the child that the parent focuses on by imitating it. Furthermore, it has been found that parents who are sensitive, able to interpret and respond to the motives and feelings of their children have securely attached children (Koren-Karie, Oppenheim, Dolev, Sher & Etzion-Carasso, 2002). Securely attached children have trust in their parents, themselves and the world in general.

It has been found that the early imitative exchanges between parent and infant enhance the development of communication skills. For example, the rate of imitation in newborns has been found to correspond with the use of gaze in social interaction at three months (Heimann, 1989). Furthermore, Papousek and Papousek (1989) found that vocal imitations and models produced by mothers promoted pre-linguistic vocal development and early forms of communication in infants. Meltzoff (1999, 2002) emphasizes the important role of imitation as a basis for developing other capacities such as empathy, theory of mind and role-taking. Imitation makes it possible for an infant to see other people as alike and later children learn the same concept on a more abstract level when they realize that other people have intentions and thoughts which are different from their own. In summary, it seems that imitation facilitates the development of communication skills from an early stage when it is exhibited innately or intuitively. Moreover, imitation can be an efficient way of learning when the child grows up and uses it consciously to learn new skills.

2.4. Interpersonal perspective: The role of imitation in dialogical communication

When imitation is used as a way of response in communication, the theoretical basis is built on theories that underline the importance of interaction and "the other" in communication. One of the theories emphasizing these elements is *dialogism* (Linell, 2001, 2009; Marková, 2006). Dialogism is a theoretical framework of language, communication and human action. It can also be understood as a group of loosely linked theories and traditions, *dialogical theories*. For example, Linell (2009) refers to Vygotsky's theory regarding the zone of proximal development as being dialogical in its nature. Dialogism is also a counter-theory to *monologism*, as Linell (2001, 2009) calls it. Monologism has been a prevalent theory of language and communication in western cultures and it closely connects to individualism (Linell, 2009, p. 46). Monologism defines language as a code which is transferred from one

individual to another. It also highlights the information processing model of cognition and the belief that cognition precedes communication (Linell, 2009, p. 37).

Linell (2009) emphasizes that dialogism is not a normative theory which tells how to build up a good dialogue, instead dialogism can be defined as an epistemology for sense-making processes (Linell, 2009, p. 431). The key elements of dialogism are *interaction*, *context* and *other-orientation*. Interaction is understood to always be part of communication and cognition, not only when individuals talk with each other but also in silent reading when a reader is in interaction with the text (Linell, 2009, p. 15). Context is defined as an essential part of discourse and meaning-making. In dialogism context is defined in a way which includes a concrete situation as well as the background knowledge that the individuals have, for example their earlier knowledge about the topic discussed (Linell, 2009, p. 17). The “other”, according to dialogism, can be other persons who are present, so called “generalized others” (others that we relate to in thinking) or “third parties” who are present but not verbally participating in the discourse (e.g., audience or jury) (see also Markova, 2006).

The human being is dialogical from birth and has a dialogical self (Fogel, de Koyer, Bellagamba & Bell, 2002; Linell, 2009; Markova, 2006). The dialogical self consists of different I-positions, which are psychological experiences of sensory stimuli related to the self or interpersonal experiences with other persons. These intrapersonal and interpersonal dialogues are united, and they make the dialogical self of the infant to develop systematically (Fogel et al., 2002). Linell (2009) argues that the innate “other-orientation” is visible, on the brain level, in the functions of mirror neurons which activate when an individual is performing an action or if he notices someone else acting in a similar way. In this context imitation is indeed a dialogical phenomenon. It is one of the first communicative means which both parts of the dyad can perceive and understand. It ties together the utterances of the infant and his or her parent and makes the interaction a kind of proto-discourse from the beginning. Imitation by the parent can be also a way to amplify an infant’s emotions and experiences as a communicator (see Fogel et al., 2002), due to the fact that imitation is said to create and strengthen different I-positions.

Similarly, imitating the expressions of deafblind individuals makes it possible for them to be part of the discourse, even in the moments when they cannot yet respond appropriately or initiate interaction. Sometimes imitative responses can be the only way to respond so that the

deafblind people can experience themselves being listened to. Furthermore, this makes it possible for them to relate to “the other”. It is indeed the role of “the other” that imitation can facilitate to be real and therefore it is often a needed element to increase interaction. This doesn’t mean that deafblind people could not be dialogical. They can have their inner dialogues with “the others” in their mind. However, it is when social interaction with other people occurs that imitation can serve as an efficient tool to connect the two or more parts of the interaction.

Dialogism underlines the interdependence between participants in interaction. This is shown in the utterances which are both *responsive* to the prior parts of conversation as well as *anticipatory* for the possible responses. In this context imitation is also a very dialogical feature of communication. In the interactions of individuals with communicative impairments, responses can be made by imitating their previous utterance. Similarly, the communication partner can use prior utterances of the child as new initiatives, because he or she anticipates that the child can imitate them. This means that the initiative taken by the communication partner has an anticipatory nature. Imitation facilitates the reciprocity of contributions, making them more interdependent (Linell, 2009, p. 179). Later also new elements and surprises can be added to the flow of interaction.

2.4.1. The transformative role of imitation

Caldwell (2006) uses the term “learning the language of our partner” when talking about imitation. By doing this she draws attention to the ability of a communication partner to focus on the form of expression that is meaningful to children with deafblindness or other severe disabilities (see also Hart, 2006). When the partner enters that language through imitation, it can be used to building up a relationship and reciprocal confidence. By doing this, imitation works as a key to the people we would like to communicate with (Caldwell, 2006; Trevarthen, 2005).

Imitation is an effective way of responding (Rødbrøe & Souriau, 1999). It creates curiosity about the communication partner (Sanefuji et al., 2009; Thelen, Dollinger & Roberts, 1975; Zeedyk, 2006), attracts attention (Hart, 2006), and increases reciprocal imitation (Thelen et al., 1975). Imitation is also a way to attune to each other and by tuning into each other it is possible to share emotions and experience joyful moments of togetherness (Caldwell, 2006).

It is imitation's ability to bring people together which makes it possible to have positive experiences of communication. This motivates both of the partners to relate to each other. Another powerful aspect of imitation is that it allows a leading role for the child who is being imitated. When an adult follows the child by imitating him or her, the child can regulate the interaction so that it does not become too complex for him or her (Dawson & Galpert, 1990).

Hart (2006) argues that when interacting with persons with deafblindness, imitative dialogues can become a way of recognizing each other. When a person with deafblindness and his partner frequently use similar patterns of interaction, those patterns can become a way of greeting each other. An imitative dialogue also naturally creates a basis for turn-taking, which is essential for communication. In these dialogues both of the partners can influence each other. Variations in the messages are important when introduced at the right time, because they keep the interaction interesting for the deafblind child (Rødbrøe & Souriau, 1999). By sending and receiving messages both of the partners also learn which aspects can or cannot be shared (Zeedyk, 2006). Furthermore, shared understanding is vital for more complex messages to develop (Hart, 2006).

Imitation also affects communication partners in a positive way. After performing an imitative act, communication partners have been described to smile, make eye contact and express themselves more spontaneously (Astell & Ellis 2006; O'Neill & Zeedyk, 2006). The reactions might tell something about the feedback that they received from the persons with communicative impairments. These experiences have a crucial meaning, giving them trust in their own abilities as competent communication partners.

2.4.2. Imitation in communication interventions

Imitation has been used in many interventions or therapeutic approaches either as a main element or as part of a process. Positive results have been reported in studies where imitation was used with people with deafblindness, severe learning difficulties, autism or dementia (Astell & Ellis, 2006; Caldwell, 2006; Dawson & Galpert, 1990; Gazdag & Warren, 2000; Hart, 2006; Sanefuji et al., 2009; Zeedyk et al., 2009). Imitation is useful as a therapeutic approach with these groups because it has been described to be effective with children and adults with wide ranges of cognitive and social skills (Dawson & Galpert, 1990; Zeedyk et al., 2009).

Imitation draws attention to the important roles of a communication partner such as making contact and sharing experiences with a child with deafblindness. This focus has been prevalent in the field of deafblindness over the last few decades (Hart, 2006; Rødbroe & Souriau, 1999). Nafstad and Rødbroe (1999) describe an approach called Co-Creating Communication, which focuses on the competences of the communication partner, shared experiences and meaning negotiation in supporting communication between a deafblind child and his communication partner. Other imitation focused approaches described in the literature are Intensive Interaction (Nind & Hewett, 2005), Reciprocal Imitation Training (Ingersoll & Gergans, 2007; Ingersoll & Schreibman, 2006), and Floor-time Approach (Greenspan & Wieder, 2006).

Descriptive studies on deafblind individuals report many positive changes in interaction as a result of imitative exchanges. Caldwell (2006) describes a case where a deafblind man reacted to imitation by laughing aloud. In his case the staff hadn't ever heard him laugh before. Hart (2006) also describes a deafblind man who responded to imitation by hugging the communication partner. Zeedyk et al. (2009) report similar results in adults with profound learning disabilities, who showed positive emotions when being imitated. The results of the study also showed that the use of eye gaze, bodily orientation and proximity to partner increased as a result of imitative answers. In children with autism, imitation has been found to support the use of eye contact, (Dawson & Galpert, 1990) spontaneous imitations, (Ingersoll & Gergans, 2007, see also Gazdag & Warren, 2000) language, and joint attention skills (Ingersoll & Schreibman, 2006). Positive effects have also been found in the play skills of the children studied. Imitative responses have shown to increase the number of toy changes, different actions with toys (Dawson & Galpert, 1990) and engagement in reciprocal play (Field, Field, Sanders & Nadel, 2001). Imitation by the communication partner has also supported the development of pretended play behaviours (Barton & Wolery, 2010; Ingersoll & Schreibman, 2006).

Some studies have compared the results of contingent and imitative responses (Heimann, Laberg & Nordøen, 2006; Sanefuji et al., 2009). When using contingent response, the adult answered immediately to the child's expression, but without using imitative behaviour. It was found that imitative responses elicited more looks at the adult from the child than contingent responses. Imitative responses also triggered more requests from the child and increased proximity between the partners (Field et al., 2001; Heimann et al., 2006). Moreover, imitative

responses have been found to enhance more joint attention behaviours when compared to contingent responses (Sanefuji et al., 2009).

Thus, imitation has been found to improve the quality of interaction, sometimes dramatically. The effects of imitation are not only visible in the qualitative changes of interaction, but most likely also in the brain function. Neuroscientific knowledge regarding the plasticity of the brain gives a basis to argue that experience shapes mind, brain and body (Diamond & Amso, 2008). The use of imitation as a therapeutic approach is also based on the underlying theory that imitation plays a significant role in learning aspects of oneself in relation to other people, known as “seeing other people like me”. This is crucial to develop representational and pretended skills (Nielsen & Dissanayake, 2004).

3. INTERACTION BETWEEN DEAFBLIND CHILDREN AND THEIR PARENTS

In the following chapters the focus is on exploring literature regarding interaction and play between deafblind children and their parents. The text is written from the perspective of totally blind and deaf infants. However, children with deafblindness often have some residual vision and/or hearing which can be used in communication and exploration of the environment (Andersen & Rødbroe, 2003). Despite individual differences, dual sensory impairment causes challenges in communication for all children with deafblindness and their communication partners.

3.1. The point of departure for parenting and language development

When a disabled child is born, the life of parents and the whole family is affected. It has been found that having one sensory disability, for example deafness, can have a profound impact on family life (Jackson & Turnbull, 2004). When an infant has multiple disabilities, the impact is multiplied. Hintermair (2000) found that parents of children with hearing impairments and additional disabilities experienced more stress than parents of children, who had only a hearing impairment. The scores for interactive stress was especially high. These results indicate the situation for the parents of deafblind infants (see Chen, 2004). Indeed, the psychosocial support for parents should be extended (Holte et al., 2006; Preisler, 2005). The support should cover not only communication, but also other issues that parents find challenging to deal with.

The dual sensory impairment makes early language development for deafblind infants very exceptional. Blind children can typically develop spoken language and deaf children can develop sign language. However, deafblind children cannot access either of these languages naturally. This is especially true if their dual sensory impairment is congenital and severe. Besides hearing and visual impairment, deafblind infants can have additional disabilities such as a developmental disability, physical disability or autism (Hoevenaars-van den Bloom, Antonissen, Knoors & Vervloed, 2009). In some cases additional difficulties can result from a dual sensory impairment. For example, it has been found that cognitive function and communication skills are interrelated in deafblind persons (Dammeyer, 2010). If an infant with deafblindness has had even a short period of normal sensory use and interaction with his or her parents before becoming deafblind this time can provide an important basis for language development, as can be evidenced by reading about Helen Keller who became famous for being a fluent user of different language modalities despite her disabilities. However, similar achievements are not typically seen in children with congenital deafblindness (Vonen & Nafstad, 1999).

The sense of touch is most often intact for infants with deafblindness and therefore a big part of their learning is done through the tactile modality. Theoretically, the possibility of naturally developing language through the tactile sense is the same as developing it through vision or hearing and indeed tactile forms of sign language and spoken language are used with people with acquired deafblindness (see Mesch, 2001). However, a congenitally deafblind child doesn't normally have a tactile sign language environment, where the natural tactile sign language development in a strict linguistic sense could occur. As a result, tactile sign language has never been described to emerge spontaneously (Vonen & Nafstad, 1999).

Having a dual sensory impairment significantly hampers learning through observation, both auditory and visual. This means that the challenge of learning and communication is enormous (Marks, 1998). However, deafblind infants can overcome this challenge by acquiring language through a communication partner who is willing to develop an ability to share tactile experiences with them and see the world from a tactile perspective (Hart, 2008; Vege, 2004). It is widely understood, that developing communication skills in deafblind infants depends strongly on the skills of their communication partners and this knowledge is the basis for clinical work in guiding parents and educators (Daelman et al., 1993; Dammeyer,

2010; Hart, 2003, 2008; Janssen et al., 2002, 2006; Nafstad & Rødbroe, 1999; Rødbroe & Souriau, 1999; Vege, 2004).

3.2. Building up interaction and communication

Dual sensory impairment makes the early interactive and sensory experiences atypical for deafblind infants. Having a hearing impairment makes it hard or even impossible to hear voices of the parents. Similarly, the lack of eye contact doesn't allow deafblind infants to look at their parents' faces, make an eye contact or perceive facial gestures or emotional states of their parents as infants typically do (Fraiberg, 1979). However, infants with deafblindness seem to have the same kind of interest in their parents' face as typically developing infants, if the adults use touch or airflow as a part of their expressions when interacting with their infant (Rødbroe & Souriau, 1999). Indeed, the role of touch as a compensatory strategy and the use of residual senses become crucial from the very beginning (Daelman et al., 1993; Rødbroe & Souriau, 1999).

Not only deafblind infants but also their parents face extreme challenges in communication. This becomes evident when the parents try to distinguish the actions and expressions of their infants. Blindness can make the infant seem uninterested in their parents because the visual impairment prevents them from reacting with a smile when seeing their parents. Consequently, parents of deafblind infants often have difficulties when trying to read their infant's affective states, easily misinterpreting them (Fraiberg, 1979). The initiatives of the child can also be easily missed (Preisler, 2005; Vervloed et al., 2006). The actions and expressions of infants with deafblindness can look different, but it doesn't mean that the expressions are not communicative or do not have many functions (see Nafstad & Ask Larsen, 2004; Peltokorpi & Huttunen, 2008). For example, getting the contact by touching a parent with a foot can have the same meaning as eye contact for a typically developing child (Daelman et al., 1993; Nafstad & Rødbroe, 1999, p. 20). This makes interaction challenging as parents of deafblind infants cannot communicate with their infants based on intuition in the same way that parents of typically developing infants do. They often need to be advised regarding what kind of expressions they need to look for (Daelman et al., 1993).

Responding to the infant with deafblindness can be challenging for parents. The typical ways of responding by gazing or talking are often not possible for a deafblind infant to detect and

therefore the answer of the parent must be translated into a “tactile language” (Hart, 2003). For example, if a deafblind baby is moving his or her hand, the parent can repeat imitatively the movement by holding the hand of the infant. This way the deafblind infant notices through a tactile channel that he has been “seen” and he learns that by being active it is possible to affect another person’s behaviour and share joy (Daelman et al., 1993). Proximity between a parent and an infant is important for the use of tactile communication. If the deafblind infant and his parent are too far from each other, the distance can make communication vulnerable or even worse prevent it (Vervloed et al., 2006). However, it is also important to allow deafblind children to decide how close they want to be to their communication partner (Rødbroe & Souriau, 1999).

Deafblindness can cause a number of typical features in a child’s behaviour. For example, infants with deafblindness can be less active in regard to making initiatives than typically developing infants. They also often have some kind of self-stimulatory behaviour because they lack the input of visual and auditory sensation (Andrew, 1989). Furthermore, their ability to respond or process information takes more time (Chen, 2004; Narayan & Bruce, 2006; Vervloed et al., 2006). This can result in the parents becoming overactive in an attempt to compensate for the child’s lack of participation. If a parent continuously takes a domineering role in the conversation, the active participation of the child decreases more easily. Finally, this can lead to unnecessary passivity or developmental delay (Daelman et al., 1993). Furthermore, if the experience of interaction for children with deafblindness is of the kind where they have no impact on the outcome, they are at risk of developing learned helplessness (Marks, 1998). To avoid the passivity of the child, the communication partner can allow him/herself to be led by the deafblind child (Hart, 2003). He or she can also interpret purposefully the actions, interests and expressions of the child meaningful and communicative (Rødbroe & Souriau, 1999).

The development of various pre-verbal communication skills during the first year of life is the basis and a prerequisite for developing symbolic language, either spoken or signed (Lock, 1999; Rødbroe & Souriau, 1999). This basis is the same for typically developing infants and infants with deafblindness. However, children with deafblindness often only develop limited symbolic language skills (Bruce, 2005). This means that it is difficult for them to learn to understand or express symbols of cultural languages. However, lacking skills to understand symbolic systems doesn’t mean that deafblind children are lacking a symbolic mind (A. V.

Nafstad, personal communication, October, 2010). Children with deafblindness can create different gestural and bodily expressions during pleasant and motivating interactive situations. These expressions have a potential to develop more and more symbolic when they are shared during interaction (Nafstad & Rødbroe, 1999, p. 27).

Clinical work and research has widened the knowledge of the characteristics involved in the communication of persons with deafblindness. It has also emphasized the importance of communication partners. Infants with deafblindness need the same kind of interactive experiences with their parents as children with typical development (Preisler, 2005). The encounters of parents and deafblind infants are often challenged with difficulties in relating to each other, but what matters most for an infant with deafblindness is perhaps not the complete understanding but the experience of a listening parent – a parent who is showing his or her willingness to listen and understand the child despite of the difficulties. This experience can have a crucial impact on the development of *communicative agency*, the sense of a communicative self that is worthy. Having a resilient communicative agency is a strength that helps a deafblind person through his or her life. It helps the deafblind person to be a persistent participant in dialogues even when the encounters are challenging due to misunderstandings (Nafstad, 2010).

3.3. Multiple functioning of the hands

The hands of children with deafblindness are used for many different functions such as listening, thinking, exploring, talking, sharing attention, and babbling etc. (Daelman et al., 1993; Miles, 2003; Rødbroe & Souriau, 1999). The hands of a deafblind person replace many functions of the eyes and ears (see also Nafstad & Rødbroe, 1999). Miles (2003) argues that the way deafblind children use their hands is related to the interactive experiences with their parents. Therefore, it is important that parents receive advice regarding how to encourage their infants to use hands for different functions. It is also important for parents of deafblind infants to understand that every time they touch their child it has a communicative meaning. Hands can be used for many interactive purposes. Parents of infants with deafblindness can imitate the hand actions of their infant the same way as the parent of typically developing infants imitate vocalizations and face expressions. Imitation of hand actions encourages infants with deafblindness to use their hands as a voice (Miles, 2003). This kind of babbling

with hands can also become an interactive play between deafblind infants and their parents (Rødbrøe & Souriau, 1999).

Inviting infants with deafblindness to first explore their own body with their hands, and then the face and the body of the parent, will add to their curiosity for exploration of environments later in life. Moreover, parents should be advised to pay attention to the hands of their infants and learn to read them, because the hands of deafblind infants tell about what the person is paying attention to and how they feel about things. Typically this would be expressed by the facial gestures. Parents can also share the exploration experience with their infant by moving their hands under the hands of the infant. By doing this the infant can easily take the hands away if he wants to. Sharing explorations together is important for the child in that it helps them to develop joint attention skills (Miles, 2003).

The use of tactile information helps to develop neural functioning. It has been found that the visual cortex which normally processes visual information takes on new functions and processes tactile perceptions in blind individuals (Cohen et al., 1997). However, processing most of the information in a tactile way takes more time, hence, deafblind children need to be given the possibility to act in their own rhythm so that they can optimally participate in activities (Daelman et al., 1993).

3.4. Characteristics of play in infants with typical development and infants with deafblindness

Play is an important element for development. It is a context where communication, cognitive, emotional and social skills are learnt (Nafstad & Rødbrøe, 1999, p. 25; Rødbrøe & Souriau, 1999). The ability to play also develops gradually (Bakeman & Adamson, 1984; Belsky & Most, 1981; Belsky, Goode & Most, 1980; Largo & Howard, 1979; McCune, 1995; Slade, 1987). It has been found that play skills predict later language skills (Bates, Benigni, Bretherton, Camaioni & Volterra, 1979). Most of the studies done regarding play and children with typical development are concentrated on different phases of play development (Largo & Howard, 1979; McCune, 1995), or on the relationship between language and play development (McCune, 1995; Ogura, 1991). Only a few studies have focused on exploring the early phases of play development in children with typical development. Even less studies have been completed regarding the characteristics of play in children with deafblindness.

In the early phases of infant development, interaction and play are so intertwined that it is difficult to analyse them separately. Indeed, the earliest form of play is a social-interactive play between an infant and his or her parents. In this play both parts of the dyad affect to each other. Parents have a tendency to get their infants to participate in games to their optimal level at each age (Belsky et al., 1980; Crawley et al., 1978; Green et al., 1980). It has also been found that when a mother is participating in the play, the child exhibits more advanced play skills than in sessions where the child plays alone (Slade, 1987). Crawley et al. (1978) found that the mothers of four-month-old infants preferred tactile games with simple stimulation such as tickling, but when the infants were eight-months-old more conventional play types with motor models were preferred (e.g. clapping hands, saying pat-a-cake, waving bye-bye).

Similarly, parents of children with deafblindness can create conventional plays based on their child's behaviour and interests. For example, when an infant is moving the head, the parent can create a "kissing game" by kissing the other cheek of the infant and prompting the baby to turn the other cheek to get another kiss (Chen & Haney, 1995). The interests of the child can be used to build up reciprocal play. The interests can be various, often including some tactile element such as water (Kono & Oda, 2005). Sounds are also often used in turn-taking games between deafblind children and their parents (Preisler, 2005).

Miles (2003) argues that the games played by children with deafblindness and their parents can include the use of their hands and these games can increase the development of babbling. This is similar to typically developing infants who develop babbling through vocal games played with their parents. Many body games and nursery rhymes already have a tactile structure (e.g. round and round the garden), this creates the basis for referential gestures (Nafstad & Rødbroe, 1999). Furthermore, imitating the actions of infants with deafblindness is a good way to build up interactional plays where turn taking can emerge. Parents can create variations and surprises in these games and elaborate them (Miles, 2003; Rødbroe & Souriau, 1999).

Exploratory play is one of the early forms of play in typical development and it is illustrated by mouthing and manipulating objects. Explorative play is a way for infants to receive information about their environment and it has been found that there are developmental changes in the ways in which children explore objects (Ruff, 1984). It has also been argued that forms of exploratory play are a prerequisite for more advanced play skills to develop

(Belsky & Most, 1981). Ruff (1984) found that duration of mouthing decreased in 6-, 9-, and 12-month-old infants, whereas fingering of objects increased with age (see also Belsky & Most, 1981). Ruff (1984) also found differences in the characteristics of mouthing in infants between 6-months-old and 12-months-old. She proposes that mouthing can have a different function at different ages. Furthermore, Ruff found that infants manipulate different kinds of objects in different ways. For example, infants used fingering to explore changes in the texture of objects and rotating to explore changes in shape.

Infants with deafblindness can lack spontaneous motivation to explore objects and environments because of the lack of information received through visual and auditory senses (Marks, 1998). However, they can use haptic perception (the sense of touch) and smell to explore objects and their environments (Narayan & Bruce, 2006). It has been found that there is more diversity in haptic exploratory strategies for children with visual impairment and additional disabilities than in typically developing children (McLinden, 2004).

Because the use of touch has a crucial role in exploratory play for children with deafblindness, adults have an important role which is to provide opportunities for haptic learning experiences. Indeed, Murdoch (1994) argues that for a deafblind infant to be active in exploring his environment, it must be accessible to him. It is important to follow the infant's lead in play and focus on the behaviours and objects that the infant likes. For example, when children with deafblindness become interested in exploring objects, adults can pay attention to their interests by giving them possibilities to explore similar, but slightly different toys (Miles, 2003; see also Recchia, 1997). Facilitating an infant's need to actively explore and providing them with opportunities for new experiences is important because it enables infants to build up their conceptual understanding of the world (Chen, 2004; Recchia, 1997). Moreover, Marks (1998) argues that it is especially important to connect exploration with communication to enhance concept development.

The play development of infants is connected to the development of coordinating attention to people and objects. Bakeman and Adamson (1984) studied 6 to 18-month-old infants and they found that the younger infants spent more time engaging with the person without objects when compared to older infants. When the infants became older, they spent more time in sharing passive joint engagement and coordinated joint engagement with the adults. In passive joint engagement an infant and his or her parent is involved in the same object but the

infant is not yet able to have awareness of the adults' involvement, like in coordinated joint engagement. The authors found that object play preceded both of these types of engagements. Similarly, a period when infants only observed action but did not participate in it proceeded passive joint engagement. Mothers had a significant role in inducing their infant's passive joint engagement. Through this behaviour parents can make the object of attention interpersonal and positively affect the development of more advanced attention-coordination skills.

Some changes in play development take place towards the end of the first year of life. Besides exploratory play, infants also start to exhibit *functional play*. In functional play children use objects appropriately in coordination with their own body (drinking from a cup etc.), and it has been found to emerge around 9 to 12 months of age (Belsky & Most, 1981; Largo & Howard, 1979). Interestingly, Largo and Howard (1979) suggest in their study that functional play seemed to be deferred imitation of past events that children had experienced. In children with deafblindness the described play behaviours in literature are often restricted to manipulation of objects. However, Pizzo and Bruce (2010) found that the children with deafblindness in their study were able to connect two objects with each other in an appropriate manner. Similarly, Hoevenaars-van den Bloom et al. (2009) found that the children with deafblindness in their study exhibited some functional play that was seen as a direct imitation of the model.

About the age of 1 ½ years old, functional play develops in a way which means that the children with typical development begin to direct the play behaviours toward another person or doll (Largo & Howard, 1979). This kind of play is called *representational play*. However, it has been found that some children develop representational play before functional play (McCune, 1995). Largo and Howard (1979) studied how children imitated functional and representational play behaviours. They noticed that children only imitated modelled play behaviours if they already exhibited similar behaviours in their spontaneous play. As the play behaviours develop, children begin to substitute objects symbolically, for example by using a stick as a spoon. This kind of play is called *symbolic play* (Belsky et al., 1980; Largo & Howard, 1979). However, there is some variability in the use of terms in the literature. Some researches such as Ogura (1991) use the term symbolic play to mean the play behaviours that other researches define as functional play. In children with deafblindness there can be

symbolic elements of play, but symbolic play where an object is substituted for another is rarely seen (Pizzo & Bruce, 2010; Rødbroe & Souriau, 1999).

Children with deafblindness seem to have challenges in developing symbolic concepts in play and in language (Pizzo & Bruce, 2010). Indeed, play and language both reflects the symbolic ability and mental representation in children (McCune, 1995). It has been found that language development and play development corresponds in infants with typical development from the age of 7 or 8 months onwards (McCune, 1995; Ogura, 1991). For example, the beginning of lexical development is often associated with pretend behaviours in play (e.g. children pretend to drink from a cup). Also in children with deafblindness the language skills have been found to relate to the level of play which the child has developed. Children with deafblindness who exhibit higher levels of play have been found to show more advanced language skills (Finn & Fewell, 1994; Pizzo & Bruce, 2010).

4. METHOD

4.1. Participants

The participants were reached through a contact person, Päivi Vataja, from the Finnish Federation of the Hard of Hearing. She sent an information letter (Appendix A) regarding the study to a family with a child with deafblindness. After reading the information letter the mother of the family contacted the researcher by telephone and a written consent was provided by mail (Appendix B). The inclusion criteria for the study included severe visual and hearing impairments and an early stage of language development (less than 10 spontaneous signs or words in use). Before sending the letter to the parents, a research plan for the study had been approved by the local ethical committee in the Hospital District of Helsinki and Uusimaa. A research permit had also been given for the study from the Hospital District of Helsinki and Uusimaa.

The subjects of the study are a girl with deafblindness and her parents. At the time of the data collection the child was 3 years and 10 months old. The family is Swedish speaking and the girl is the only child of her parents. Both of the parents work during weekdays while the child attends kindergarten. The child has a diagnosis of Trisomy 13. She also has a severe visual impairment and microphthalmia in both eyes. The functional use of vision is restricted to

some light perception and perception of black and white stripes. The severity of hearing impairment is not clear. The child has been found to react to speech and music without hearing aids at 70-80 dB and with hearing aids at 55-65 dB in a free sound field assessment. She has received hearing aids at the age of two years and five months. Besides hearing and visual impairments, the child also had a cleft palate which has been operated on. Additional diagnoses are epilepsy and a congenital heart defect. Motor development of the child is severely impaired. She cannot walk by herself and also needs to be supported when being seated.

The parents reported that the child uses hearing aids throughout the day which has proven to be of great benefit. It is not clear to the parents if the child understands the meaning of some words or sentences. The communicative means used at home are speech and tactile signs. The child may understand some of the signs used and spontaneously uses the sign for “drink”. There are also some objects of reference in use. The child has received communication support from a local centre for persons with developmental disabilities. A communication advisor from the centre has been seeing the child weekly, mainly in the kindergarten.

4.2. Procedure of immediate imitation

When the concept of *immediate imitation* was introduced to the parents no specific approaches, such as intensive interaction (Nind & Hewett, 2005) or reciprocal imitation training (Ingersoll & Gergans, 2007), were strictly followed because the strength of imitation is generally acknowledged in deafblind literature (see Hart, 2006; Nafstad & Rødbroe, 1999; Rødbroe & Souriau, 1999). The basic principles regarding the use of imitation are always very similar, hence, it is clear that the use of immediate imitation in the present study shares many similarities with intensive interaction and reciprocal imitation training.

Immediate imitation was introduced to the parents as follows. The researcher informed the parents about different aspects of imitation, for example, by sharing information about different ways to use imitation as a way of response. The parents were told that almost any movement or vocalisation of the child can be imitated. From the recorded free-play sessions it had been noted that the mother often used vocal imitation spontaneously in her responses. It was suggested that the parents should continue their personal ways of imitating but also try to include tactile elements in their imitative responses.

It was agreed that tactile elements are important when imitating gestures of the child because she cannot perceive typical gestures without tactile elements. Sometimes the researcher gave some advice to the parents during the play, but typically all of the feedback and advice was given before as well as after the sessions. The researcher also showed the parents some concrete examples of immediate imitation when interacting with the child. Furthermore, the parents were informed that when they manage to create turn taking exchanges with the child through imitation, they can also make variations in their imitative responses. This is to keep the interaction interesting. The parents were told that the first variations should be the vocalizations and gestures that are in the spontaneous expressive repertoire of the child and new expressions could be used later on.

At the beginning of each session, the researcher often showed the parents some video clips of the previous sessions which included examples of immediate imitation. Some other video clips of immediate imitation with people with deafblindness were shown to the parents also. Finally, the video clips were analysed together. In summing up all the information to the parents it was confirmed that the parents could use immediate imitation as a “tool” in communication. They were told that they can imitate various actions and vocalizations of the child, but they don't need to imitate everything. It was emphasized that parents can monitor the use of imitation in interaction naturally.

4.3. Design of the study

The study was made as *a case study*. Case studies are typical research strategies when studying individuals with unusual conditions (Cozby, 2009, pp. 115-116). Case studies provide in-depth information regarding the phenomenon studied. As the number of children with deafblindness is limited and the group is very heterogeneous, the use of case studies is a typical research setting (see Janssen et al., 2006; Murdoch, 1994; Vervloed et al., 2006). A case study is a well functioning strategy because it focuses on a phenomenon in context (Robson, 2002, pp. 178-179).

The methods used in this study are both *qualitative* and *quantitative*. Qualitative methods are appropriate for studying behaviours in natural settings and they are often used when the number of participants is small (Cozby, 2009, p. 107). Quantitative methods make it possible to quantify the aspects of communication studied. As the quantitative and qualitative

approaches give a different kind of information, both methods were used to get comprehensive knowledge of the phenomena studied. Indeed, case studies often include both ways of data collection (Robson, 2002, p. 178).

Videotaped play sessions served as the main method of data collection. Videotaping has been found to be necessary in studying characteristics of communication where the individuals have deafblindness (Nafstad & Rødbroe, 1999, p. 13; Vervloed et al., 2006). Without videotaped data it wouldn't be possible to analyse interaction and the specific characteristics of it, because the expressions of deafblind individuals can be very different from typical ones and may not be easy to detect in reality.

The researcher met the family ten times in total and data were collected from nine play sessions (I-II and IV-X). The only time when no recordings were made was the session III when the topic of immediate imitation was introduced to the parents. Recordings were done twice a week, on two consecutive days over a six week period. The child had an ear infection during the period of recording and consequently she could use hearing aids only in the free-play sessions (sessions I & II) and session X. Recordings I-IV and VIII-X were made at the home of the family. Recordings V to VII were made at The Service and Activity Centre for the Visually Impaired in Helsinki (IIRIS), as the family participated in a one week course there. The recordings were done by the researcher using a Panasonic HDC-TM700 Full HD video camera. An external microphone Audio-Technica PRO24-CM was used to ensure good voice quality. The only time when the external microphone was not used was during session V, because that session was videotaped by the pool. During each play session three to five recordings were made, each of them lasting from 2 to 20 minutes.

As one of the aims of the study was to gather information regarding spontaneous use of immediate imitation in interaction between a child with deafblindness and her parents, information regarding the purpose of the study was not given to the parents in the beginning. Specific information about the focus of the study could have affected their behaviour and therefore they were initially only informed that the study would focus on exploring the characteristics of interaction. During sessions I-II the parents were asked to play with their daughter as they normally would. After session II the parents were informed of the purpose of the study so that during the following sessions the researcher could work together with them

to help them use immediate imitation intentionally as a way of response when playing and interacting with the child.

4.4. Data analysis

The recorded samples where the child was communicating most actively were selected for the analyses from the recordings of free-play and play sessions where imitation was intentionally used. Another criterion for analysis was recordings that lasted a minimum of five minutes. Play sessions with objects were left out of the data analysis, because it was noticed that when the child was playing with the objects she was mainly focusing on toys and not interacting with the parents.

Video recordings were made during sessions I-II and IV-X. Recordings from sessions VI and VII were left out of the data analysis, because the child was very tired and fell asleep almost immediately after the recordings had begun. Additionally, the quality of the recordings during session IX was not good due to a bright light providing a shadow over the face of the parent and the child. These recordings were also left out of the data analysis. In summary, one recording from session I, II, IV, V, VIII and X was chosen for the analysis. These recordings lasted from five to ten minutes. The five most active minutes in terms of communication from each recording was selected for the analysis. The six samples totalled 30 minutes of footage for analysis.

Verbal and nonverbal expressions of the parent and the child were transcribed from video recordings and the data were analysed with the help of Windows Media Player software. After transcription, a bilingual (Finnish-Swedish) person checked the text to make sure it corresponded with the recordings. He also gave the researcher a translation of some of the utterances that were not understandable.

4.4.1. Frequencies, modalities and length of imitative answers

In order to explore the characteristics of the imitations (Research Questions 1 and 2), frequencies, modalities and length of imitations were measured by applying a coding system from O'Neill and Zeedyk (2006). O'Neill and Zeedyk used the coding system for studying spontaneous imitation of young people with developmental delay and their adult carers. This system was chosen for the analysis of the present study, because it is clear and flexible

enough to apply when analysing the characteristics of imitation in communication with people with deafblindness and their communication partners.

The first step in the coding system is to identify *imitative bouts*. When one partner imitated vocalizations, gestures or actions of the other, an imitative bout was marked. One imitative bout included an action and imitation of it. Examples of imitative bouts include: 1) the child splashes water with a hand and father imitates the action by splashing the water in a similar way 2) the parent vocalizes and the child imitates the vocalization 3) the child touches the mother's arm and the mother imitates the action by touching the child's arm.

Each imitative bout was coded in the following way.

1. *Imitator*. It was marked whether the parent or the child initiated an imitative bout.
2. *Number of rounds*. The number of complete rounds for imitative bouts was counted. Counting the rounds enabled the researcher to see how many of the imitative bouts lead to further answers by the communication partner and turn-taking exchanges. If an action was imitated once and no further imitations occurred, the length of the bout was one round. A bout having the length of 1 ½ rounds could include vocalization of a child, imitation of the vocalization by the mother, and one more imitation by the child (altogether three turns) etc.
3. *Communicative mode*. The communicative mode of each imitative answer was described. In the original coding system of O'Neill and Zeedyk (2006) only two categories, vocal and physical imitation, were used. In the present study the number of categories was increased to gather more comprehensive information regarding the communicative modes used in imitations.

The communicative mode was defined by the person who initiated the imitative bout. If the imitative bout was long and more than one communication mode was used, the communicative mode that was used in most of the turns was marked. The categories used were 1) vocal imitations, 2) gestural imitations 3) tactile imitations 4) gestural-vocal imitations 5) vocal imitations with added tactile elements 6) gestural imitations with added tactile elements.

Vocal imitations that were marked included imitations of vocalizations, imitative sighs and whispers. Laughter was marked as a vocal imitation only when the laugh-like

sound was intentionally used as an imitative answer. *Gestural imitations* were marked if the partner imitated a gesture, for example head shaking. *Tactile imitations* were marked if the partner imitated the touch of the other. For example, the child could first touch the cheek of the parent and the parent responded by touching the child's cheek in a similar way. *Gestural-vocal imitations* included gestural and vocal elements in the imitative expression. For example, the child could vocalize "hvahvahva" while shaking her head simultaneously and the parent repeated both of the expressions by shaking the head and imitating the vocalization. *Vocal imitations with added tactile elements* occurred if the partner imitated a vocalization and added a tactile element to the imitation. For example, if the child made a flicking teeth sound and held simultaneously her hand in front of her mouth, the parent could imitate the sound by vocalizing and tracing the movement with her mouth onto the child's hand. This way the imitation included vocal and tactile elements. *Gestural imitations with added tactile elements* were marked if the partner added some tactile information to the imitation. For example, when the father imitated the splashing water gesture of the child, he made it in the way that the child could perceive the movement by keeping her hand on his hand.

Some modifications and criteria were added to the original coding system. Firstly, if the parent imitated the pitch of the child's voice but not the vocalization itself, the utterance of the adult wasn't classified to be an imitation. Similarly, if the child was shaking the head and the parent commented verbally "no-no" without shaking the head, the utterance was not classified as an imitation. Secondly, if the child vocalized after a word uttered by the parent the vocalization of the child was not classified as an imitation, even if the tone of the voice was similar to the parents.

This might have limited the amount of imitations of the child, but the criteria was used because otherwise it would have been very difficult to define which of the imitations of the child are similar enough to the target words of the adult to be classified as imitations. Thirdly, if the partner made two or more imitations successively and the time between repeated imitations didn't exceed three seconds, the long imitative answer was counted as one imitative turn. The only exception was session V which took place by the pool. As almost all the activity was splashing water, it was possible to define turns only by detecting visible pauses in

splashing. It could be that there was not a pause of three seconds between the turns, but the turns were still analysed as different turns if there was some visible pause in splashing.

An imitative answer was required to occur within three seconds of the initial behaviour to be classified as an imitation. Similarly, if the imitative answer led to turn-taking, each imitative turn was required to appear within three seconds of the previous turn to be taken as a part of the imitative bout. The time limit for an imitative answer to appear was one second longer in the present study than in the original coding system of O'Neill and Zeedyk (2006). A longer time limit was chosen because observations of the videotaped data showed that three seconds was often needed before an imitative answer of the child appeared. Even though the time limit is longer than in the original coding system, it is possible that some of the answers didn't fit into the criteria because they appeared after three seconds of the initial behaviour. However, a new imitative bout was marked if the delayed answer of the child got an imitative response from the parent or vice versa. Moreover, it was defined that clear changes in the content of the utterance made a new imitative bout begin, even if they appeared within three seconds from the last imitative turn. For example, if the child made a sound first such as /aaaa/ and in her following turn a smacking sound and both of the vocalizations were imitated by the mother, these imitations were marked as two separate imitative bouts.

4.4.2. Effects of immediate imitation on the child's behavior

In order to explore the effects of immediate imitation on the child's behavior (Research Question 3), the coding system of O'Neill and Zeedyk (2006) was applied. O'Neill and Zeedyk studied the occurrence of four social behaviors: smiling, laughter, eye contact and vocalizations. In the present study the focus was on exploring the occurrence of three different behaviors: emotional expressions, stopping activity and placing hands on parent's mouth or face. The decision to explore these three behaviors was based on the findings from video recordings. The videos were viewed several times before analyzing the data and these three behaviors seemed to appear in connection to the imitative answers of the parents. The three behaviors were analyzed to unearth more precise information about the nature of them. Altogether six categories were defined. The first three categories involved only single behaviors and the last three categories included combinations of these behaviors. The categories are as follows.

- 1) *Emotional expressions: smiles, laughter and hugs.* Smiles, laughter and hugs were marked if the child showed one or more of the expressions during or after parent's imitative answer.
- 2) *Stopping activity.* Stopping an activity was marked when there was a visible change in the action of the child as the child was focused on listening to the parent's voice. Stopping an activity was marked if it occurred during or after parent's imitative answer.
- 3) *Placing hands on parent's mouth or face.* Placing hands on parent's mouth or face was marked if the child directed one hand or both of the hands to the parent's mouth or face during or after parent's imitative answer.
- 4) *Stopping activity and placing hands on parent's mouth or face.* Stopping activity and placing hands on parent's mouth or face was marked if both of these behaviors appeared during or after parent's imitative answer.
- 5) *Smiling and placing hands on parent's mouth or face.* Smiling and placing hands on parent's mouth or face was marked if both of these behaviors appeared during or after parent's imitative answer.
- 6) *Smiling and stopping activity.* Smiling and stopping activity was marked if both of the behaviors appeared during or after parent's imitative answer.

O'Neill and Zeedyk (2006) coded the frequency of the social behaviors 10 seconds before and 10 seconds after the imitative bout. By comparing these numbers they evaluated if the social behaviors had increased following the imitative bout. The time period of 10 seconds was found to be too long in the present study. The vocal themes in interaction between the child and her parents changed sometimes so fast that the 10 second time limit would have included more than one imitative bout, making it very difficult to analyze the effects of different imitative responses. It was coded whether there was some change in the behavior of the child *during or within four seconds after the imitative response of the parent.* To be able to identify a change in behavior, three seconds before the imitative response were analyzed. If the child didn't show the same behavior before the imitative response than during or right after the imitative response, it was concluded that the change in behavior was most likely affected by the imitative response of the parent.

O'Neill and Zeedyk (2006) studied the effects of imitation on both of the partners. Instead, in the present study only the effects on the child were studied. Moreover, O'Neill and Zeedyk

analyzed only the bouts where the adult had initiated the imitation and bouts that lasted for a single round. Similarly, in this study only the imitative bouts initiated by the parents were analyzed. However, all the bouts initiated by the parents were analyzed, including bouts that also had a length of more than a single round.

Reliability

Measuring the reliability of the results aims to clarify how reliable the results are. A secondary aim is to find how probable it is that another researcher would get similar results by using the same method. Hence, reliability refers to the precision of the measurements. One way of testing the reliability of the study is inter-rater reliability. This means the extent to which at least two persons find similar results with the same method (Cozby, 2009, pp. 91-95). In the present study the reliability of the coding procedure was established by using a second coder, who was a speech and language therapist, specialized in working with children with autism spectrum disorders. She re-coded 15 randomly chosen bouts from all six play sessions, which was 21% of all data. These bouts were coded for the presence of the six categories defined for the effects of parents' imitative answers. The inter-scorer reliability of the communicative expressions was 87 per cent. Total agreement was achieved in 13 of the 15 bouts analyzed. This outcome revealed an acceptable level of coding reliability.

5. RESULTS

5.1. Free-play sessions

The free-play sessions consisted of two different sessions (sessions I and II). In session I the mother played interactive vocal games with the child. In the following session (session II) the father and the child played a jumping game together.

5.1.1. Free-play interaction between the child and her mother

In the free-play between the child and her mother (session I), the mother was sitting on the floor and holding the hands of her daughter while they were interacting face to face. Holding hands was needed, because the child couldn't stand or sit without support. Sometimes the mother held on to the child's waist if the child was using her hands to explore her mother's face. Holding on to the child physically made a good tactile contact between the dyad, but it also restricted the mother in using her hands for communication.

The interactive play was based on playful vocal dialogues between the mother and the child. The mother adapted her behavior well and the rhythm of speech suited the child, creating space for both of them to communicate. It was clear that the mother was the one who was maintaining the interaction and increasing it from her own speech and actions of the child. When the mother was speaking, she used a loud voice with various tones. Sometimes she also added tactile elements to her vocal expressions. For example, while saying bye-bye she was waving the child's hand. She was constantly paying attention to the child and commented on her actions. She interpreted all the vocalizations of her daughter communicative and responded to them accordingly. At times the expressions of the mother and the child formed dialogues.

The child was actively involved in the interactive play and she seemed to like it a lot. She listened to her mother's voice attentively and also used her own voice communicatively. In vocal dialogues the mother sometimes repeated her initiative utterance several times before the child made her first vocalization to answer. It seemed that the mother was well aware of this and she was giving enough time for the child to join the dialogue. The child seemed to use her vocalization for initiatives also which the mother answered typically by varying her tone of voice in short utterances like "hi". Sometimes the turn taking exchanges were long, taking altogether about nine turns. In her own turns, the child made several vocal sounds: smacking-sound, /aaaaa/-sound, some non-phonated throat sounds and flicking teeth as well as /ahh/ -sounds. It seemed that the sounds she used most communicatively were /aaa/ and non-phonated throat sounds. Beside this, she made a gesture of head shaking, which communicativeness was difficult to evaluate. She also responded to her mother's voice often by smiling. Moreover, she liked to be close to her mother and hugged her several times.

Characteristics of imitation in free-play interaction between the child and her mother

The session included 20 imitative bouts. The mother initiated 19 (95%) of them and the child initiated one bout (5%). This reveals that the mother frequently used imitation spontaneously as a part of her responses. Most of the bouts initiated by the mother had a length of a single round. Of the 19 bouts, 84% (16 bouts) lasted only a single round, and 16% (3 bouts) lasted two rounds. The one bout initiated by the child had a length of 1 ½ rounds. The communicative modes used in imitative bouts initiated by the mother were mostly vocal. Of the 19 bouts, 53 % (10 bouts) were vocal, 26% (5 bouts) gestural, 16% (3 bouts) gestural-

vocal and 5% (1 bout) was vocal imitation with added tactile elements. The single imitative bout initiated by the child was vocal.

Head shaking was the only gesture that was imitated by the mother and it occurred in all her gestural and gestural-vocal imitations. The mother made it spontaneous by shaking her head and it is likely that this imitation was not perceived by the child because she couldn't see it. Other gestures of the child were mainly connected to exploring her mother's face and those gestures would have been impossible for the mother to imitate because she was holding onto the child with both of her hands. The mother often imitated vocalizations of the child and three times simultaneously both gesture and vocalization (for example head shaking gesture and flicking teeth sound). Once she added tactile elements to her vocal imitative response. In that imitative response she shook the child's hands in the same rhythm with her vocal imitative response and tickled her. The one initiated bout of the child appeared after a short pause when the mother had modeled a sound belonging to the child's sound repertoire. In the following example there are three imitative bouts initiated by the mother. The first imitation is vocal, the second gestural and the third vocal. Imitative responses are all underlined.

Child:		ah	(shakes head)
Mother:	äää, böö (leans toward the child, touches her face with nose)	<u>ah</u>	noo (<u>shakes head</u>)
Child:	hvahva (flicking teeth sound)		
Mother:	no-no (<u>shakes head</u>)	<u>hvatahvata</u>	What are you saying?

Effects of imitation on the child's behavior

The session included 19 imitative bouts initiated by the mother. Only two imitative responses of the mother (11%) had an effect on the child's behavior. Both of the child's reactions appeared after vocal imitations of the mother. The first reaction was marked in the category of smiling and stopping activity. After the mother's imitative response the child stopped her

action for some seconds, listened to the mother and smiled. The second reaction was a hug and it was marked in the category of smiles, laughter and hugs.

5.1.2. Free-play interaction between the child and her father

In session II, the child and her father were playing a jumping game together. That game had been earlier mentioned by the parents as one of the typical games between the child and her father. The idea of the jumping game is that the father lifts up the child several times in a jumping-like way. They often jump many times in a row followed by a pause when the child can continue the game by making some body language gesture if she likes to jump again. As the theme of the game is jumping, it is natural that the session included more physical activity and less vocal interaction.

In the play session the father was standing on the floor and supported his daughter standing position by holding her under her armpits. Because the child needs to be supported when standing, the father could not use his hands in signing or some other way of communication. However, the position made it possible for the father to talk to the child close to her ear which might have helped her in listening to the father's speech. By holding the child by the arms, the father and the child had tactile contact throughout the game. During the play session the father was focused on the child and her expressions. He acted similar to the mother, giving time and space for the child to communicate. He seemed to read the body language of the child well and gave interpretations of the expressions he saw. When the father talked, he focused on describing what the child does or made questions for her.

The child seemed to enjoy the game a lot. After some jumps she often turned to the father and touched father's mouth and face when he was speaking. She also often smiled and laughed aloud between the jumps. She made one clear initiative during the game with a body language gesture, which was a kind of imitation of jumping. The father perceived this gesture and answered to it appropriately. The child also vocalized during the session and the vocalizations came typically after jumps. The father answered to the vocalizations and at times the vocalizations led to turn-taking exchanges.

Characteristics of imitation in free-play interaction between the child and her father

The session included three imitative bouts of which the father initiated all of them. The nature of the game was physical activity, so there was less vocal interaction and naturally fewer opportunities to imitate for both parts of the dyad. All the imitative bouts were gestural and they had a length of a single round. The gestures of the child that were imitated by the father were one shaking head gesture and two nodding head gestures. Once the father both nodded with his head and moved his body slightly as well as his hands in the same rhythm as the nodding. This gesture might have been noticed by the child. However, it is possible that the child didn't perceive the imitations of the head shaking gesture and the other nodding gesture because she was not touching the father's face at that moment.

Even though there were only a few imitative bouts during the session, it was noticed that the father often had imitative elements in his speech. For example, he used the same loudness and tone of voice as the child when he was speaking. By doing this his vocal responses were often imitation-like even though he didn't imitate the vocalizations of the child exactly. In the following example there are two imitative bouts. Both imitative responses of the father are underlined.

Child: (Touching father's neck)	(shakes head)	(nods head "jumping-like way")
Father: Can (child's name) say böö?	no	not any böö's (<u>shaking head</u>)
Child:	(makes a gesture with a hand close to her face)	
Father:	jump? (<u>nods with his head and body</u>)	(lifts up the child)
Child:	(jumps several times)	(smiles) äääääää
Father:	hui, ui, ui!	

Effects of imitation on the child's behavior

The session included three imitative bouts that were all initiated by the father. There were no clear changes in the behavior of the child after imitative bouts.

5.2. Play sessions with intentional use of imitation

Immediate imitation was intentionally used by the parents in sessions IV, V, VIII and X. In sessions IV, VIII and X the situation was the same as in session I. The mother played with the child on the floor and supported her standing position. No toys were used and the play was interactive vocal play. The father and child played in session V. That session was recorded by the pool.

5.2.1. Characteristics of play and intentional use of imitation in session IV

During this play session the mother acted mostly in the same way that she had in the free-play session. However, this time she used more utterances of the child in her initiatives. This might be partly because the child didn't vocalize much during this session and the mother tried to activate her in the vocal interplay. However, the child was often exploring her mother's face and mouth while the mother was speaking. The child seemed to enjoy all the shared moments in play and hugged her mother several times.

The session included five imitative bouts. The mother initiated four bouts (80%) and the child one bout (20%). All of the bouts initiated by the mother had a length of one round, whilst, the one bout initiated by the child lasted seven and a half rounds. The communicative modes used in the imitative bouts initiated by the mother were as follows. Of the four bouts, 25% (1 bout) was tactile, 50% (2 bouts) were vocal with added tactile elements and 25% (1 bout) was gestural-vocal. The communicative mode in the one imitative bout initiated by the child was vocal.

The one tactile bout occurred in a situation when the child had first touched mother's elbow and the mother imitated that action by touching the elbow of the child. The two bouts where the mother used vocal means with tactile elements were alike. When the child was making a flicking teeth sound and simultaneously taking her hand close to her own mouth, the mother imitated the sound and traced the movement of her mouth onto the child's hand. In the

gestural-vocal bout the mother imitated the vocalization of the child whilst shaking her head simultaneously.

The child initiated one imitative bout which was vocal. It was interesting to notice that the sound that the child imitated belonged to her sound repertoire and it was a laugh-like sound /ihihi/. Before the imitation the mother had uttered the same sound four times. Right after the first time the mother had uttered the sound the child stopped her activity to listen to it, but it took three more times to hear the sound before she imitated it. Finally this imitative bout led to a long turn-taking exchange.

Effects of imitation on the child's behavior

The session included five imitative bouts. The mother initiated four bouts and the child showed a reaction to two imitative answers (50%). One reaction was marked in the category of smiles, laughter and hugs and the other in the category of placing hands on parent's mouth of face. Both of the reactions appeared after the mother had imitated the child by making a flicking teeth sound on child's hand (vocal imitation with added tactile elements). In the following example the child reacts by smiling to the second imitative answer of the mother where the mother uses tactile elements in imitation. The imitative responses are underlined and the reaction of the child is written in italics.

Child:			hvahvahva (flicking teeth sound)
	(touches mother's hair and face)		(shakes head)
Mother:	Hi	You say hi	<u>hvatahvatahvata</u> (shakes head)
Child:			
		<u>hvahvahva</u> (flicking teeth sound)	
	(takes her hand close to her own mouth)		(<i>smiles</i>)
Mother:			
		<u>hatahata</u>	(laughs)
		(<u>makes the sound by vocalizing and tracing it on the child's hand with mouth</u>)	

5.2.2. Characteristics of play and intentional use of imitation in session V

Session V was very different from other play sessions because it was videotaped by the pool. In this session the child and her father were in the pool and the father was holding the child in front of him in a way that meant their faces were looking in the same direction. The play was in water and there was naturally less vocal interaction because of the type and context of the play.

The session included 18 imitative bouts. The father initiated 17 bouts (94 %) and the child one bout (6%). The length of the bouts was not calculated because the imitations were always simultaneous. The communicative modes used in the imitative bouts initiated by the father were tactile in 12% of the bouts (2 bouts) and gestural with added tactile elements in 88% of the bouts (15 bouts). The communicative mode in the one bout initiated by the child was gestural.

The imitative bouts in this play session were mostly imitations of the hand movements in the water. The child was freely moving her left hand while she was keeping her right hand on her father's right hand. By doing this it was possible for the father to imitate the hand movements of the child in a way so that the child could perceive the movement by tactile means. The child enjoyed this imitative game very much and reacted to imitations often by smiling. Sometimes she seemed to be testing her father's reactions. For example, she could begin to splash the water for a long time and after that have a short break which was followed by quick splashing and a pause again. When she noticed that the father was following her in all the movements, she had a big smile on her face.

The two tactile bouts occurred in a situation where the father was imitating the child's tactile gestures. The child touched the father's cheek and father responded to this by touching the child's cheek. Another tactile bout occurred when the child leant her cheek on the father's cheek and the father imitated the movement by leaning his cheek toward the child's cheek. Both of these tactile bouts were connected to a situation where the child was very happy and sharing joyful moments with the father. The father joined in with her expressions and also used the pitch of his voice in a very empathic way during the session.

Effects of imitation on the child's behavior

The session included 18 imitative bouts of which the father initiated 17 of them. The child showed a change in her action during eight of the 17 bouts (47%). All the changes in behavior appeared after the imitative movement of splashing water with a hand (gestural imitation with tactile element). It was noticed that sometimes the child reacted to imitation in the beginning when father answered to her initiative by splashing water similarly and sometimes she showed a reaction after the father had stopped splashing, following her initiative. The child showed her reaction by smiling in seven of the bouts and these expressions were marked in the category of smiles, laughter and hugs. One change in the child's behavior was marked in the category of placing hands on parent's mouth or face. During this expression the child touched her father's face and leaned her cheek towards the father's cheek. In the following example the child reacts with a smile when the father follows her rhythm in splashing. The dotted line marks where the movement continued. The parentheses shows where the movement begins and ends. Imitative answers are underlined and the reaction of the child is written in italics.

Child:
 (starts splashing the water with a hand-----) (splashes--)

Father: swim, swim, swim, swim, swim
 (starts splashing the water with a hand-----) (splashes---)

Child:
 (*Smiles*-----)

Father: yeah, swim!
 (laughs)

5.2.3. Characteristics of play and intentional use of imitation in session VIII

In session VIII the child expressed herself more by vocalizing than in session IV. The child was enjoying vocal interplay and she was listening to her mother attentively. She also often placed her hand on the mother's mouth while the mother was speaking. The mother noticed all the vocal initiations of the child and responded to them. When answering to the child, the mother used both imitation and familiar words like "hi" and "ahaa" to build up turn-taking exchanges. She also used her tone of voice very imitatively, in imitative bouts and also in

speech without imitation. The mother used the child's utterances, both gestural and vocal, in her initiatives. Sometimes she also added tactile elements to her initiatives.

The session included 14 imitative bouts. The mother initiated 13 (93%) of the bouts and the child one bout (7%). Of the 13 bouts initiated by the mother 85% (11 bouts) lasted only one round whilst 15 % (2 bouts) lasted two rounds. The one imitative bout initiated by the child lasted one and a half rounds. Of the 13 imitative bouts initiated by the mother 8% (1 bout) was gestural, 15% (2 bouts) were vocal and 77 % (10 bouts) were vocal with added tactile elements. The two vocal bouts initiated by the mother also included a tactile element because the child was spontaneously holding her hand on the mother's mouth when the mother was speaking. In summary, of all the imitative responses, a tactile element was present in 92% of the turns. The communicative mode in the one imitative bout initiated by the child was gestural.

The mother added different tactile elements to her imitative responses. For example, she could touch the nose of the child with her own nose while she was speaking or vocalizing. Sometimes she kissed the cheek of the child when she finished imitating some sound. She could also lead the child to touch her mouth when she was speaking or imitate the vocalization of the child by "speaking to the child's hand" in a way that the child could perceive her articulatory movements in a tactile way. The vocalizations imitated by the mother were a smacking-sound, laughing-sound, long /a/-sound and a flicking teeth sound. The only gesture imitation by her was the head shaking gesture. The one gesture imitated by the child was also a head shaking gesture. Before this imitation the mother had first taken the initiative by shaking the head and simultaneously repeating the movement with her nose as previously mentioned. By doing this the child had received some tactile cues about the gesture.

Effects of imitation on the child's behavior

The session included 14 imitative bouts of which 13 bouts were initiated by the mother. The change in the child's behavior was visible in seven bouts (54%). The child smiled four times during or after the imitative bouts. This was then marked into the category of smiles, laughter and hugs. Moreover, she both smiled and placed her hand on the mother's mouth twice. These reactions were marked in the category of smiling and placing hands on parent's mouth or face. The reaction of placing hands on the parent's mouth or face happened only once.

In total, six reactions (86%) appeared after the mother responded by vocalizing an imitation and added tactile elements to it. One of the child's reactions appeared after a vocal imitative turn of the mother. During that imitative response of the mother the child was simultaneously holding her hand on the mother's mouth, so that turn had also a tactile element. In the following example the behavior of the child changes twice, first with a smile and change in the placement of the hands and a second time with change in the placement of the hands only. The imitative responses of the mother are underlined and reactions of the child are written in italics.

Child: aaaaaaaaaah
(smiles and takes hands on mother's mouth)

Mother: aaaaaaaaaaaaaaaaah (laughs)
(touches the child with her forehead)

Child: aaaaaaaaaah
(takes hands on mother's mouth)

Mother: aaaaaaaaaaaa-aaaaaa
(goes very close to the child, cheek to cheek)

5.2.4. Characteristics of play and intentional use of imitation in session X

The typical characteristic of the play in session X was vocal interplay like in the previous sessions. However, in this session the imitative bouts were much longer than in previous sessions. The mother often used vocalization that belonged to the repertoire of the child and familiar words like "Böö" in her initiatives. The child used her own sound repertoire to initiate vocal dialogues. She was focused on listening to the mother by holding her hands often on the mother's mouth while the mother was speaking. Vocal initiatives and responses from both parts of the dyad lead to turn-taking exchanges. However, turn-taking wasn't only a characteristic in imitative dialogues but also in speech-like dialogues where the mother used words and sentences in her turns.

The session included 19 imitative bouts. The mother initiated 17 bouts (89%) and the child two bouts (11%). Of the 17 bouts initiated by the mother 59% (10 bouts) lasted only one

round, 17% (3 bouts) two rounds, 6% (1 bout) three rounds, 6% (1 bout) four rounds, 6% (1 bout) nine rounds and 6% (1 bout) eleven rounds. Of the two bouts initiated by the child one lasted one and half rounds and the other two and a half rounds. The communicative modes used in the imitative bouts initiated by the mother were vocal in 70% of the bouts (12 bouts), gestural-vocal in 12% of the bouts (2 bouts) and vocal with added tactile elements in 18% of the bouts (3 bouts). It is important to note that seven of the vocal bouts initiated by the mother also had tactile elements, because the child was spontaneously holding her hand on the mother's mouth while the mother was speaking. In summary, the tactile element was present in ten imitative responses, which is 59% of the turns. The communicative modes used by the child were, vocal in one bout and gestural-vocal in the other bout.

In this play session the vocal imitation led to long turn-taking exchanges. Both parts of the dyad seemed to enjoy the vocal interplay and sometimes the child looked a little amused after the imitative response of the mother. The mother didn't use as many tactile elements in her imitative responses as in session VIII. This can be partly because the child often spontaneously placed one or both hands on the mother's mouth while she was speaking. The vocalizations imitated by the mother were short /ah/ or longer /aaah/-sounds, flicking teeth sounds and laugh-like-sounds /hihihi/. The imitative turns where the mother used gestural-vocal means were turns where she imitated the flicking teeth sound and shook her head simultaneously. The imitative bouts where she used vocal means and added tactile elements were similar imitations as the ones with gestural-vocal means (flicking teeth sound and head shaking gesture), but instead of making the gesture in the typical way, she shook her head in a way that the child could perceive it by tactile means. The two sounds imitated by the child were /ha/-sound and flicking teeth sound. Before the imitation of the flicking teeth sound the mother had made the sound and used tactile means to imitate the simultaneous shaking head gesture.

Effects of imitation on the child's behavior

The session included 19 imitative bouts of which the mother initiated 17. The change in the child's behavior was visible in eight of the bouts (47%). The child smiled twice during or after the mother's imitative response. These expressions were marked in the category of smiles, laughter and hugs. Placing hands on the parent's mouth or face was marked three times during this session. Moreover, three times the child showed two reactions during or after the mother's imitative response. One was classified to be in the category of stopping the

activity and placing hands on the parent's mouth or face, another in the category of smiling and placing hands on the parent's mouth of face and finally, one in the category of smiling and stopping activity.

Five of the child's reactions appeared after a vocal imitative answer from the mother, two after gestural-vocal imitations and one response after a vocal imitation with added tactile elements. In one imitative answer which was marked as a vocal turn there were tactile elements present, as the child was spontaneously holding her hands on mother's mouth. In summary, tactile elements were present in two of the eight imitations (25%), which triggered a change in the behavior of the child. In the following example, the child reacts to the mother's first imitation by placing her hands on the mother's mouth. After this the child imitates the mother by vocalizing with a "ha" sound. Finally, the child initiates a new vocalization that the mother again imitates. The child reacts to the imitation by smiling and placing her hands on the mother's face. The imitative responses are underlined and the reactions of the child are written in italics.

Child: (open and closes mouth)
(shakes head)

Mother: yes, (child's name) can, hvathvathvat, hvathvathvat
(shakes head very close to the child's face)

Child: aaah ha
(places hands on mother's mouth) (smiles)

Mother: böö ha

Child: ahh hvathvat (flicking teeth sound)
(shakes head)

Mother: hhahaha hahaha hvahvahva
(leans toward the child, touches her cheek with her own nose) (shakes head)

Child: aaaaah
(smiles, places hands on mother's face)

Mother:

5.3. Summary of the results

Table 1 summarizes the frequency of the imitative responses of the parents and the child. Both of the parents were interacting in a very responsive way with their daughter in free-play sessions as well as sessions where imitation was intentionally used. The mother used more imitation in free-play sessions with the child than the father, but these numbers cannot be directly compared as the content of the play was very different. There was also variety in the activity of the child during the play sessions. Sometimes she vocalized more and sometimes less. As vocalization is the main expressive mode of the child, it naturally provided most of the opportunities for imitation.

There was not a clear difference in the number of imitations by the mother when the two types of play were compared. During session IV she imitated less utterances of the child than in other sessions, but this was mainly because the child was not vocalizing as much as in other sessions. However, there was a clear difference in the number of imitations by the father between the free-play session and the play session where he used intentionally imitation in his responses. However, this is only an indicative result, as the context of the play was very different in the sessions. The frequency of initiated imitative responses of the child was limited and remained the same during all play sessions.

Table 1

Frequency of imitative responses in play sessions

	Mother	Father	Child
Free-play sessions			
Session I	19	-	1
Session II	-	3	0
Sessions with intentional use of imitation			
Session IV	4	-	1
Session V	-	17	1
Session VIII	13	-	1
Session X	17	-	2

Note. – is marked when the parent was not involved in the play session

The length of imitative bouts in free-play sessions and play sessions where imitation was intentionally used by the parents is presented in Table 2. Most of the imitative bouts had a length of a single round. The only exceptions were the imitative bouts in sessions IV and X. In session IV one imitative bout initiated by the child led to a long turn-taking exchange lasting altogether seven and a half rounds. In session X almost half (41%) of the imitative bouts initiated by the mother had a length of at least two rounds. The longest imitative bout also occurred in this session.

Table 2

Number and length of imitative bouts in play sessions

	Parent	Child
Free-play sessions		
Session I	16 (1 round)	1 (1 ½ rounds) 3 (2 rounds)
Session II	3 (1 round)	0
Sessions with intentional use of imitation		
Session IV	4 (1 round)	1 (7 ½ rounds)
Session V	not calculated	not calculated
Session VIII	11 (1 round) 2 (2 rounds)	1 (1 ½ rounds)
Session X	10 (1 round) 3 (2 rounds) 1 (3 rounds) 1 (4 rounds) 1 (9 rounds) 1 (11 rounds)	1 (1 ½ rounds) 1 (2 ½ rounds)

The characteristics of communication modes used in the imitative responses by the child and her parents are presented in Table 3. The mother mostly used vocal communication modes in the free-play session. In some imitative responses she also used gestures. Tactile elements were used only in one imitative response. The communication modes used by the mother in her imitative answers clearly changed in sessions where she used imitation intentionally. Tactile elements were present in almost half (47%) of all her imitative answers during these

sessions. The mother was creative in adding tactile elements to her imitations and consequently there were many variations in her imitative answers.

During session X the amount of vocal imitative answers with tactile elements was smaller than in sessions IV and VIII. However, this number doesn't describe well the total amount of tactile elements throughout the interaction, because it only includes the communicative modes used by the mother. Instead, the total number of imitative responses with tactile elements better describes the general change in tactility as this number also includes the imitative turns where the child was spontaneously placing her hands on the mother's mouth or face. The father mainly used gestures in his imitative answers during the free-play session. However, in session V all of his imitative responses included tactile elements. It was also significant that he imitated tactile emotional expressions of the child by repeating the touch in a similar way. However, even though there was a clear increase in the number of imitative answers between session II and V, they cannot be directly compared as the context and content of play was very different.

The child used vocal, gestural and gestural-vocal modes in her imitative responses. All the imitative responses were imitations of utterances that were belonging to her vocal or gestural repertoire. Moreover, the gestural imitative answers of the child were always imitations of the parents' gestures with tactile elements. This is obvious because the child couldn't have perceived expressions which were purely gestural.

Table 3

The communication modes used in imitative responses

	Free-play		Intentional use of imitation			
	Session I	Session II	Session IV	Session V	Session VIII	Session X
Vocal	10 (53%) <i>(C I)</i>	0	0 <i>(C I)</i>	0	2 (15%)	12 (70%) <i>(C I)</i>
Gestural	5 (26%)	3 (100%)	0	0 <i>(C I)</i>	1 (8%) <i>(C I)</i>	0
Tactile	0	0	1 (25%)	2 (12%)	0	0
Gestural- vocal	3 (16%)	0	1 (25%)	0	0	2 (12%) <i>(C I)</i>
Vocal with tactile elements	1 (5%)	0	2 (50%)	0	10 (77%)	3 (18%)
Gestural with tactile elements	0	0	0	15 (88%)	0	0
All imitative responses including tactile elements ^a	1 (5%)	0	3 (75%)	17 (100%)	12 (92%)	10 (59%)

Note. The imitative expressions of the child are marked with C. They are also written in italics and in parenthesis.

^a This category includes the turns where the parents used tactile elements in imitation and also turns when the child was exploring the parent's mouth or face during parent's imitation

The effects of imitative responses on the child's behavior are presented in Table 4. The results of this study show that the imitative answers of the parents had an effect on the child's behavior more often in sessions where the parents used imitation intentionally as part of their communication than in free-play sessions. In both free-play sessions I and II, a maximum of eleven percent of the imitative answers triggered a reaction from the child, whereas in sessions IV, V, VIII and X the number was nearly fifty percent. The high number of reactions in sessions IV, V, VIII and X is an important finding, because it clearly shows the change in the child which took place when imitation was intentionally used. Most often the child reacted by smiling. Interestingly, during sessions VIII and X the child reacted more often to the imitative answer of the mother by placing her hand on the mother's mouth or face, in comparison to all other sessions.

Table 4

Effects of imitation on the child's behavior

	Free-play		Intentional use of imitation			
	Session I	Session II	Session IV	Session V	Session VIII	Session X
Changes in the child's behavior	2/19 (11%)	0/3 (0%)	2/4 (50%)	8/17 (47%)	7/13 (54%)	8/17 (47%)
Smiles, laughter and hugs	1	0	1	7	4	2
Stopping activity	0	0	0	0	0	0
Placing hands on parent's mouth/face	0	0	1	1	1	3
Stopping activity and placing hands on parent's mouth/face	0	0	0	0	0	1
Smiling and placing hands on parent's mouth/face	0	0	0	0	2	1
Smiling and stopping activity	1	0	0	0	0	1

The communicative modes used in imitative responses that triggered a reaction from the child are presented in Table 5. When the communicative modes used in imitative responses that triggered a reaction from the child were analyzed, it was possible to see that the child reacted to vocal imitations, vocal imitations with tactile elements, gestural imitations with tactile elements and gestural-vocal imitations. Tactile elements were included in 63% of the imitative responses of the parents which caused a change in the child's behavior.

In sessions IV, V and VIII nearly all the imitative responses of the parents that triggered a change in the child's behaviour included some form of tactile element. The only exception

was session X, where the imitative answers that had an effect on the child's behaviour were mainly vocal. However, in this session the tactile communication modes were present in more than half of the imitative answers of the parents. This time it wasn't the parent who used tactile communication modes as a part of imitation, but more the child who either spontaneously or as a reaction to the mother's imitative answers placed her hands on the mother's mouth.

Table 5

The communicative modes used in imitative responses that triggered a reaction from the child

	Free-play		Intentional use of imitation			
	Session I	Session II	Session IV	Session V	Session VIII	Session X
Total number of changes in the child's behavior	2	0	2	8	7	8
Vocal	2	0	0	0	1	5
Gestural	0	0	0	0	0	0
Tactile	0	0	0	0	0	0
Gestural-vocal	0	0	0	0	0	2
Vocal with tactile elements	0	0	2	0	6	1
Gestural with tactile elements	0	0	0	8	0	0

After the play sessions the researcher asked the parents to freely give some written feedback about the experience of using imitation intentionally in communication. In the feedback the parents wrote that they found the whole process very interesting and they thought it was something that they had been looking for to enhance the interaction. They liked the use of video examples to illustrate imitation and communication with persons with deafblindness. They also appreciated all the advice given to them and the fact that the play sessions were mainly videotaped at their home. They found this important because they think that the child

doesn't act in the same way in new places as she does at home. Finally, the parents wrote that it was nice to see that the child enjoyed the sessions.

6. DISCUSSION

The purpose of this study was to explore the characteristics of imitation in interaction between a child with deafblindness and her parents. The purpose was to find out the characteristics of imitative responses in free-play sessions and play sessions where the parents use imitation intentionally. Moreover, the focus of the study was also to explore the behaviour of the child and find out if the imitative responses of the parents had any effect on the three specific characteristics of the child's behaviour: emotional expressions, placing hands on parent's mouth or face and stopping activity. Because communication is intersubjective and "other oriented" (see Linell, 2009; Sameroff & MacKenzie, 2003), the focus was on exploring characteristics of imitative answers from both parts of the dyad. First the research questions will be answered shortly. After that findings about different characteristics of imitation explored in this study will be discussed in depth and related to other studies.

Results from this study show that the parents exhibited notably more imitative answers than the child. In free-play interaction the mother imitated the child more than the father, but the frequency of imitative answers from the parents was equal in sessions where they used imitation intentionally. Most of the imitative bouts had a length of one round. The longest imitative bouts were exhibited in the sessions where the parents used imitation intentionally in their answers. The parents mainly used vocal and gestural communication modes during free-play sessions, whilst tactile modes were used infrequently. The use of tactile modes of communication was significantly increased during the sessions where the parents used imitation intentionally in their answers. The communication modes used in the imitative answers from the child were vocal and gestural throughout the sessions.

Only some of the imitative answers given by the parents had an effect on the child's behaviour during free-play sessions. Up to half of the imitative answers the parents gave had an effect on the child's behaviour during sessions where imitation was intentionally used. Of all the reactions smiling occurred most often. The action of placing hands on the parent's mouth was noted frequently. The results suggest that the parents' intentional use of imitation

and especially the use of tactile modes of communication might have been associated with the increased number of changes in the child's behaviour. The implications for the development of children with deafblindness are discussed.

6.1. Frequencies and length of imitative answers

It was found that both of the parents were very sensitive and good communication partners by nature. They interpreted all kinds of actions of the child meaningful and embedded them into the interaction. This kind of adult behaviour has been found to support communication development, as the child is given an active role in communication already in a phase where his or her actions are not yet intentional (Berducci, 2010).

There was a big difference in the amount of imitative answers of the parents in comparison to the child. The majority of imitative bouts were initiated by the parents both in free-play sessions and sessions where imitation was intentionally used. Of the 79 bouts identified, the parents initiated 92% of them. This number is bigger than in the study of O'Neill and Zeedyk (2006). They found that adults initiated 78% of all bouts and in 22% of the bouts it was the young person with developmental delay who was the initial imitator. It is important to notice that the definition of imitative answers in the present study could have affected the limited number of initiated bouts by the child. However, it was obvious that the parents had a crucial role in maintaining interaction with the child and imitation was one way of carrying it out. Indeed, the frequency of imitative answers by the communication partners can be interpreted as responsiveness toward the person with deafblindness, because imitative responses are "other-orientated" by nature (Linell, 2009).

In comparison to session I, the frequency of imitative answers of the mother remained the same or even decreased in sessions IV, VIII and X, where she was told to use imitation intentionally. It is logical to think that if a person uses imitation frequently by nature, the amount of imitation doesn't necessarily increase when she or he applies it intentionally. However, the number of imitative answers of the father was significantly increased in session V compared to session II. As already mentioned, the context and content of those sessions was very different, which makes comparing frequencies rather difficult. However, it is possible that he was spontaneously using imitation less than the mother in general and that it

was indeed the intentional use of imitation that triggered the increased number of imitative responses in his communicative behaviour.

When discussing the frequency of imitative answers of the parents in interaction, the question arises whether the high frequency of imitation is a value in itself. In other words, is the interaction supposed to be of more quality when the parents or any other communication partner responds by using immediate imitation? It can be argued that the answer is both yes and no. As it has been found that the parent's imitative answers enhances the language development and social skills of both typically developing children (Bloom, Russell & Wassenberg, 1987; Papousek & Papousek, 1989) and children with atypical development (Dawson & Galpert, 1990; Ingersoll & Schreibman, 2006; Sanefuji et al., 2009), the high frequency of imitative answers can be considered a positive quality of communicative behaviour.

However, on the other hand, if all the utterances were imitative, the interaction may even change to be abnormal as imitation is typically a characteristic of interaction, not the aim of it. Good communication partners can respond contingently also without imitation (Bloom et al., 1987). Moreover, imitation can be present in some prosodic features of the utterance, even if the utterance itself is not an imitation (Papousek & Papousek, 1989). This was noted in the present study. The child seemed to equally like the vocal turn-taking exchanges irrespective of whether the content of the parents' utterances was wholly imitative or partly imitative. It is important to note that the frequency of the communication partner's imitations is evaluated in the right context, especially relating to the child's age and communicative abilities. Frequent use of imitation by communication partners can be advantageous for many children, whilst for some others imitation might be not an appropriate way to answer.

Most of the imitative bouts (79%) had a length of a single round and only a fifth of the turns (21%) exceeded the length of two or more rounds. This result is similar to O'Neill and Zeedyk (2006), who found that 74% of the bouts had a length of a single round. In the present study it was interesting to find out that the longest bout occurred in session X, where 41% of the turns exceeded the length of two or more turns and moreover, that the longest bout had a length of 11 rounds. It is possible that the long turn-taking exchanges in session X were a result of the continuous and intentional use of imitation during sessions IV to X. It would have been interesting to follow up the process of intentional use of imitation and observe if

the imitative rounds had been longer in the following plays sessions. However, it is also possible that the long imitative exchanges were typical characteristic of communication only in session X.

It can be argued that the nature of imitative response allows turn-taking to appear, as the content of turns is based on the expressive repertoire of the child (see Hart, 2006). Turn-taking has been found to be an important and necessary ground for communication and sociality. For example, an incipient form of turn-taking is needed before turn-taking with more mature language skills can occur (Berducci, 2010). Furthermore, it has been found that turn-taking exchanges between infants and their parents enhance the quality of the infants' vocalization. When adults answer contingently to their infants whilst maintaining a turn-taking pattern, the vocalizations of the infants have been found to include more speech-like syllabic sounds than in interactions where adults don't maintain the rules of turn-taking (Bloom et al., 1987).

6.2. Communicative modes of imitative answers

Because the child could hear the mother's voice and also vocalize herself, vocal means of communication had developed in a pleasant way for both of the partners. This is naturally due to the fact that vocal communication means were also possible to perceive by both of the partners. The mother also imitated some facial and head gestures of the child in the free-play session, but it is probable that the child didn't perceive these expressions because of her blindness. As the number of the mother's imitative answers with tactile elements increased, she was able to deliver at least some of those communicative elements that the child was unable to perceive before.

The change in the communicative modes used between free-play sessions and sessions where imitation was intentionally used, was similar and even more significant for the father than for the mother. The tactility in gestural imitations made it possible for the child to follow the father's answers and participate in the game. However, as almost all of the father's imitative answers were imitative hand movements in water, it is natural that the content of the mother's imitative answers with tactile elements was more variable than the father's.

It can be argued that when using tactile modes of communication with persons with deafblindness, the communication partner uses the communicative means that the persons with deafblindness can perceive without struggling. This is because the tactile sense is presumably often the most functional sense for them. When a communication partner shows a person with deafblindness that she or he is able to share experiences through a tactile sense, it can naturally increase the interest of the deafblind person. Moreover, by using tactile elements in communication it is possible to show children with deafblindness that tactile expressions can be communicative and intentional. Imitation is only one way to use the tactile mode in communication. However, tactile imitative exchanges are presumably important elements for the development of tactile sign language, as it has been found that the imitative vocal games between a parent and an infant are important for the development of speech in typically developing children (Papousek & Papousek, 1989).

In the present study the mother often used both vocal and tactile communication modes simultaneously and by doing this she gave the child the possibility to perceive the message through two sensory channels. This is a normal phenomenon for typically developing children as they hear the speech and see the simultaneous gestural expressions of their communication partner. By perceiving a message through two sensory channels it is possible to combine information from both two modalities that complement each other. If children with deafblindness have some usable residual vision or hearing, tactile information has an important role in compensating the other non-functioning sense.

6.3. Effects of imitative answers on the child's behaviour

The studied behaviours: emotional expressions, stopping activity and placing hands on parent's mouth or face are discussed in more detail in the following chapters.

6.3.1. Emotional expressions

The most common reaction to either parent's imitative answers in the present study was an emotional expression; such as smiling, laughter or hugs. It appeared fifteen times during or after either parent's imitative answers which is more than half (55%) of all reactions. When the turns are calculated where smiles occurred together with other reactions, the number is even bigger. The most typical emotional expression was smiling. Other researchers have also found persons with deafblindness react to imitation with an emotional expression. Caldwell

(2006) reports of a deafblind man who responded to imitation by laughing aloud. Another deafblind man described by Hart (2006) reacted to imitative answers by hugging the communication partner. Similarly, emotional expressions have been found to be one of the most typical reactions to imitative answers by persons with developmental delay (O'Neill & Zeedyk, 2006; Zeedyk et al., 2009).

Nadel et al. (2004) found smiling to be one of the earliest reactions to being imitated in infants with typical development. Infants showed this reaction to imitation by the age of one month. Only later, at the age of five months did the infants react to imitation by laughing aloud. The researchers do not describe any age for hugging to appear as a reaction to being imitated. Nor are there any studies on developmental steps of imitation recognition in individuals with deafblindness or developmental delays. However, emotional expressions seem to be one of the most common reactions to being imitated in these populations.

The results of the present study support the findings that imitative answers often trigger smiles and other emotional expressions from the person who is being imitated. This is a valuable finding, because it can be hard to create positive experiences of interaction for persons who have challenges in communication when there is the absence of a common language. Moreover, emotions have a significant role in communication. They promote interaction with other people (Trevvarthen, 1993) and they can be regarded as motives for intentional communication (Kokkinaki & Kugiumutzakis, 2000). Emotions also stimulate cognitive processes (Nafstad & Rødbroe, 1999, p. 57; Trevvarthen, 1993) and can be considered more the cause for psychological activities than results of them (Trevvarthen, 1993). Thus, emotions have a more important role in child development than they are credited for.

6.3.2. Placing hands on the parent's mouth or face

Placing hands on the parent's mouth or face appeared as a single reaction six times, which is 22% of all reactions. If the turns are counted where placing hands on parent's mouth was one of the two reactions, a change in hand placement occurred altogether ten times, which is 37% of all reactions. It is interesting to notice that this reaction appeared only in sessions where imitation was intentionally used. This doesn't mean that the reaction was completely new for the child and appeared for the first time after the introduction of immediate imitation. This

was not the case, because the parents reported that the child had this behaviour prior to the researcher discussing it with them. However, during recordings the child started placing her hands on the parents' mouth or face from session IV onward and this behaviour appeared most frequently in sessions VIII and X.

Why did the imitative answer trigger the action of placing hands on either of the parents' mouth or face and what are the possible functions of this action? It was noticed that nearly all the changes in hand placement occurred after the mother's vocal imitations. Tactile elements were included in some of these vocal imitations. It can be argued that one reason for placing hands on the parents' mouth after an imitative answer is that it can be used as a sign of interest in the partner or the voice (see Sanefuji et al., 2009; Thelen et al., 1975; Zeedyk, 2006). Secondly, it can be proposed that placing a hand on the parent's mouth or face is an indication of a change in attention. As children with typical development show attention to a speaker by looking at him, in people with deafblindness the function of the eyes is replaced by the use of the hands or feet (Nafstad & Rødbroe, 1999, p. 20).

If it can be assumed that placing hands on the parent's mouth or face has the same function as eye contact in typically developing children, then the change in hand placement is similar to the findings of researchers who found that imitative answers increased eye gaze toward the partner (Dawson & Galpert, 1990; Zeedyk et al., 2009). However, as O'Neill and Zeedyk (2006) didn't find shared eye contact to be a characteristic after imitative responses in young people with developmental delay and their communication partners, this change of behaviour doesn't seem to always connect with imitation.

It is generally accepted that typically developing children use both audible and visible information in speech perception (Stephens & Holt, 2010) and the role of visual information becomes even more important when the listening conditions are not optimal. If the action of placing hands on the parents' mouth or face has the same function as eye contact in speech perception, the child with deafblindness can receive a lot of useful information regarding speech by "listening" to it in a tactile way. Indeed, it has been found that tactile information can influence and enhance speech perception (Gibraiel, Gick, Ikegami, Johannsdottir & Muehlbauer, 2005; Gick, Jóhannsdóttir, Gibraiel & Mühlbauer, 2008). This information is the basis for the use of the Tadoma method with persons with deafblindness. In the Tadoma method the hand of the deafblind receiver is placed on the speaker's face in a way that the

thumb rests vertically over the lips and the fingers are spread over the cheek and neck (Reed & Rabinowitz, 1992).

6.3.3. Stopping activity

Stopping the activity didn't occur as a single reaction, but it appeared two times in connection with smiling and once connected to the action of placing of hands on the parent's mouth or face. This reaction occurred for the first time in session I and the two other times in session X. In session I the child stopped her activity and smiled during the second imitative round of a turn taking exchange. In session X this reaction appeared first when she was having a long turn-taking exchange with her mother along with a sigh-like sound /ah/. After many repetitions of this sound, the child suddenly made a slight variation of it by prolonging the vowel in the syllable (/aaaaah/). When the mother responded to this by imitating the sound, the child reacted to it by lifting up her head, stopping the activity and placing her hands on the mother's mouth. The second time the action of stopping the activity occurred was in session X when the child and her mother had first been having a vocal turn-taking exchange with the /aaah/-syllable. Suddenly the child changed her vocalization to a flicking teeth sound while nodding her head simultaneously. When the mother followed her by imitating the sound and a head gesture in a way that her forehead was touching gently the child's forehead, the child reacted by smiling and stopping the activity.

Thus, it seems that by stopping her activity the child showed her attention toward the mother's utterance and by doing this she confirmed that she had detected the mother's imitative answer. Indeed, Hart (2006) argues that attracting attention is one of the four key functions of imitation for enhancing interaction between persons with deafblindness and their partners. In persons with normal vision, attention is typically seen as a change in eye gaze. Caldwell (2006) describes a man with autism spectrum disorder and severe learning disabilities whose first reactions to being imitated were glances toward the imitator. Moreover, Ingersoll and Schreibman (2006) found that imitative responses of the communication partner strengthened joint attention skills in children with autism by increasing gaze coordination between the object and the adult. As persons with deafblindness cannot use their eyes to share attention, it is natural that their attention can be shown in behaviours like stopping an activity or changing the placement of their hands, feet or body.

In session X the child seemed to play with different kinds of vocalizations. It is possible that she was testing if the mother can follow her by altering the type or length of vocalization. This would tell something about her abilities in recognizing and comparing the utterance of the mother to her own utterance. Caldwell (2006) reports similar findings in a woman with autism spectrum disorder when she was imitated the first time. Furthermore, Nadel et al. (2004) studied the reactions of typically developing infants and found that the infants were testing the imitator in a similar way at the age of 9 to 15 months. Stopping the activity and waiting for a partner's activity had appeared in the infants' behavior earlier, at the age of seven months. The researchers describe how the children at that age looked back and forward between their own movements and their partner's movements after imitation or showed an emotional expression while waiting for the adult's answer. This finding is similar to the observations of the present study in regard to emotional expressions accompanied by the reaction of stopping the activity.

In the present study, the imitative answers of the parents triggered a reaction of stopping the activity occasionally. This behavior and the action of placing hands on the parent's mouth are most likely to be embodiments of attention. If both of these reactions are taken into account, the change in attention appeared in nearly half of the reactions. Stopping the activity may be an indication of the child's awareness that the parent is paying attention to the self or to some aspect of the self, like vocalization (see Reddy, 2003). Placing hands on the parent's mouth can also be an indication of awareness of the parent's attention to the self, but it includes also an act of directing attention to the other.

If imitation can strengthen the child's awareness of being the focus of someone's attention, this is an important finding. Reddy (2003) argues that infants need to first have the experience of being the focus of attention before they can join attention to an external object together with an adult. Furthermore, it would be natural to suppose that after first having the experience of being the focus of someone's attention, the child would direct attention towards the other before being able to direct her attention toward the third element in the interaction: the focus of the adult's attention. Placing hands on the parent's mouth or face might be a special indication of directing attention towards the other. This is an important aspect of communication because only when focusing attention towards the other does interpersonal engagement occur (Zeedyk, 2006).

6.4. Participants and procedure

The child and her parents were ideal participants for the study in terms of the content of the study. Imitation, especially vocal imitation, was already part of their spontaneous communication and this made it possible to analyse characteristics of it and connect the advice given to the parents to something concrete. With some other child with deafblindness and his or her parents the advice given could have been different. Moreover, as the present study is a case study, the results may not be generalizable to all other children with deafblindness and their parents.

The chosen time limit (3 seconds) in the present study was one second longer than the time limit used in the study of O'Neill and Zeedyk (2006). It would be interesting to study the characteristics of imitation with other children with deafblindness and explore whether the longer time limit is needed for their imitative answers to appear. Without any time limits it would have been very difficult to define which of the imitative answers could have been classified as imitations in the present study. However, it was also noted during the analyzing stage that the time limit seemed artificial to be in some respects.

Defining the model and the imitator wasn't always clear in the present study either. As the parents used vocalization and other expressions that were belonging to the repertoire of the child, many of the initiatives seemed to be natural imitative responses. Other researchers (see Kokkinaki & Kugiumutzakis, 2000; Papousek & Papousek, 1989) have also found it challenging to define who imitates whom. For example, it has been argued that there might be mismatches between the mother's pauses and the infant's response latencies.

Even though the method of the present study captured imitative answers in the given time limits it didn't reveal the intentionality of imitations, because all kinds of visual and auditory imitations were transcribed and taken as part of the analysis. Even if it could be assumed that the majority of the parents' imitative answers were intentional in sessions IV, V, VIII and X, some of their imitations could have been intuitive and without specific intention to address the child. This phenomenon was probably even more common in the free-play sessions. Examples of intuitive imitations can be some head shaking and nodding gestures, which are part of the partner's responsiveness. These are not always intended to be imitative responses per se. It can be argued that both intuitive and intentional imitations are important

characteristics in communication with children with deafblindness as they may be with seeing and hearing children, because they reflect the sensitivity to the child's expressions and reciprocity in communication (see Bronfenbrenner, 1977; Rødbroe & Souriau, 1999).

A new imitative bout was always marked when the content of the imitation clearly changed. However, it might have been better to also include the imitative responses that had different kinds of content into the same imitative bout if they had appeared within the three second time limit. The method used in the present study was a good way to detect different kinds of imitations by marking them separately. However, the variable nature of an imitative turn-taking sequence was not possible to capture. The definition might have also caused some imprecision in measures. As the imitative bouts with different contents were always marked as separate bouts, sometimes it appeared that the bouts were very tightly joined and a new bout could start almost immediately after the previous bout. This resulted in a very limited time for a reaction of the child to appear after the imitative response. This may have limited the number of detected changes in the child's behavior after a parents' imitative response.

6.5. Reflection on dialogism and the present study

The present study supports the theory of Dialogism (Linell, 2001, 2009; Marková, 2006), the Transactional Model (Sameroff & MacKenzie, 2003) and other similar theories which emphasize the interactive nature of communication and language. It has been a common way in science to explore characteristics of language and communication concentrating solely on the child with atypical language development whilst ignoring the communication partner. However, dialogistic theories focus on "the other" in communication and by doing this communication is understood and explored from a wider perspective. These dialogical principles were the basis for choosing and developing methods of the present study. The aim was to explore characteristics of imitation in interaction and focus on the imitative utterances of both parts of the dyad.

Linell (2001, p. 265) argues that sequential analysis is one of the essential elements for studying communication in a dialogical way. This means that every utterance should be analyzed in its context and sequence in a communication flow. This was an aim of this study, as all the imitations were studied in bouts. By analyzing imitative bouts it is possible to explore both the model and the imitator, not only by a single utterance, but at least two (or

more) utterances in a sequence. The context is included in the analysis of imitative responses automatically, because an expression cannot be classified as an imitation without exploring its similarity with the preceding expression (see Linell, p. 73). Furthermore, Linell (2001) argues that quantification of units of discourse is desirable but also challenging as it requires some amount of decontextualizing. The same conclusion can be drawn in the present study. By quantifying it is possible to have more concrete elements which help to understand the phenomenon studied, but it is often that quantification violates the joint nature of utterances to some extent.

Other-orientation is one of the key elements in dialogism and it assumes that humans are interdependent with others (Linell, 2009, p. 13). Other-orientation occurs in interaction where the communication partners address the other, anticipate the next actions of the partner and respond to his or her previous utterances. By doing so the human mind is always focused on the other. Other-orientation was clearly visible in the imitative answers of the child and her parents in the present study. For example, when the parents imitated the child, her last utterance was the basis for the parents' response. Similarly, when making new initiations the parents anticipated the possible actions of the child by using initiatives that belonged to the repertoire of the child. Imitation is indeed a dialogical phenomenon and it has a significant role in orientation towards the other and in the development of the concepts of self and the other.

Another important dialogical concept is communicative agency which consists of experienced communicative relationships. Communicative agency is connected to aspects of dignity and it refers to the subject's experience of being worthy to be listened to by other people. If a person has a resilient communicative agency, she or he is able to cope with difficulties in communication and mutual understanding. Developing and maintaining a resilient communicative agency is only possible if the persons with deafblindness can experience the listening attitude of their communication partners (Nafstad, 2010). It can be argued that the listening attitude is clearly visible in imitative answers. When a communication partner answers to a deafblind person by repeating his expression in a perceivable way, the partner shows that the expression was noticed and heard. By doing so, imitation can also have an important role in strengthening the communicative agency of a deafblind person.

6.6. Clinical significance of the outcomes

It is widely recognised that deafblind children need competent communication partners to be able to develop their communication skills. As parents are typically the most important persons for children, the quality of communication between deafblind children and their parents has to be of great value. The focus of professional practise should be in supporting the interaction between deafblind children and their parents. Emphasis should not be on the not yet emerged communicative abilities of the child. Instead it should be on giving the child an active role in interaction with his or her existing repertoire of expressions (Nafstad & Ask Larsen, 2004; Nafstad & Rødbroe, 1999, pp. 18-19). Essential elements involved in giving an active role to a deafblind child in communication are the adult's sensitivity to the child's expressions and the balanced use of repetition and novelty (Rødbroe & Souriau, 1999).

The use of imitation in interaction creates excellent possibilities to give an active role to the child. This is because an imitative answer makes the imitated expression an initiative irrespective of whether or not it was originally an initiation or not. When a child with deafblindness receives experiences of being a person who can affect other people's behaviour and lead the interaction, it can radically change his or her role in communication. The child involved in the present study had an active role in vocal communication, but she might have had less experience of being an active communication partner with gestural and tactile modes of communication. There was a clear change in her behaviour when the father began to imitate her hand movements in the pool. Suddenly she became an active communication partner who led the game, and she really seemed to enjoy her role as a leader.

This study confirms the findings regarding positive effects of imitation as a strategy to enhance communication (see Caldwell, 2006; Hart 2006; Ingersoll & Schreibman, 2006). Indeed, the results of this study encourage professionals to guide parents of deafblind children to use imitation in communication if the child is in the early stage of language development, exhibiting spontaneous imitation only occasionally and/or making only a limited number of initiatives. Imitation can also be an appropriate way of supporting communication with persons with whom it is challenging to get in contact (see Caldwell, 2006). However, the importance of using imitation as a communication strategy is always best evaluated individually, because imitation as with any other form of support is not appropriate for everybody.

The results of the present study show that imitation was applied easily to the communication by both of the parents regardless of how much they used imitation spontaneously. Imitation was also easily applied to different games and different contexts. This flexibility is very useful in clinical work and it makes it possible to use imitation creatively. However, the experiences from this study show that it is important to evaluate the characteristics of imitation and interaction of the deafblind child and his or her parents first. This knowledge helps professionals to concentrate on the most essential aspects when guiding parents through interactions. There are various characteristics in imitation that can be focused on, such as different communication modes, rhythm, pitch of voice, novelties or modifications etc.

As a seeing and hearing person it is not typical to use tactile elements in communication frequently. It was found in this study that the parents communicated mainly vocally with the child. Tactility is indeed a special characteristic in communication with persons with deafblindness and the communication partner often needs to consciously take this element as a part of his or her expressions. This study showed that the parents were able to add tactile elements in their expressions very creatively. As a result, the expressions with tactile elements triggered many positive reactions from the child. However, as the continuous use of tactile elements in communication occurs intuitively only on rare occasions, the parents need information and concrete guidance. For many deafblind children the main communication mode will be tactile and for some others the tactile modes of communication can give complementary information. Thus, how tactile modes of communication are used has to be evaluated individually and in collaboration with the parents of the deafblind child. The parents need to be given enough time and support to learn these new modes of communication.

One finding of the present study was that the imitative answers of the child were always imitations of the parents' expressions that belonged to her own expressive repertoire. This information can be applied when the focus of the guidance is on strengthening the spontaneous imitation of the child with deafblindness. It is important that the partners express themselves in a way that the deafblind child can perceive them (see Preisler, 2005). It is also essential to assess whether the child can imitate only expressions that belong to his or her own repertoire or also new actions (see Piaget, 1951, pp. 18-34). If the child cannot yet imitate new actions, the parents can focus on using the expressive repertoire of child in interaction and play. These kinds of interactive games where the child can modify his own behaviour to

match the parents' and use his own expressions have been found to be important for later language development (Cress, Andrew & Reynolds, 1998).

The focus of the present study has been on the use of imitation in play and interaction as well as the positive effects of imitation. However, it is important to note that imitation is not the only way to enhance interaction with persons with deafblindness who are in the early stage of language development. Nor it is enough to foster language development alone.

Communication and language development is composed of many different elements and imitation is only one of them. However, imitation provides as a powerful means of enhancing interaction in the early phases of language development when many other methods of intervention might not yet be appropriate.

Future research should aim to explore the characteristics of interaction of deafblind children and their parents. As there are only a few reports in literature on this topic, more knowledge is needed about different aspects of communication. We also need to learn more about the characteristics of communication between deafblind children and their siblings. In the present study the focus was on studying the effects of imitation on three different behaviours. In future research it would be important to concentrate on other factors of interaction that imitation can affect. It would also be interesting to include more parents in the study and explore if there are differences in the amount of imitative answers which they exhibit spontaneously and how these characteristics relate to the behaviour of the deafblind children. It would be also important to do longitudinal studies and document the possible effects of imitation on development of joint attention skills (including the prerequisites of it) and development of play skills in deafblind children.

6.7. Conclusion

The results of the present study show that the parents already used imitation more or less spontaneously in their communication, but the intentional use of imitation made their answers qualitatively different. The use of tactile elements in imitative answers increased in play sessions where the parents used imitation intentionally and the results suggest that this change had a pivotal role in triggering changes in the child's behaviour. After the parents' imitative answers, the child often showed emotional expressions and placed her hands on parents' mouth or face. Occasionally the child also stopped the activity and focused on listening to the parent's voice. All three behaviours can be argued to have positive effects on the child's

communication development. Presumably they also positively affect the parents, as they see the positive emotional expressions of the child and increased interest and attention towards them.

Deafblind children and their parents face enormous challenges in communication. Parents need to learn to understand the meaning of many atypical expressions of the child and find compensatory ways of expressing themselves. It is important that the parents have communication support soon after of their child is diagnosed as having a combined hearing and visual impairment. The parents should have the possibility to receive information about the special characteristics of communication in deafblind persons and concrete guidance regarding interaction. Having experiences of being listened to and understanding others is an important aspect of quality of life. Imitation can be one efficient way of providing these experiences to a child with deafblindness in the early stage of language development. Through imitation it is possible to participate in the journey towards more representational thinking and language.

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**Information letter to parents
(Translation of the original version)**

Appendix A

Dear parents,

In this information sheet I tell about my research project and I politely ask you to participate in the study. I am a speech therapist and I work at The Finnish Federation of The Hard of Hearing. I am doing a one-year study *on deafblindness and communication* at the University of Groningen, in the Netherlands. In my thesis I study interaction between deafblind children and their parents. This topic hasn't been studied much and therefore all new information is valuable. The purpose of the study is to bring more knowledge about the characteristics of interaction between deafblind children and their parents. This information is helpful in planning future interventions.

The study will be made by videotaping play sessions between deafblind children and their parents. The study consists of about 10 videotaped sessions (approx. 30min-1h) and the videotaping will take place at the homes of the families. If parents prefer some other place, videotaping can take place elsewhere also. The study itself consists of two separate parts. In the first part the researcher interviews the parents and collects information about the child. After this free-play sessions are videotaped. In the second part the researcher cooperates with the parents and continues videotaping the play sessions. The study focuses on analyzing communicative characteristics of both parts of the dyad, the adult and the child. There are no certain immediate benefits of the study for the parents or for the child, but the parents have a possibility to learn new aspects of interaction and communication during the research process. After all the play sessions have been videotaped, it is also possible to organize a session with the parents where topics about deafblindness and communication are discussed in more general way. Parents will also be given a copy of the thesis.

I hope to reach from 1 to 3 children with severe dual sensory (vision and in hearing) impairment for my study. Another criterion is that children are in the early phase of their language development, having less than 10 spontaneous words or signs in their expressive vocabulary.

All information presented in the study is anonymous in a way that it cannot be traced back to a particular research participant. The personal information about the child and the parents won't be shared outside of the researcher and supervisors. The data of the study will be stored in a locked space and if parents want, the videotapes can be deleted after the study will be finished. With the consent from the parents the researcher can access the medical information concerning the child, and a research register is compiled. Parents can have a copy of the register for themselves if needed. The information form and the medical documents will be used to collect background information regarding the participants. The supervisors of this study are two professionals in the field of deafblindness: Marlene Daelman from Belgium and Professor Marleen Janssen from the Netherlands. The responsible doctor in Finland is Arja Voutilainen from the Hospital District of Helsinki and Uusimaa (HUS).

Participation is voluntary. You have the right to leave the study for any reason. Leaving the study doesn't affect the services provided to the child. If you would like to participate in this study I would kindly ask you to contact me by telephone. In case you would like to receive more information about the study you can contact me directly. My supervisor can also answer your questions in English.

Best Regards,

Sini Peltokorpi
speltoko@yahoo.com
Tel. xxxx

Supervisor: Marlene Daelman (PhD)
fb688329@skynet.be

Certificate of consent**Appendix B****Name of the child:** _____**Date of birth:** _____**Address:** _____

I allow my child to take part in the study that explores the characteristics of interaction between deafblind children and their parents.

I have been told that the study focuses on exploring the interaction of both deafblind child and the parent in the context of play. It has been clarified that the study will be made by videotaping. The information concerning the child and the parent are used only in this study. Any information concerning the identity or other personal information won't be shared outside of the researcher and supervisors.

The participation is voluntary. I am also informed that I can leave the study for any reason. Cancelling or denying the participation doesn't affect any services provided to the child. Two copies of this consent form have been provided: one for the researcher and another for the parents.

The use of videotapes after this study

	I allow	I don't allow
In scientific research	_____	_____
In education	_____	_____

Place and date: _____**Signature of parent:** _____**Print name of parent:** _____

I commit to store the videotapes in a locked place. All information presented in the study is anonymous in a way that it cannot be traced back to a particular research participant. If parents want, the videotapes will be erased when the study is finished.

Place and date: _____**Signature:** _____**Sini Peltokorpi**