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Water in Action
Encounters among 2- to 3-Year-Old Children, Adults, and Water in Day Care
ABSTRACT

In line with cultural psychology and developmental theory, a single case approach is applied to construct knowledge on how children’s interaction emerge interlinked to historical, social, cultural, and material context. The study focuses on the negotiation of constraints and meaning construction among 2- to 3-year-old children, a preschool teacher, and the researcher in settings with water. Water as an element offers a special case of cultural canalization: adults selectively monitor and guide children’s access to it.

The work follows the socio-cultural tradition in psychology, particularly the co-constructivist theory of human development and the Network of Meanings perspective developed at the University of São Paulo. Valsiner’s concepts of Zone of Free Movement and Zone of Promoted Action are applied together with studies where interactions are seen as spaces of construction where negotiation of constraints for actions, emotions, and conceptions occur.

The corpus was derived at a Finnish municipal day care centre. During a seven months period, children’s actions were video recorded in small groups twice a month. The teacher and the researcher were present. Four sessions with two children were chosen for qualitative microanalysis; the analysis also addressed the transformations during the
months covered by the study. Moreover, the data derivation was analyzed reflectively.

The narrowed down arenas for actions were continuously negotiated among the participants both nonverbally and verbally. The adults’ expectations and intentions were materialized in the arrangements of the setting canalizing the possibilities for actions. Children’s co-regulated actions emerged in relation to the adults’ presence, re-structuring attempts, and the constraints of the setting. Children co-constructed novel movements and meanings in relation to the initiatives and objects offered. Gestures, postures, and verbalizations emerged from the initially random movements and became constructed to have specific meanings and functions; meaning construction became abbreviated. The participants attempted to make sense of the ambiguous (explicit and implicit) intentions and fuzzy boundaries of promoted and possible actions: individualized yet overlapping features were continuously negotiated by all the participants. Throughout the months, children’s actions increasingly corresponded adults’ (re-defined) conceptions of “water researchers” as an emerging group culture. Water became an instrument and a context for co-regulations.

The study contributes to discussions on children as participants in cultural canalization and emphasizes the need for analysis in early childhood education practices on the implicit and explicit constraint structures for actions.
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INTRODUCTION

“…the universe may be understood as a wide network of interactions, where nothing is absolutely independent of other parts”

(Najmanovich, 1995, p. 67).

Children’s everyday worlds in a microscope

Children’s everyday worlds provide an enormous variety of directions for research. In Nordic countries today, children spend more and more time in specially organized institutions such as day care centres and schools with trained professionals (Jensen et al., 2004). Worldwide, the gross enrolment rate in pre-primary education and other early childhood care and education programs was 56% in 2004. In developed industrial countries the rate was 85.3%, whereas in Sub-Saharan Africa the percentage was only 10% — the lowest of all areas. (UNESCO, 2006.)

Even today, in many families, children represent significant economic assets or liabilities: an estimate of 246 million children engage in child labour around the world (UNICEF, 2007).

As the figures indicate, each day children around the world face a variety of contexts and situations in their everyday lives. Nevertheless, there is a common nominator to all of them; from early on, children are engaged in culturally specific routines and begin to engage in activities that form the early precursors for subsequent, socially relevant activity.
In this study, I have chosen very specific situations in order to be able to dwell on the details of the here-and-now unfolding of the events and 2- to 3-year-old children’s experiences and actions. The interest is on how do children observe themselves and the world around them and how do they engage in actions and interactions with social others and material objects. While the events under scrutiny took place at a day care centre in Finland, the practical implications of the research are not restricted to this specific context as the study describes the processes that take place among children, adults, and the material-symbolic setting. Qualitative microanalysis proved to be an efficient tool to understand some of the cultural, social, and psychological complexities of the situations in which children engage in their daily lives.

The competent Nordic child?

This study can be roughly summarized as the result of an encounter between two different backgrounds: the ideological and scientific starting points at the time of the intervention at a Finnish day care centre (1998-1999) and the theoretical-methodological work at the Brazilian Research Centre for Human Development and Early Child Education at the University of São Paulo. I will first describe the Nordic setting. Theoretical-methodological notions will be developed in Chapter 1.

The first idea for the project emerged in 1997 when I worked as a researcher in the Children and Quality group of Services and Quality research and development unit at the National Research and Development Centre for Welfare and Health (STAKES) in Finland. The projects coordinated by the group aimed at improving the quality of early childhood education, particularly public day care services, with different development and research projects in co-operation with professionals in the field. Emphasis was on the active role and participation of the clients, as established by the statutes and proposed in the guidelines for the

Around that time, at the end of 1990s in Finland, discourses about children and childhood were multiple (see, e.g., Alanen, Sauli, & Strandell, 2004). Concepts taken from the sociology of childhood (Prout & James, 1990) were applied in various developmental projects and these notions were applied in public discussions on the quality of day care. Children were seen not only as clients of services or members of families, but positioned as active and competent constructors of the everyday routines and culture (Karlsson, 2000; Kauppinen, Riihelä, & Vesanen, 1995; Riihelä, 1996). The ethnographic studies on children’s interpretative reproduction of culture emphasized the view of a socially skillful and creative child instead of an internalizing (from outside to inside) view of childhood socialization (Corsaro, 2003; 2004; Strandell, 1995). Children were no longer seen as objects to be moulded, but subjects and authors in their own projects constructing knowledge about the world around them.

These notions were also supported by the post-modern paradigm of early childhood education, where the child was seen as an active subject: a constructor of knowledge, culture, and his or her own identity, in interaction with others (Dahlberg, Moss, & Pence, 1999; Karlsson, 2000; Riihelä, 1996; Riihelä & Rutanen, 1998). This view is well summarized in the widely applied words of the Reggio-Emilian psychologist and pedagogist Loris Malaguzzi (1993, p. 10, cited in Dahlberg et al., 1999):

[This] image of children no longer considers them as isolated and egocentric, does not see them only engaged in action with objects, does not emphasize only the cognitive aspects, does not belittle feelings or
what is not logical and does not consider with ambiguity the role of the affective domain. Instead [this] image of the child is rich in potential, strong, powerful, competent and most of all, connected to adults and other children.

In comparison to this image, it is very eye-opening to read Denzin’s (1977, p. 15) critical words from about 30 years ago. He points out how in each society there is a period between birth and maturity where persons are seen as being in-between, as not yet having acquired the attributes of adulthood. Because of this incompetence, assigned and evaluated, socially approved, age-graded institutions are created to transform the children into more competent individuals.

Various different observations and discussions about the position of children in society have emerged since, as pointed out above. However, instead of moving to the other extreme, i.e., critiquing the future-oriented perspective and romantically idealizing childhood as a unique phase, opposite discourses have emerged as well. In these discourses, while children are seen as active and entitled to certain rights, questions are asked about the implications of the notion of the *competent child*, a concept which has been particularly emphasized in the policies and practices prevalent within the Nordic countries (Kristjansson, 2005). For example, Brembeck, Johansson, and Kampmann (2004) discuss further the idea of the competent child and the fact that it could even be a hindrance as far as the view of children as proper humans is concerned. In addition, theoretical discussions about agency as a relative, social phenomenon can be applied to critically review the views where the child is intrinsically active and creative *in nature*; applying Ratner’s (1999, p. 11) words: “To say that individuals are active agents is trivial and vacuous unless the extent and content of agency is considered…The extent and content of agency depends upon the manner in which social activities are organized.” (See also Rainio, forthcoming, 2008).
The prevailing discussions at the end of 1990s directed my interest to study children under three years of age. Various researchers in Finland have investigated children’s play, interaction, and agency at day care centres (Hakkarainen, 1990; Helenius, 1993; Hännikäinen, 1995; Kronqvist, 2004; Lehtinen, 2000; Mäntynen, 1997; Niiranen, 1995; Riihelä, 2000; Strandell, 1995). However, only a few studies have focused on the youngest children despite the public concern about the lack of these studies (Helenius, Karila, Munter, Mäntynen, & Siren-Tiusanen, 2001; Lyytinen & Lyytinen, 1996; Riihelä, 1996; Ruoppila et al., 1999; Sosiaali- ja terveysministeriön asettaman valtakunnallisen varhaiskasvatustyöryhmän muistio [Memorandum of the Committee on Early Childhood Education], 1999). On the other hand, mother-infant interaction is being studied and theoretical developments in this area progress both in Finland (e.g. Jakkula, 2002) and abroad (e.g. Trevarthen, 1998).

The mainstream of contemporary studies in psychology on young children’s interaction seems to focus either on how children interact with their peers or to investigate the interaction among child/ren and adult/s, usually the teacher or the mother. A few studies in developmental psychology investigate children’s everyday experiences from the viewpoint of them being, continuously and simultaneously, engaged in various relations in a complex semiotic, material, and cultural context (Amorim, 2002; Rossetti-Ferreira, Amorim, & Silva, in press, 2007; Rossetti-Ferreira, Amorim, Silva, & Carvalho, 2004; Silva, 2003; Solon, 2006; see also www.iscar.org/). Sociology and early childhood education, on the other hand, include variety of widely applied theoretical tools for investigating actions in institutional contexts (Corsaro, 2003; 2004; Lehtinen, 2000; Metsomäki, 2006; Strandell, 1995).

Following these contemporary thoughts, instead of proposing a dual picture of adult-controlled institutions and a separate peer culture among children, somewhere outside of the adults’ reach, this research intends to...
focus on the microanalysis of emerging actions by both children and adults in the situations constructed for children’s explorations with water.

**Summarizing the aims of the study**

This study applies a single case approach to construct knowledge about negotiation of constraints and construction of meanings among 2- to 3-year-old children and adults. The unit of analysis is not an individual child in relation to another: rather, the analysis focuses on the nonverbal and verbal negotiation among all the participants of the situations, including adults.

The following questions will guide the analysis: What occurs among children in situations where adults have invited them to play? How are the constraints of actions negotiated among children and adults? What kind of meanings emerge and how does this happen? What is the role of material objects? How are the sessions dynamically interconnected? How does children’s relation to the main object (water) change?

In the qualitative microanalysis, I will first focus on each recording session as an individual case. Subsequently, the specific moments of change are discussed in relation to the transformations during the months covered by the study. Moreover, the aim is to analyze the process of data derivation reflectively. Using video recordings, notes from the field, and tape recorded discussions, the goal is to draw together the movements of meaning making during and after the intervention.

The study deals both with the (small scale) history of the context and the personal cultural history of the participants. Water as an element offers a special case of cultural canalization since parents or other caretakers selectively monitor and guide children’s access to it. As a result, the applicability of Jaan Valsiner’s zone concepts (ZPA/ZFM) as organizers of development will be discussed in relation to the particular material derived here.
PART 1. THEORETICAL AND METHODOLOGICAL CONSIDERATIONS: INVESTIGATING CHILDREN’S EVERYDAY WORLDS
1. CULTURAL, SOCIAL, AND SEMIOTIC NATURE OF ACTION: DEFINING CONCEPTS AND APPROACHES

Before presenting the intervention at the day care centre, I will focus on the theoretical-methodological ideas applied in this work. The first question will be: how to understand, conceptualize, and analyze the here-and-now situation, actions, and meaning construction occurring among children in situations where adults are observing them?

In this study, the main theoretical ideas are derived from sociogenetic theory, particularly Valsiner’s (1997, originally 1987; see also the upcoming book on cultural psychology, in press, 2007) co-constructivist theory of human development, Fogel’s (1993) relational and systemic approach to human development, and the Network of Meanings perspective developed by the CINDEDI research group (Amorim, 2002; Rossetti-Ferreira, Amorim, & Silva, 1999; In press, 2007; Rossetti-Ferreira et al., 2004).

1.1. Dialogues with and behind the material

During the history of psychology there has been movements towards holistic approaches, in order to overcome the division into dualities such
as material-symbolic, individual-social, human-environment, and biological-cultural, and to provide insights into how these might be separated inclusively, rather than exclusively. In this study, the case of a dyad of children will be discussed in relation to the dialogical relation and interaction among individuals and the social/physical world. The material environment is understood as social and cultural; objects are cultural, social, and physical, and have symbolic elements in interaction with humans. Following Moro and Rodríguez (1998), an “object contains a human dimension and as such constitutes a social object” (p. 4).

Later on in this chapter, I will focus on the Network of Meanings perspective (e.g. Rossetti-Ferreira et al., in press, 2007; Rossetti-Ferreira et al., 2004) and discuss in more detail Valsiner’s (1997) theoretical work focusing on constraint structures. The role of the material is discussed in elaborate ways within various other perspectives as well. The common nominator for these approaches is that the material world is not separate from the social or the semiotic; rather, all these are interlinked.

The material and the body in dialogues is addressed in contemporary work in the sociology of knowledge in which the actor status is not limited to humans but discussed in relation to material objects (Latour 1988; 1996; 1997; Law 1997a; 1997b). While I am not directly applying the works of Actor Network Theory (ANT), various writings emphasizing the role of non-human actors have inspired me and reminded me of the role of the material world in human interaction.

The material is a network of relations; objects are “the effect of performative stabilization of relational networks. Material objects are enactments of strategies, and actively participate in the making and holding together social relations” (Pels, Hetherington, & Vandenberghe, 2002, pp. 11-12). In interaction, material objects gain symbolic meanings and establish relations with other objects; “objects need symbolic framings, storylines and human spokespersons in order to acquire social lives; social relationships and practices in turn need to be materially grounded in order to gain temporal and spatial endurance” (ibid.). (See
also the special issue on Sociality/Materiality in *Theory, Culture & Society* 2002, 19, pp. 5-6.

Latour (1996) addresses the question focusing on the network of relations behind face to face interactions:

We say, without giving the matter too much thought, that we engage in 'face to face' interactions. Indeed we do, but the clothing that we are wearing comes from elsewhere and was manufactured a long time ago; the words we use were not formed for this occasion; the walls we have been leaning on were designed by an architect for a client, and constructed by workers — people who are absent today, although their action continues to make itself felt. The very person we are addressing is a product of a history that goes far beyond the framework of our relationship. If one attempted to draw a spatio-temporal map of what is present in the interaction, and to draw up a list of everyone who in one form or another were present, one would not sketch out a well-demarcated frame, but a convoluted network with a multiplicity of highly diverse dates, places and people. (p. 13)

While Latour and colleagues work in the field of sociology of knowledge, similar ideas about the dialogues behind the material and face to face encounters, and the material conditions for human activity and cultural practices, are discussed in various works on cultural and developmental psychology (Cole, 1998; Costall, 1995; Gibson, 1979; Hermans & Kempen, 1995; Rogoff, 2003; Tomasello, 1999). Hermans and Kempen (1995) give an example of a scientist driving to his institute:

... to illustrate that the person involved in action (e.g. driving a car) is not simply “alone” and acting as an isolated individual, but continuously part of a society in which other people are indirectly co-construing the individual action. The performing person is using tools (e.g. a car and its accessories) that have a particular cultural value and therefore, the action is a mediated action in a variety of ways. The
example also shows that other persons can play a more active and direct role in the immediate construction of an action (e.g. cooperation among colleagues in order to produce a book) than others. (p. 104)

Social others are the others around and within us; there are historical dialogues within (behind) the material world. In other words, other people are present and playing an indispensable role in all our actions even when we are alone.

**Children and objects’ affordances**

Studies in developmental psychology have focused the discussions on young children’s actions related to particular cultural/material contexts. Tomasello and colleagues (Striano, Tomasello, & Rochat, 2001; Tomasello, 1999; Tomasello & Rakoczy, 2003) have studied 2-to 3-year-old children and their use of objects in play. To summarize Tomasello’s and his colleagues’ discussion, children tune into the intentional dimension of artefacts people have created to mediate their behavioural and attentional strategies in specific goal-directed situations. Children join the (cultural) action by using artefacts which include intentional affordances that the child is tuned into; the child interprets the meaning of the artefacts for action. Using Tomasello’s (1999) example, “a cup is not only a sensory-motor object, and not only a symbol for a hat, but it is also a cultural artefact with intentional affordances for drinking” (p. 34).

Previous studies give reason to assume that children have an understanding of adult intentionality in different situations. Tomasello and Rakoczy (2003) interpret evidence about children’s understanding of shared intentionality on the basis of a study in which Tomasello and

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1 *Affordances refer to action possibilities latent in the environment; they are always dependent of the capacities of the actor. Affordances are jointly determined by the environment and the organism. (Gibson, 1979.)*
colleagues provided 18- to 30-month-old children toys and objects to play with. The 2- to 3-year-old children looked at the experimenter more often after performing a symbolic action than after performing an instrumental action. Children also looked at the experimenter longer after the symbolic action than before the action or during it. (Striano et al., 2001, p. 452.)

Striano, Tomasello and Rochat (2001) discuss the results:

Our interpretation is thus that 2-to 3-year-old children understand something about what different types of objects are “for”, what “we” do with them. Replica toys are made for symbolic play and so the children know how to incorporate them in symbolic acts. Natural objects are not made for symbolic play — indeed, it is not clear what things such as sticks and stones are made for, if anything, in the child’s experience — and so they afford symbolic interactions less well than replica objects. Instrumental objects are made for activities that are not symbolic play, and so to use them as vehicles in an act of symbolization requires an additional step. Instrumental objects present children not only with a dual representation problem as any physical objects used as symbols, but also with a triune representation problem originating from sensorimotor and symbolic affordances, as well as competing instrumental affordances of the object (Tomasello 1999). (p. 450)

While Tomasello and colleagues have emphasized the symbolic use of replica toys, other studies have shown that children do use “natural objects” symbolically as well. For example, a collection of articles from Brazil discusses the ways in which children use symbolically the objects available (such as pieces of wood, rocks) in their everyday environments (Carvalho, Magalhães, Pontes, & Bichara, 2003).

Tomasello and colleagues also acknowledge the emergence of novelty in play. In play, instead of using objects conventionally, children engage in a non normative use of objects and “children can play with the normal, conventional use of symbolic artefacts such as words, and be
amused by that, in much the same way they play with the normative uses of material artefacts” (Tomasello & Rakoczy, 2003, p. 132).

When discussing children’s play, one cannot omit Vygotsky’s work on the interlinkedness of context and action, and further, children’s emancipation from situational constraints. On the basis of Lewin’s experiments, Vygotsky (1978, p. 96) argued that “to a considerable extent the behaviour of a very young child…is determined by the conditions in which the activity takes place…” He refers to Lewin’s idea of psychological topology and his studies of the trajectory of children’s movements in a field with forces. Vygotsky (1978, pp. 96-97) also underlines the specific nature of play in relation to the situational constraints: “But in play, things lose their determining force. The child sees one thing but acts differently in relation to what he sees. Thus, a condition is reached in which the child begins to act independently of what he sees”, and further, “The creation of an imaginary situation is not a fortuitous fact in a child’s life, but is rather the first manifestation of the child’s emancipation from situational constraints” (p. 99).  

Following Vygotsky’s and Luria’s (1984/1994) ideas, children’s field of attention does not coincide with the field of perception. With the help of the indicative function of words, “the field of perception is organized by the verbalized function of attention” (pp. 132-133). With words, the child is able to evaluate the importance of the perceived field: “…singling out ever new “figures” from its background…All this frees the child’s attention from the power of the actual situation that immediately affects it. Creating along with the space field for its action, with the help of speech, a time field just as visible and real as the optic situation (although, perhaps more vague) the speaking child obtains the possibility of dynamically directing its attention, acting in the present from the viewpoint of the future field, and often reacting towards the changes actively created in the present situation from the point of view of the past activities” (pp. 132-133).
In addition to the cultural or symbolic uses the objects afford, the material environment can relate to children’s actions in terms of spatial constraints for play and interaction. Studies have shown that the spatial arrangements can affect the amount of interaction among children, either increasing or reducing the contacts children have with each other. Children seem to interact more in rooms where the space is divided in small areas by low walls, shelves, or other similar constructions which still allow them to see the adult. These small areas for play favor the creation and maintaining of interaction within small groups of young children more than open spaces in which the adult and other children can interrupt the construction of play more easily. (Campos de Carvalho & Bonagamba Rubiano, 1994, p. 121.)

As discussed in this chapter, the interlinkedness of material and social is acknowledged in variety of approaches to human communication and action. Next, I will discuss a perspective particularly influential for this study. One of the starting points developing this perspective has been that culturally structured environments are interlinked to processes of meaning making within here-and-now situations. Individual and cultural processes are mutually constitutive rather than theoretically or empirically separated.

1.2. The Network of Meanings perspective

After the intervention and video recordings on the field (1998-1999), the elaboration of the theoretical background and data derivation took significant developments, when I stayed as a visiting graduate student at the Brazilian Research Centre for Human Development and Early Child Education (CINDEDI), at the Faculdade de Filosofia, Ciências e Letras campus of the University of São Paulo in Ribeirão Preto. The CINDEDI is a group coordinated by Professor M. C. Rossetti-Ferreira and formed by professors, researchers, lecturers, students, and practitioners with a
lively national and international network of collaboration. The theoretical-methodological ideas published and discussed today have more than 15 years of history of thoughts and work in practice. (Rossetti-Ferreira et al., in press, 2007; see also http://www.ffclrp.usp.br/english/)

Through this contact, discussions, and later readings, the theoretical assumptions for the present study were re-structured. At the CINDEDI, I was acquainted with the theoretical core of the Network of Meanings perspective, which addresses the co-constructive, interlinked nature of organisms and environments (Rossetti-Ferreira et al., 1999; in press, 2007; Rossetti-Ferreira et al., 2004). It is a theoretical and methodological tool elaborated for investigating and understanding human developmental processes, based mainly on the theoretical and empirical work within the socio-historical or cultural-historical approaches on human development (e.g. Bakhtin, Bruner, Valsiner, Vygotsky, and Wallon). This Brazilian theoretical-methodological tradition, collaborating with various universities nationally (Brasília, Pernambuco, São Paulo, Campinas) and internationally (Portugal, USA, Norway, Italy, France) is in the forefront of contemporary sociocultural research (Rossetti-Ferreira et al., in press, 2007; Rossetti-Ferreira et al., 2004; Valsiner & Rosa, in press, 2007; see also presentation at http://www.issbd2006.com.au/speakers.php).

Network of meanings refers to the configuration of meanings that results of the dynamic and dialectic relations among various “factors” related to human development (personal components, interactive fields, scenes, and the socio-historical matrix):
The network configuration is understood as a milieu / moyen, which, at each moment and situation, delimits, frames and attributes some possible meanings to the situation and to each partner’s behaviour, setting them in a certain position, favouring certain meaning making, disposing a repertoire of possible roles, constraining the flow of behaviour and development

(Rossetti-Ferreira, Amorim, & Silva, 2002).

The dynamic network has a semiotic configuration, composed by organic, physical, interactional, social, economical, cultural, and political elements. The changing configuration of the network emerges from the interrelations among the elements, which “structure, signify, and canalize a set of possible actions, emotions and conceptions, acting as constraints on the situation, providing possibilities and limits to the persons’ behaviors and development.” (Rossetti-Ferreira et al., in press, 2007, p. 2/29 of the draft).

In developing the perspective, the CINDEDI group has applied Valsiner’s (1997; 1998) notion of constraint, emphasizing the system of constraints as canalizing the development to some direction. Constraining “is the enabling of the process of emergence of novel phenomena through creation of temporary partitions (limits) within a field of (previously) indeterminate possibilities” (Valsiner, 1998, p. 50). Together with the limitation of the next move, the system of constraints opens possibilities to novelty. The concept of constraint allows a discussion of two of the main assumptions of the perspective: the interlinkedness of person and context and the developmental trajectories as neither determinate nor totally indeterminate (Rossetti-Ferreira et al., 2004; Silva, 2003; Valsiner 1997; 1998).

In the approach, the empirical analysis focuses on the production of meanings in specific situations in order to understand the negotiation of roles and counter-roles that are assumed, attributed, confronted, negotiated, and/or modified in the ongoing situations (Oliveira, 1988).
The actions of one person are confronted by the role assumed by the partner, although this does not occur in all cases. This dynamic structure sets up ranges of possible actions that derive from role and counter-role negotiations (Oliveira & Rossetti-Ferreira, 1993.)

Furthermore, the whole here-and-now situation and its participants are understood as immersed in a semiotic, discursive mesh in which the socio-historical matrix has certain concreteness. The notion of matrix comes from Amorim’s (2002) study according to which the socio-historical matrix is composed by social, economical, political, historical and cultural elements and has a semiotic nature. In line with the idea of the materiality of the sign, the matrix is assumed to have concreteness in the here-and-now situations, constraining the flow of actions.

The Network of Meanings perspective emphasizes the figure-background movement: something in the interactive situation is highlighted as figure, while other possibilities of meaning making remain on the background. Network is a dynamic metaphor enabling to overcome the problem of the inside-outside distinction, for it is not possible to locate it neither inside nor outside. It is interaction; it is among. Yet, the network metaphor acknowledges differences among subjects: each has their own network configuration, as past experiences

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3 According to Valsiner (2004, p. 47), if a perspective claims to focus on dynamic relationship of the organism and the environment, the starting point is some version of a field theory (referring to Valsiner & Diriwächter, 2005) or uses dynamic-structural metaphors (such as the web by Fischer & Bidell, 2006). Other theoretical-methodological perspectives for holistic understanding and studying human development and action can be found in the work of Bronfenbrenner at Cornell University, Thelen and Smith at Indiana University, Engeström at the University of Helsinki, and Järviilehto at the University of Oulu, just to name a few of the contemporary developments.
and expectations — the personal history of meaning making — are necessarily different among individuals.

In the field of developmental and cultural psychology, within the sociogenetic, constructivist, and co-constructivist traditions, the focus is on describing the mechanisms and processes of interdependence of child development and the social world (Valsiner, 1995; in press, 2007). In line with these traditions, the Network of Meanings perspective attempts to study processes of production and transactions of the senses and meanings instead of focusing on the developing individual excluded from social and cultural contexts. The perspective is also in line with developmental science (Cairns, Elbers, & Costello, 1996), emphasizing the dynamic interplay of processes across time frames, levels of analysis, and contexts.

As a tool for reflecting upon my position within the process, and analyzing the concreteness of the various levels of meaning making in the here-and-now situations, the Network of Meanings perspective proved to be valuable in the analysis of the conditions of production of this study. I understood the importance to discuss the changes that occurred, the various contradictory interests and assumptions that pertained to the basis of this knowledge production and were visible in the here-and-now actions of the participants. Thus, not only the video recordings but the recorded discussions with mothers and teachers, the documentation made by teachers, and the field diary I kept were taken under examination (see Chapter 4. Deriving the corpus of material).

As such, in line with the Network of Meanings perspective, this work is situated within the contemporary framework of idiographic science (Molenaar, 2004; see also International Journal of Idiographic Science, www.valsiner.com); instead of focusing on variation between cases (interindividual variation), the study focuses on time-dependent variation within a single case (intraindividual variation).
1.3. Constraint structures in the person-environment relation

Valsiner's (1997; 1998) theoretical account of the dynamics of organism-environment transactions in bounded indeterminacy in development is based on the elaboration of the idea of constraints in development. As already mentioned in the previous chapter, to Valsiner constraints are hierarchically organized fields regulating the process of development:

…a constraint is a regulator of the move from the present to the immediate future state of the developing organism-environment system, which delimits the full set of possible ways of that move, thus enabling the developing organism to construct the actual move under a reduced set of possibilities


In the microgenetic context of development, persons are “pulled from” or “pushed to” a certain direction by a social other (such as a teacher, a researcher, another child) or by personal goal orientations.

In human development, semiotic and action levels are interdependent and organized by constraint structures. In Valsiner’s (1997) theory, these structures are conceptualized in terms of three zone concepts: Zone of Free Movement (ZFM), Zone of Promoted Action (ZPA), and Zone of Proximal Development (ZPD). These concepts are viewed as the organizers of development both interpsychologically and intrapsychologically (as semiotic regulation of thinking, feeling, and acting). “The environment of the developing child is structured by sets of boundaries that define different environmental zones” (Valsiner, 1997, p. 186), and further, “zones specify the immediate present — to future possibilities for the action (and mediation) system, and provide the here and now temporary structure for actual development” (p. 208).
**Zone of Free Movement (ZFM)**

Originated in Lewin’s (1933; 1939), the Zone of Free Movement (ZFM) structures “a) the child’s access to different areas in the environment b) the availability of different objects within an accessible area, and c) the child’s ways of acting with the available objects in the accessible area” (Valsiner, 1997, p. 188). Eventually, the physical constraints that originally structure the ZFM may give way to of intrapersonal psychological constraints, of ZFM of personal thinking and feeling that becomes internalized.

The Zone of Free Movement also depends on adults’ actions; according to Valsiner (1997, p. 189) it is “based on the meanings of different aspects of the environment for the social other (sibling, teacher) who is the leading organizer of the Zone of Free Movement for child,” and further, “negotiations of ZFM boundaries in the realm of actions can lead not merely to the reorganization of those “actions fields” but also to the reorganization of the domain of semiotic mediation (the “mediational field”). Once the latter is reorganized, it regulates further the field of actions” (p. 201).

**Zone of Promoted Action (ZPA)**

The Zone of Promoted Action (ZPA) is “a set of activities, objects or areas in the environment, in respect of which the person’s actions are promoted” (Valsiner, 1997, p. 192).

**Zone of Proximal Development (ZPD)**

Valsiner’s (1997) application of the Zone of Proximal Development (ZPD) has its origins in Vygotsky’s concept; it is a narrowed-down extension of Vygotsky’s concept, entailing the “set of possible next states of the developing system’s relationship with the environment, given the current state of the ZFM/ZPA complex and the system” (p. 200). In
other words, ZPD is a zone that includes the actions (within ZFM) that the child is able to do with the help of the promotion efforts of the adults (ZPA). (See also Silvonen, 2004.)

**ZPA/ZFM/ZPD relations**

Valsiner (1997) describes the relations among these zones as follows:

Developmental process is constrained “from the outside inwards,” so to speak. At each level of organisation, starting from the primary (i.e. actions level), the ZFM delimits the “outer boundaries” of the field at the given time. This defines the boundary areas where negotiation about further development is going on. Further differentiating that ZFM structure is the set of highlighted (promoted) actions (ZPA). (…) The crucial point is again the notion of bounded indeterminacy — the range of possibilities within ZPD, given the previous ZFM/ZPA complex, is defined, yet which of those options is going to become actualized remains to be negotiated in the actual development. (p. 203)

In line with Valsiner’s work, Winegar (1988, p. 9) defines constraints as the boundary conditions within which some actions of the child are promoted and others are discouraged by the social others. Winegar (1988) describes constraining in the following way:

Both the physical and social environment provides information for performance that organizes and constrains children’s action. Similarly, just as children’s levels of sensory-motor development structure their exploratory manipulation of objects, children’s levels of social understanding constrain their choice of action during social encounters and limit information that they can extract from exchanges with social partners. Further, social others provide additional constraining of children’s actions, perceptions, and representations in efforts to channel children toward appropriate social functioning. (p. 3)
While constraints may become encoded in some fixed form, they are maintained in a dynamic steady state. Their form may become materially fixed; yet, the function of such materialized constraints is maintained by dynamic semiotic processes (Valsiner, 1997, p. 182).

The discussion about constraints is returned later on together with the analysis of the empirical material. Next, I will discuss the main insights from studies on child-child interaction.

1.4. Interactions as spaces of construction

The review of previous literature in the next chapter on child-child interaction will show that researchers have understood and conceptualized interaction in a very polysemic way and they have also followed diverse theoretical itineraries to construct their empirical material. In this section, I will present the main applications relevant for this study.

Pedrosa and Carvalho have studied young children’s interaction with various collaborators for decades; the earliest discussions date back to the 1970s (Carvalho, 1988; Carvalho, 2004; Carvalho & Pedrosa, 2004a; 2004b; Carvalho, Império-Hamburger, & Pedrosa, 1998; Pedrosa, 1989; Pedrosa & Carvalho, 1995; Pedrosa & Carvalho, 2006; Pedrosa, Carvalho, & Império-Hamburger, 1997). As for their theoretical background, they apply both cultural-historical approaches (Wallon, Piaget, and Vygotsky) together with ethological approaches (Hinde) and systems thinking (Maturana and Varela). They discuss social interactions in play groups as a topos (i.e., a meaningful space) for development (Carvalho et al., 1998; Carvalho & Pedrosa, 2004a; Pedrosa, 1989; Pedrosa et al., 1997; see also Lyra & Rossetti-Ferreira, 1995); the subject is constituted in interaction: social interaction is a space of inter-regulations in which psychological processes are constituted (Pedrosa, 1989; Pedrosa & Carvalho, 2006). Following this, both emotion and
communication are essentially interactional or “relational”, occurring within the psychological space between one body and another, even though they have individual dimensions.

In various works, these scholars have criticized the usual descriptive or operational concept of interaction, defined by a reciprocated social exchange. As Pedrosa (1989, p. 7) points out, different studies of “interaction” have lost or modified their focus on “action between” (“ação entre” — “interação”) in their handling and analysis of empirical data because of the difficulty of translating the theoretical concept to observable parameters.

Pedrosa and Carvalho conceptualize interaction as a theoretical, hypothetical phenomenon. Interaction is a state or a (hypothesized) process of reciprocal regulation, interpreted on the basis of the individuals’ behaviours: “Concept of social interaction presupposes a relation of regulation or reciprocal influence among individuals” (Pedrosa, 1989, p. 7, referring to Branco et al., in press; Carvalho, 1988; Pedrosa & Carvalho, 1987). In other words, interaction is not an “observable”; rather, what one observes is the behaviour, actions, and states of individuals (or events) in interaction (Carvalho, 1988, p. 512; Carvalho et al., 1998). Furthermore, theoretically speaking, there could be interaction (regulation) between people in the form of implicit rules of a group and not only by manifested behaviour (Pedrosa, 1989, p. 7).

The movement and transformation of the interactional space among children is discussed with various examples in Pedrosa’s work (1989): reciprocal regulation was evidenced in the behavioural level “as a series of adjustments of actions that compound a joint activity” (p. 172). In theoretical terms, reciprocal regulation, following Pedrosa’s (1989) study, “is a process of mutual adjustments through which an agreement about meaning, or a shared meaning, is reached” (Carvalho et al., 1998, p. 168).

As interaction is something to be explained by the combined effects of the interacting elements, or something “that occurs between them,
implying an interindividual psychological space, or inter-individual relationships as units of analysis” (Carvalho, 2004, p. 3), Carvalho and Pedrosa have proposed *interactional episode* as the unit of analysis. (The issue of unit of analysis will be discussed further in Section 2.4. *Qualitative microanalysis* and Section 3.3.3. *Dialogical approaches: interaction as being.*)

Fogel (1993, p. 6, 19) refers to this simultaneous coordination with the term *co-regulation*; in co-regulation, “individual joint actions blend together to achieve a unique and mutually created set of social actions.” Co-regulation is the social process involving dynamic alterations of behaviour with respect to the partner’s behaviour. According to Fogel and Branco (1997), *dialogue* can be defined as co-regulated if “a) there is a simultaneous mutual adjustment of action and b) the dialogue yields emergent novelty and mutual creativity; that is, the communication is more than the simple sum of its partners’ input” (p. 68).

The conception of interaction as the potential of regulation between the components widens the notion of interaction, as it is not necessarily always mutually directed or reciprocal. In regulation, the individual’s actions can be altered with respect to the partner’s actions without evidence of reciprocity. Nevertheless, *a potential* for reciprocal regulation exists.

### 1.5. Field of meanings

In co-regulation (or reciprocal regulation), *shared meanings* emerge as mutually constraining influences (Carvalho, 2004; Carvalho et al., 1998; Fogel, 1993; Pedrosa, 1989; Pedrosa et al., 1997). Meanings are constructed when two or more individual share them. This leads to the emergence of a new quality in the system; more complex collective states are activated. In the system, a field of meanings (or field of information)
emerges, defined as “places (loci) where the objects of thought and experience are situated” (Pedrosa et al., 1997, p. 136).

The field of meanings is constituted by “linguistic expressions, such as body movements, gestures, sighs, laughs and other manifestations besides verbal language, it includes cognitive and emotional features” (Fogel et al., 1992, cited in Pedrosa et al., 1997, p. 136; also Fogel, 1993; Carvalho et al., 1998). Information created in interaction can “…be anything that is perceived and created through co-regulated interactions with objects and people: information can be in the form of body movement, emotion, thought, memory, or sensation” (Fogel, 1993, p. 90).

Pedrosa and colleagues (1997) apply Haken’s (1988, p. 23) idea of space of information as a “medium” to which individual parts contribute and obtain information on how to behave; “In our context, the space of information is a supraindividual or interindividual locus where information is created and exchanged, and shared attributions of meaning take place” (p. 136).

Corresponding to a field of information regulating the actions, from a sociocultural viewpoint, and a dynamic systems perspective, Lyra and Valsiner (1998) describe an inclusive separation of the two fields, the action field and the semiotic field. In addition to the differentiation of the fields, another main point is the hierarchical organization of human development. The action field (the domain of human action) is regulated by the semiotic field. Furthermore, the fields constitute a bi-directional relation in which signs emerge from the action field and become superordinate to that field, forming the semiotic field. (Pp. 5-6.) Valsiner (1998) describes the relations between the semiotic field and that of actions as being one-to-many rather than one-to-one:

A particular meaning constructed within the semiosphere constrains multiple specific actions, allowing different (even seemingly contradictory) actions to be justified by the same meanings. Similarly
every act of conduct (within the field of actions) is polysemous in its meanings — it constrains the construction of multiple personal senses at the semiotic level. (p. 76)

Following this construction of signs, human environment “becomes a semiosphere (Lotman, 1992),” that is, “a bounded field of heterogeneous structure of semiotic mediating devices that are constructed and guided by human actors” (p. 235; see also Valsiner, 2006).

Like Vygotsky, Valsiner (1997) makes a difference between personal sense and cultural meanings:

New meanings can emerge in a culture as a result of convergence of the personal sense of different individuals. Meaning, thus, is not a pregiven and immutable ideal entity, but a by-product of social transaction that is used to regulate person-environment relationships. (…) The children’s environments are structured by the cultural-historical meanings that they include. The meanings are coded into objects and events of the particular child’s environment through the actions of the people who surround the child and on the basis of their personalized senses derived from the meanings. Within such culturally structured (meaningful) and personalized (“sense-ful”) environments, developing children invent (or reinvent, by imitation) novel ways of acting and thinking, out of which only those that end up being accepted by the child and his social environment might be retained. (p. 156)

This quotation develops the idea of field of meanings further, linking meanings and senses to the discussion of material environment. The concreteness of the semiotic field is emphasized as the meanings are coded into culturally structured environments (see also Amorim, 2002).

4 See also the discussion in Chapter 1.1. Dialogues with and behind the material, where I refer to Vygotsky’s discussion of children’s emancipation of situational constraints in play.
In this section, I have discussed the field of meanings and the regulatory function (of actions) within the field of meanings (see also related approaches by e.g. Cole, 1998; Rogoff, 2003). An important aspect to underline here, also in relation to the empirical part of this study, is the issue of temporal duration and repeatedness of the regulations and the co-construction of meanings. This will be the topic of the next section.

1.6. Abbreviation in meaning making and relationships development

Fogel & Branco (1997) define relationships as communicative systems composed of three mutually embedded levels:

a) the level of communication occurring in the present moment: the direct dialogue that occurs between participants, b) the level of the relationship, which involves a temporal domain of the history and future of the communication in the particular dyad or group of individuals, and c) the sociocultural-contextual level in which communication and relationships are embedded within cultural scripts, roles, and expectations, and larger social-contextual systems, such as family, peer group, work group, church, community, or society (Bernal & Baker, 1979; Branco & Valsiner, 1992). (p. 72)

Similarly, this study emphasizes the interlinkedness of these levels. To discuss the multilevel changes in relationship development, a concept of abbreviation has been introduced in studies on mother-child interactions (Lyra & Rossetti-Ferreira, 1995; Lyra & Winegar, 1997; Souza, Villachan-Lyra, & Lyra, 1997). It will be also applied here.

Abbreviation refers to the moments of quasi-stability in this development of relationships. Similarly to co-regulated actions and the resulting correlation (Pedrosa et al., 1997), in abbreviation the mutual adjustments that were previously part of the relationship development
move to the background and other actions get highlighted as figures. In addition, the duration of the exchange is reduced, as “the abbreviated negotiations are immediately established, during short periods of time, in a smooth and mutually adjusted way” (Souza & al., 1997, p. 5). A related concept, *ritualization*, will be presented with the subsequent analysis of the empirical material.

In Souza’s and colleagues (1997) study, abbreviation is discussed together with the concept of Dialogical Highlighting Dynamics. Similarly to Carvalho’s and Pedrosa’s (Carvalho et al., 1998; Pedrosa et al., 1997) and Fogel’s (1993) discussions of co-regulation (mutual adjustments) and framing, the Dialogical Highlighting Dynamics refers to the dyadic highlighting of some elements within the flow of partners’ actions bringing some actions more definable as a figure (Souza et al., 1997, p. 3; also Lyra & Rossetti-Ferreira, 1995). Lyra and Rossetti-Ferreira (1995, p. 61) describe this dynamics as a process of creation of meanings based upon the partner’s actions: “These created meanings have an intersubjective nature, the primary function of which is to mediate the process of dyadic relationships.”

To summarize these ideas, the history between the person, the relationship development and the co-created meanings (field of meanings) mediate (regulate) the individuals’ actions. (See also Section 1.5. *Field of meanings*).

As presented here, in this study, I apply a relational approach in which the focus is not on the individual but on relations (Carvalho & Pedrosa, 2004a; Carvalho et al., 1998; Fogel, 1993; Lyra & Rossetti-Ferreira, 1995; Rossetti-Ferreira et al., 2004). I apply the notion of interactions as spaces of construction where negotiations of constraints for actions, emotions, and conceptions occur by the individuals. *Context* is the background for a temporary figure to emerge, a basis for interpretation of the figure. The actions of the participants gain particular meaning within the (context of) dynamics of the field of interactions.
2. SCIENCE AS CONSTRUCTION

This study affiliates with a co-constructivist ontology-epistemology that is in line with hermeneutic, interpretative approaches to knowledge construction (Branco & Valsiner, 1997; Guba & Lincoln, 1994; Rossetti-Ferreira, et al., 2004; for interpretative approach in childhood socialization see Gaskins, Miller, & Corsaro, 1992). The goal is to approach the world by explicit and assessed descriptions that are also understood as having a feed forward role in (re)constructing the world. An underlying natural world embedded in natural laws is assumed, as well as a restricted possibility to translate the complex world of linguistic and non-linguistic meanings to written descriptions.

2.1. The methodological cycle

Methodology refers not only to the procedures described in one part of a research report; rather, it comprises the assumptions about the world, theories, understandings of the pertinent phenomena, and “ways of constructing specific methods to transform some aspects of the phenomena into purposefully derived data” (Valsiner, 2004, p. 10). It is “the process of goal-oriented thinking and interventional procedures used by the investigator in interaction with the investigated phenomena, which leads to the construction of new knowledge” (Branco & Valsiner, 1997, p. 39). In other words, neither qualitative nor quantitative data are
collected but derived from phenomena, on the basis of the investigator’s reasoning (Valsiner, 2004, p. 10, referring to Kindermann & Valsiner, 1989; Valsiner, 2000).

Branco and Valsiner (1997) describe the methodological cycle uniting empirical and nonempirical sides of the research process:

Knowledge is constructed in a dynamic methodological cycle in which the researcher’s general assumptions about the phenomena set constraints on theoretical constructions. The theoretical constructions set constraints on the construction of methods in conjunction with the researcher’s ability to access the phenomena in the research process. Finally, the interaction of the methods and the phenomena leads to the construction of the data. The data, in their turn, can constrain further the construction of theories (jointly with general assumptions), and the revised or new theories may reorient the observer’s view of the world in general. Thus the methodology cycle entails mutually constraining relations among assumptions, theories, methods, phenomena, and data.


Following this, data are constructed entities that may represent their underlying phenomena in various ways; they are temporary figures within the process (Branco & Valsiner, 1997; Valsiner, 2000; Valsiner & Diriwächter, 2004; See also Section 10.3. The methodological cycle in this study).

This notion of methodology as a cycle or a helix (Valsiner, 2004, p. 15) leads to the idea of the importance of consistency between the abstract and the concrete in research. The critical evaluation of the consistency among the assumptions, the theories, the methods, the data, and the phenomena investigated forms the basis for credibility.
2.2. Research as co-construction of meanings

Following the ideas already discussed, I take the stance that in the research process, the researcher is involved with the construction and reconstruction of meanings in relation to the object of the investigation (Kindermann & Valsiner, 1989; Pedrosa & Carvalho, 2005; Rossetti-Ferreira et al., in press, 2007; Rossetti-Ferreira et al., 2004; Valsiner, 2000; Valsiner & Diriwächter, 2004). The previous readings, knowledge about the particular field of the research, the experiences, the interests, and personal intuitions of the researcher provide particular viewpoints to the issue to be studied. The subjectivity of the researcher is present from the first ideas of the research topic, to the choice of subjects and data collection, the reference to literature, and the analysis, to the form of the final report. Simply the choice of the theme of the study is a value judgment in the sense that some phenomena, questions, or viewpoints are privileged over others (Goldenberg, 2000). The challenge is to describe the background assumptions, observations, choices, and decisions critically, reflecting also upon the limitations and the problems that occurred during the process.

It is not the solitary researcher who constructs knowledge, but various participants, objects, and levels of action and meaning making are related to the practice of doing research. The data are derived from phenomena in dialogue among various participants within the process of study as the co-construction of events (phenomena) takes also place among various participants.
In data derivation, the *lenses* applied to observe the empirical reality and construct relevant data at a specific point in time during the research project gain particular importance. The theoretical-methodological lenses are not a fixed viewpoint but an open set of varied and even contradictory voices that have emerged in discussions, literature, and observations which the researcher continues to elaborate. The circulating notions and concepts had a specific point in time, when they, for various reasons, gained a status of lenses for reconfiguration of the study.

This research is based on an intervention in the everyday life at a day care centre. This goes in line with the Lewinian idea that to understand a system one needs to change it; and by intervening, it is possible to learn about the dynamics of the system. I agree with the position that research is always an intervention in people’s lives. The degree and nature of intervention varies, but doing research is not observing someone’s life from the outside. It means always participating and changing the system. The researcher is part of the system under investigation (Valsiner & van der Veer, 2000).

As this study is understood as a complex developmental process including the researcher as a participant in the co-construction of the phenomena of the study, and as the goal is to focus on the process of emergence, microgenetic research strategies are applied.

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5 *The notion of lenses is derived from Amorim’s (2002) study. The lenses present in a specific situation (e.g. in a day care centre) canalizing the observation and interpretation of the events are dialogically constituted on the basis of conceptions about the institutions, roles assumed/attributed, characteristics of the child, among other things. These lenses lead to different conceptions and interpretations of the actions of the child or events related to the child and acting together with her.*
2.3. Investigating developmental change

The literature on developmental psychology conceptualizes development and change and the methods to study them from various perspectives. In this section, I concentrate on the emergence of the actual from the possible; the focus is not on the prediction of behaviour but on the processes of emergence of novel psychological phenomena.

What is developmental change? Vygotsky (1978) formulates the idea of studying development as emergence in his widely referred quotation:

To encompass in research the process of a given things development … means to discover its nature, its essence, ‘for it is only in movement that a body shows what it is.’ … In summary, then, the aim of psychological analysis and its essential factors are as follows: 1) process analysis as opposed to object analysis, 2) analysis that reveals real, causal or dynamic relations as opposed to enumeration of a process’s outer features, that is, explanatory not descriptive, analysis; and 3) the developmental analysis that returns to the source and reconstructs all the points in the development of a given structure. (p. 65)

In its most general form, development refers to “any process of progressive change” (Magnusson & Cairns, 1996, p. 11). Valsiner (1997) describes this change as follows:

... development entails change in the organizational state of a system in time, which is maintained (rather than lost) once the conditions of its emergence disappear. When seen in these terms, development refers to reorganization of the structure of a system, as a result of the system’s constant relating with its surrounding conditions…

and further,
the developmental perspective concentrates the researcher’s attention
on the time-dependent phenomena of becoming, or emergence of a new
structural order of the phenomena from their previous state. (p. 3)

These time-dependent phenomena of becoming can be studied at
different levels of magnitude such as from a microgenetic viewpoint
(Draguns, 1984), in the unfolding of a here-and-now situation (Valsiner,
1997, p. 3). In developmental systems analysis, one looks for the
emergence of hierarchically complex regulatory mechanisms. The
regulatory mechanism, such as a higher-level semiotic mediating device,
may be initially fragile and ill-formed. In other words, the analysis of
development deals with the transitional forms between the levels, as the
higher levels are constantly in formation. (Valsiner, 2004, pp. 22-23.)

Valsiner (2004, p. 17) describes the focus on to single cases as
follows:

The focus on synthesis makes the qualitative investigation operate at the
level of single cases — any specific episode where a new- previously
unencountered — form is observed to come into existence is by
definition a single case. It is the systemic recomposing operation that
allows qualitative psychology to study the single case. (Emphasis in the
original).

This is the notion forming the basis for contemporary perspectives in
idiographic science (see also Section 1.2. The Network of Meanings
perspective). While the events are unique, the principles by which the
unique events occur may be universal, as shown by the systemic analysis
of the events (see also Valsiner, in press, 2007).
2.4. Qualitative microanalysis

In contemporary literature, researchers use the terms *microgenesis* and/or *microanalysis* in various meanings and in connection with diverse theoretical approaches. The term micro-analysis does not only refer to a close or detailed (“micro”) analysis of a phenomenon different from large scale studies such as surveys of attitudes or values. Even though various terms surround the detailed analysis of development and/or change on a short time scale as micro-genetic change, there is one common nominator behind the variety of microgenetic methods used today. The common notion is to study changes as they occur within and across experimental sessions, instead of procedures whose development is complete (Valsiner & van der Veer, 2000).

In the history of psychology, microgenesis related to different uses and approaches has been prevalent since the 20s. Parallel developments have emerged in both Europe and North America since then. Valsiner and van der Veer (2000) situate the origin of the term *microgenesis* in the works of Heinz Werner; the concept was used and developed further in his collaboration with Kaplan in the USA. The first writings occurred simultaneously with the development of Gestalt psychology by Sander and colleagues in Leipzig. In their terminology, “Aktualgenese,” a German term, referred to progression and emergence of new forms in time. Later on, in North America, these two roots were brought together and gained visibility in the works by Flavell and Draguns that promoted the use of microgenesis in studies of perception and thought. Parallel to these developments has occurred research in Scandinavia, particularly by Kragh and Smith (1970) at the Lund University.

The issue of time span is essential for researchers dealing with developmental approaches. Valsiner (2004, p. 19) names microgenesis one of the levels of generality of transformation of structures that developmental sciences investigates. “Each of these levels of processes (phylogeny, cultural history, ontogenesis and microgenesis, NR) is
characterized by its own functional time unit…Ontogeny is limited to the maximum length of the organism’s life time, while microgenesis may be limited to developmental transformations that occur in milli- or microseconds.” (See also Gottlieb’s, 2007, discussion of probabilistic epigenesis).

Time-preserving analytic units are in line with developmental science investigations (Valsiner, 2004, p. 21): “Such units would be characterized by time-based description of transformation of the phenomenon under study in a specifiable direction.” (See also Cairns, Elder, & Costello, 1996.) Draguns (1984, p. 6) suggests we might need an additional term for progressions that transcend the discrete and observable time span but are not ontogenetic.

Some applications of the microgenetic method emphasize the acceleration of the natural change process (Kuhn, 1995, pp. 133, 138). For this purpose, the researcher will, for example, organize settings in which the subject has opportunities to engage in the cognitive strategies investigated (e.g. Siegler & Crowley, 1991).

The microanalytic treatment of this present material shares similarities with applications of conversation analysis which investigate how the participants in conversation organize the interaction from one moment to another (Heath, 2004; Myers, 2000). Approaches based on ethnomethodology and conversation analysis to analyze the organization of social actions in face to face interactions with video recordings contrast with traditional approaches to non-verbal behaviour in which non-verbal behaviour is treated as a distinct channel of communication, isolated from talk and other aspects of human interaction (Heath 2004, p. 178).

Heath (2004, p. 271) emphasizes the necessity to draw on the *sequential organization of conduct* as a resource for the analysis of in situ social actions and activities. The meaning of a gesture might be tied to its physical form as well as the contexts in which it arises. In addition, the physical environment does not have a stable and overarching
influence — its relevance and sense are accomplished by the participants during the interaction: “The sequential and interactional organization of the conduct remains a critical resource for the analysis of how participants themselves orient to each other’s action, make sense of each other’s contributions, and produce their own conduct” (Heath, 2004, p. 271).

In summary, in order to analyze the interactional process, this study applies a qualitative microgenetic approach to investigate change when it occurs. Instead of focusing on ontological development of the children or long term changes, the goal is to focus on the case analysis of the here-and-now processes occurring among the participants. Following Branco (1996; 1998; 2003), who characterizes the recording situations with children as quasi-experimental, I understand the research process as an intervention where a change is put in action. In line with Branco (1996; 1998), Branco and Valsiner (1997), and Oliveira and Rossetti-Ferreira (1993), the aim is to retain the individual sequence of phenomena in the derived data.

The microgenetic analysis will thus focus on the interactive process, particularly, the emergence of joint action and the establishment of abbreviated communicative acts. The episodes are examined and interpreted as wholes, according to the functional dimensions of behavioural acts and the process of joint negotiation. Gestures and postures as well as conversations are examined as possible indices of meaning making (Branco, 1996; 1998; Lyra & Rossetti-Ferreira, 1995; Oliveira & Rossetti-Ferreira, 1996). (See Chapter 4. Deriving the corpus of material).
3. FROM INDIVIDUALS IN RELATIONS TO RELATIONAL AND DIALOGICAL AGENTS

3.1. The mainstream child and the marginal child in previous literature

In developmental and social psychology, there are various conceptual instruments to study and discuss child/ren’s actions in the presence of other child/ren. The discussion revolves around concepts such as social competence, social behaviour, social participation, coordinated action, cooperation – competition, collaboration, social status, social skills, prosocial behaviour, peer relations, play, and social interaction styles, among others. As Pedrosa (1989, p. 7) has noted, the variety of uses of

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6The title refers to changing approaches in the studies of interaction among young children. Nevertheless, the literature in psychology has included discussions addressing the social nature of the mind (“relational, dialogical agents”) already during the 19th and 20th centuries, even though contemporary ideas about the social mind are sometimes presented as of novelty (For discussions and reviews see, e.g., Cole, 1998; Ratner, 1999; Valsiner & van der Veer, 2000).
the concept of interaction makes it difficult to discuss previous studies comparatively.

For a literature review, I chose the databases PsycINFO (1872-6/2002), ERIC (1966-6/2002), and Sociological Abstracts (1962-6/2002). At the beginning of the search, 37 keywords were chosen to describe the process (such as “interaction”, “co-regulation,” “co-operation”) and to refer to the age of children (such as “2 AND years AND old,” “toddlers,” “preschool”). After preliminary searches, the search was limited to 18 keywords in order to exclude search results that were impossible to review because of the great number of abstracts; yet, these keywords covered the field sufficiently (Appendix 1).

The 18 keywords produced a corpus of 7,821 abstracts from which I selected a corpus of 357\(^7\) abstracts according to selection criteria I formulated while going through the abstracts (Appendix 2). Only 4% of the abstracts (357 out of 7,821) were finally selected; 265 of these were from PsycINFO, 71 from ERIC, and 21 from Sociological Abstracts. The majority of the studies had an emphasis other than interaction among 1- to 3-years-old children or the approach was clinical and therefore not of the interest for this study. If a study followed longitudinally the same children from two or three years on, it was included even though the children were older than 4.5 years. From these 357 abstracts, I created a database with Microsoft Access software tables specifying the author(s), year, title, publication, place of study, age of children, objective, objective, objective.

\(^7\) If a study appeared in many data bases, only the first mention was taken into account. The majority of the abstracts referred to publications in scientific, peer reviewed journals (307 abstracts). The selection included 39 dissertation abstracts and 11 book chapters, which were of particular interest for this study. As an example of a detailed review on data bases, see Ben-Arieh & Ofir’s (2002) study on children’s use of time.
framework, method, results, keywords, database, and note(s) on the issue(s) I found interesting.

Going through the corpus of 7,821 abstracts using my selection criteria and creating the database, I could make general observations about the mainstream of the studies that one way or another referred to child-child interaction among young children. The majority of the studies were affiliated to works done in the field of developmental psychology. Two of the main reasons for leaving a great number of studies out from a more detailed reading were that only child-mother interaction was investigated and/or the study was based on assessing the developmental implications of early social interaction for later life. Many of these studies included diagnostics, assessment of skills, testing, therapy and/or other interventions. Interaction among infants was mentioned only on few occasions (Leavitt, 1994; Vandell & Mueller, 1995).

The abstracts seemed to open up a strong view of normality that referred to an ideal (social) developmental trajectory for a middle-class three-year-old North-American child to follow from first interest to others to later pro-social behaviour at preschool age. In a more limited corpus of 357 abstracts, 69% of the studies were reported in the USA. Others were from Italy (21), France (19), Canada (14), United Kingdom (10), Finland (7), Brazil (6), and Germany (5). The rest were from 22 countries, with one to four contributions from each.

According to the United Nation’s statistics, US children represent 3.4% of the children in the world (PRED Bank, 2006; Children under 15). As the majority of the world’s children spend their everyday life outside the USA, the (over)emphasis on North-American scientific production shows a clear lack in the studies of children’s everyday lives within environments and cultural contexts of the majority of the world’s children.
3.2. First peak and the following silent decades in peer interaction research (1920-1970)

Previous reviews on peer interaction research locate the earliest works at the beginning of the last century. For example, Hartup (1983) and Renshaw (1981) both mention Cooley’s (1902; 1909) work on peers as socialization agents. Following these early works, the reviews situate a first growth in interest in peer interaction research at the end of the 1920s and the beginning of 1930s (e.g., Hartup, 1983; Niiranen, 1999; Renshaw, 1981). The electronic databases may fail to give access to these early studies; the earliest study appearing in the search I performed was published in 1957.

The period from the end of the 1920s to the 1970s is characterized first by the development of methods in the 1930s, followed by a decline in interest in children’s peer relations for forty years. According to Hartup (1983, p. 105), the two major advances for the whole field of social psychology were the systematic methods of observing the behaviour of individuals in groups and the experimental work on the social climate of groups (Lewin and his colleagues in 1936). Thrasher’s participant observation study of adolescents’ gangs and clubs in 1927 is considered to be one of the landmarks of the observational tradition (Hartup, 1983; p. 105; Renshaw, 1981, p. 2). With younger children, researchers wanted to discover the “true” inclination of human nature before the effect of a multiplicity of complex social factors (e.g. Parten, 1932). The invention of sociometric methodology and Moreno’s (1934)

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For more details about the changes during these decades see the reviews by Renshaw (1981) and Hartup (1983). They provide an overview of the developments emphasizing peer relations and friendship studies.
popularization of the sociometric test constitute the third advance in the early decades of the century (Hartup, 1983; Renshaw, 1981).

From the viewpoint of the 1980s, Renshaw (1981, p. 6) argues that the 1930s was characterized by researchers’ openness to alternative paradigms and research methods. After World War II there was an increase in interest in Freudian and social learning theories, concomitant with the emphasis on parent-child relations. In child-child studies, the emerging trend toward the laboratory left observational studies on the margins.

During the two relatively silent decades (1950-1970) preceding the renewed interest on child-child relations, Piaget’s (1959) works started to influence the field. For example, Mueller and Lucas (1975) underline his importance, particularly on the conception that early interactions with peers are similar in structure to early interactions with things. This notion was subsequently questioned and discussed in detail, particularly following the works on primary intersubjectivity (Trevarthen, 1998). Advances were also made in demonstrating the efficacy of peer reinforcement, punishment, and modeling (Hartup, 1981, p. 106). Burman (1994, p. 37) characterizes this shift in infant research from the 1920s until the 1960s as a shift from genetic endowment to environmental history (behaviourist ideas), corresponding with a preoccupation with child training.

### 3.3. Emergence of a variety of approaches and interests (1970-2000)

Previous reviews and my own inquiry identify the 1970s and the beginning of the 1980s as a peak in the number of studies on children’s peer interaction (Carvalho & Beraldo, 1989; Hartup, 1983; Renshaw, 1981). The next marked increase in the number of the studies occurred at the beginning of the new millennium, after year 2000. Indeed, within five
years after the turn of the century, more studies were added to the
databases as during all the previous decades (confirmed by entering the
keyword “toddlers AND interaction” in the PsychINFO).

In 1970-1980, new observational techniques emerged, group
structures and special relationships (such as friendships) were studied,
and strategies for enhancing social skills were invented. In educational
literature, comparisons between the effects of different day care
arrangements started to gain space. However, from today’s perspective,
the range of research topics remained relatively narrow. These studies
were characterized by a lack of specific paradigms and attempts to
construct tools for analysis (see also Pedrosa & Carvalho, 2005).
Besides, qualitative analysis of interaction was practically missing from
the literature. During the following decades, more diverse approaches,
interests, and viewpoints related to children’s interaction started to
emerge.

The research following the beginning of the 1970s encompasses
various partly overlapping approaches to child-child interaction which I
have organized under three general titles (Table 1):
1) Individual-centered approaches; where appropriate and effective
interaction is a goal and a norm, including
   a) Observation of the individual’s behaviour in relation to other(s)
      and in groups;
   b) Assessment of children’s social skills;
   c) Analysis of social network and friendship;
2) Instrumental approaches; in which interaction is seen as context and a
   means (instrument) of cognitive development and learning;
3) Dialogical approaches; in which interaction is seen as co-constitution
   and co-construction of the self, identity, meanings, symbols, frames, peer
   culture, etc.
These categories reflect the assumptions on the nature of child-child interaction, the objectives, and the research methods.9

Table 1. Main features in individual-centered, instrumental, and dialogical approaches.

<table>
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<th>INDIVIDUAL-CENTERED APPROACHES</th>
<th>INSTRUMENTAL APPROACHES</th>
<th>DIALOGICAL APPROACHES</th>
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<td>Main interests</td>
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<td>Results of interaction</td>
<td>Microgenesis</td>
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<td>about interaction</td>
<td>Effectiveness</td>
<td>(skills, learning)</td>
<td>Co-action</td>
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<td>Core concepts</td>
<td>Attachment</td>
<td>Transfer</td>
<td>Emergence</td>
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<td></td>
<td>Socialization</td>
<td>Learning in context</td>
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<td>Interactional styles</td>
<td>Tutoring/guidance</td>
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<td>Co-elaboration</td>
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<td>Focus</td>
<td>Social skills</td>
<td>Innovations</td>
<td>Meanings</td>
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<td>Individual’s behaviour</td>
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<td>construction</td>
<td>Internal dialogues</td>
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<td>Starting point</td>
<td>Individual who participates in</td>
<td>Individuals’ viewpoints</td>
<td>Ambiguity and</td>
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<td>various groups</td>
<td>brought together</td>
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<td>Bidirectionality</td>
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</table>

Individual-centered approaches refer to studies that address the question of human development from a mechanistic and deterministic perspective, focusing on individual maturation or socialization as a one-way process of the individual’s adaptation to the constraints of the social world. The emphasis could also be on others’ unidirectional contribution to the development of the individual. Instead of focusing on developmental

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9 I will use the concept of approach similarly to Valsiner’s (2004) notion of frames of reference. Frames of reference are: “...general conceptual positioning devices within the minds of researchers, who set up their research questions and construct methods in ways that unify different levels of the methodology cycle” (p. 11).
processes, these works usually apply a comparative approach and a non-developmental perspective (Valsiner, 2004, p. 19).

In the other two approaches, the interlinkedness of child(ren)’s behaviour and the historical-material-cultural-social context is taken into more detailed consideration. In instrumental approaches, the interest is to investigate interaction from the point of view of learning and/or evaluate the results of interaction, often with specific problem solving tasks. In dialogical approaches, development is included in the discussion from a dynamic perspective. Our psychological being (self, emotions, personality, identity, and so on) emerges and is constituted in interaction.

Only a few studies that were in line with the dialogical approaches appeared in the literature search. The mainstream of child-child interaction studies was related to individual-centered approaches, setting the individual at the centre, as observed also in previous reviews (Carvalho et al., 1998, p. 174; Pedrosa, 1989).
3.3.1. Individual-centered approaches: interaction as a goal and a norm

**Individual-centered approaches**
- Core concepts: Attachment, Socialization, Interactional styles
- Focus on the individual’s behaviour and social skills
- The individual participates in various groups
- A relational approach: friendship studies
- Main interests concerning interaction: quantity, effectiveness

![Diagram](image)

**Figure 1.** Main features of studies in line with individual-centered approaches.

Individual-centered approaches include partly overlapping fields: studies concentrating on the question of when and how interaction emerges in ontogeny and how it changes during maturation, observation of the social formation of the individual’s behaviour in groups, studies on social networks, and studies on children’s friendship relations. The child’s behaviour is evaluated in relation to the other (or within group) in order to investigate the child’s skills and competences, and to discuss the role of peer relationships in child development. (For an extensive review, see Rubin, Bukowski, & Parker, 2006.)

Depending on theoretical lenses, cognitive maturation can be seen as a pre-condition of social interaction or social interaction enhancing cognitive change and long-term or qualitatively new encounters with others. Both approaches are individual-centered in the sense of maintaining a unidirectional model of influences. The functionalist conception and the unidirectional model of socialization represented the
mainstream in peer interaction studies in the 1980s (see also Pedrosa, 1989, p. 49).

The research procedures may vary from longitudinal studies to cross sectional comparisons, where children of different ages are compared. The comparison of amounts and/or qualities of interaction among different age groups is criticized for lacking a developmental aspect as the same children are not observed at a later point in time (Asher & Gottman, 1981).

Comparative studies of children attending different forms of care have been made also (Howes & Rubenstein, 1981). The behaviour of children with more day care experience was compared with the behaviour of children with less experience of being with other children. These comparative studies appeared in educational abstracts as well as in sociological abstracts databases, where focus was on investigating the child’s move from home environment to day care institution. More recently, instead of the rough comparisons of day care with home care contexts, more detailed explorations of the spatial arrangements and their relation to children's interaction have been made (Campos de Carvalho & Bonagamba Rubiano, 1994).

As the mainstream of the studies on interaction follows the idea that interaction is tied to intentionality and the acquisition of spoken language, only a few studies have focused on the interaction among infants. With infants and toddlers, a common research procedure in a

10 The developmental literature indicates the ninth month in the child’s life as a crucial change; around that time, children begin to understand others as intentional, goal oriented actors (Tomasello, 1999). Children become capable of shared attention with others (see also Trevarthen, 1998, secondary intersubjectivity). Following the works of Vygotsky (e.g. 1978), another crucial change in children’s lives is the emergence of language: according to him, language is a tool of internal speech (thinking).
laboratory setting has been to compare the frequency of interest in peers (other directed behaviour/socially directed behaviour) to the interest in objects when the mother is also present (Mueller & Lucas, 1975).

**Observation of the individual’s behaviour in relation to other(s) and in groups**

Rate measures (frequency of social acts per unit time) dominated the research at the end of 1970s and at the beginning of the 1980s (see also Hartup, 1983, p. 105). In the mainstream of observational studies, the observer would set a *temporal frequency* to describe the behaviour of the participants as interdependent (Lewis & Rosenblom, 1975). Interaction was separated as a distinct category from *socially directed behaviour* and *social contact*. Socially directed behaviour was coded when the individual’s action was interpreted to be directed to the other, whereas *interaction* had to involve both actors in *reciprocal* exchange behaviour (e.g. Bokus, 1981). Social contact, even including a shared field of attention, was still considered a state of non-interaction.

Even though constructivist theories have replaced the unidirectional models of socialization in recent studies, the issue of temporal sequence and frequency of separate behavioural acts continues to play a central role in empirical procedures and analyses. The actions of both children of a dyad are usually coded separately and then, integrated on the same time line to judge the temporal and topical connectedness. For example, Eckerman and Didow (1996) discuss the change from nonverbal imitative acts to verbal means of coordination of actions among toddlers. A similar approach is used in cross-cultural comparison of development of toddler’s skills in generating co-operative action in the USA and Papua New Guinea (Eckerman & Whitehead, 1999) as well as in longitudinal studies of nonverbal imitative acts (Eckerman, 1999).

Parten’s findings from the 1930s were supported by some studies in the 1980s suggesting that children move from asocial to coordinated
activity. These studies maintained an image of a child who is first a solitary onlooker of other children’s activities and then, engages in parallel activities at around 3 years of age, to finally enter in cooperation with others.\footnote{Similarly, Burman (1994) characterizes the research tradition in infant studies in the early 1970s as focusing on infant’s gradual transition from a biological to a social being.} Interactions among children increase in frequency and complexity as children mature, as Brown, Odom, and Holcombe (1996, pp. 19-20) summarize referring to, e.g., Hartup (1983), Howes (1988), and Parten (1932). However, contemporary works have shown that instead of linear move from asocial to coordinated activity, a variety of aspects and qualities (temporary withdrawal, joint elaboration, observation, imitation) are present from early on (see e.g., Singer, 2002).

Assessment of children’s social skills

In individual-centered approaches, children are typically observed with the help of behavioural rating scales both by teachers, researchers and parents (e.g., Child Behaviour Checklist). Children also completed self-report measures. Together with assessing children’s responses to others, researchers have been interested in the relationship of children’s social behaviour with different factors such as sociometric, socioeconomic, or developmental status (Brown et al., 1996; Farver & Branstetter, 1994). Brown and colleagues also remind us that instead of a single assessment approach, many researchers have recommended using multimethod, multisource, and multisetting information to assess children’s social behaviour.

Some fields in developmental psychology have had a close connection to studies of child-child interaction. Mother-child attachment studies provide a good example. Children and mothers were first
evaluated in terms of attachment security and the child was subsequently assessed in terms of social skills and competence with peers. This procedure relates to the deterministic and linear assumptions of the development. Some authors emphasize that the relation does not follow a linear model, but suggest that a foundation for later peer relations may be laid (Stroufe, 1981, p. xiv, cited in Bronson 1981).

To critique these studies, it seems that the relational nature of the concept of attachment is overlooked and that the child is seen as transferring an internal quality of attachment from one social or cultural context to another. Similarly, the concept of interaction style refers to a stable character in the majority of the studies. As soon as the subject has established this character, residing somewhere inside, its potentially similar use in other social settings is evaluated. The cultural and situational nature of interaction is missing.

**Analysis of social networks and friendship**

Children’s relationships are often discussed in terms of individual development and their contribution to the child’s interactional competence (e.g., Fine, 1981). Friendship studies have shown that children are able to form special relationships and that these relationships seem to transform over age (Asher & Gottman, 1981; Berndt & Perry, 1986; Hartup, 1989; Hartup, 1996; Parker & Gottman, 1989; Renshaw, 1981). Hartup (1983, p. 123) refers to 1970s studies that point out the priority of dyadic interaction among children instead of giving preference to interaction in groups. In interaction style theory, the assumption is that children have preferences in interacting with peers with similar play interactional style. In addition to having preferences in their play, children also have different play styles with an unfamiliar partner and with peers they consider as their friends.

In sociometric research, besides Moreno’s original idea of assessing differences in group structures, applications focusing more on the
assessment of individual differences in behaviour emerged during the following decades (Hartup, 1983, p. 106; Renshaw, 1981, p. 13). In contemporary works, corresponding with changes in social sciences paradigms, qualitative, interpretative studies have gained more importance than observation with predefined codes. Not only there is interaction among children, but qualitative differences were observed in the relationships and interaction patterns that children establish. Contemporary studies have revealed that children suffer from the loss of a friend and that they have preferences as to their willingness to play with boys or girls. Thus, children are understood to construct and be part of social networks. (See e.g., Rubin, Bukowski, & Parker, 2006.)

The terminology of individual-focused approaches

On the basis of a very general overview of the literature, the quality (content and complexity) of interaction appears to be characterized in multiple ways and the vocabulary for describing the nature of individual acts is wide. Actions may be immature or inefficient (Hartup, 1983, p. 116) and social behaviour appropriate and effective (Brown, Odom, & Holcombe, 1996, in respect to peer relationships and child development). Children benefit from the capacity to interact constructively with their peers (Goudena & Vermande, 2002, p. 172).

The studies include multiple uses of the notion of social. Usually, a line is drawn in between the attention to material objects and interaction with the other, between object centered activities and social play (Verba, Stambak, & Sinclair, 1982, referring to Musatti, 1979; Stambak et al., 1979). In some studies the notion of social gains an opposing pole of non-social, or semi social (Hartup, 1983, p. 11); non-social is behaviour directed to the others, but not social in the sense of being compliant. An individual with non-social behaviour is problematic, whereas the
prosocial one is on the positive pole. Conflict and aggressivity form an opposing pole to positive interaction.

Aggression can also be discussed as symmetrical behaviour (like, e.g., sociability) in the context of same-age interactions. Asymmetrical behaviours (e.g., instruction and nurturance) are assumed to be related to mixed age interactions, the overall assumption being that children learn different behaviours while interacting with different age groups (Farver & Howes, 1988).

To define, judge, and measure appropriate and effective interaction depends on the researcher’s conception of what constitutes desirable social behaviour and relates to the conceptual boundaries between good-bad, ineffective-effective, valued-not-valued. On the basis of the review, it seems that the mainstream of the studies is based on the perspective of interaction being harmonious and non-conflictuous exchange among children. With the emphasis on social behaviour as positive behaviour, these studies leave little space for conflicts, ambiguity, or misunderstandings as fundamental aspects of interaction and communication (Rommetveit, 1990). Following the normative stance implicit in the studies, children’s interaction is assumed to increase in frequency and complexity with age and maturation, albeit mostly along a scale of harmonious forms. In contemporary research, on the other hand, effective, fluent interaction is seen not only as conflict avoidance; rather, various researchers share an interest in how conflicts are part of negotiations among children (Branco, 2003; Hännikäinen, 2001; Kronqvist, 2004; Singer, 2002; see also Section 3.3.3. Dialogical approaches: interaction as being).
Promotion of interaction

Following the conceptualization of interaction as a positive goal, various interventions were established to promote peer interaction.12 Already in the 1930s individual children were assisted to change their interactional styles and to gain peer acceptance (Renshaw, 1981, p. 15).13 Techniques were applied to facilitate social play and the role of teacher was discussed as mediating the democratic inclusion of all children. This idea seemed to include an assumption that for a favourable social development each child should participate in social exchanges as frequently as any other child.

As a result of the unidirectional developmental approach, individual children are objects of interventions. Two-way dialogicality is not discussed in order to determine how the other (adult or/and child) changes, nor is there a detailed analysis investigating how change occurs among various participants. Social skills and behaviour, sociometric

12 The word peer denotes equal standing; according to Hartup (1983, p. 106), peer status ordinarily means equal status between individuals and their associates. Among children, the concept of peer often implies equality between children of the same chronological age. In the literature on adolescents and adults, the concept occurs mainly in the context of a particular feature or a problem, when peer support is needed (e.g., alcoholism, marginalization, disability, loss).

13 These studies were built on a field-experimental approach, following Lewin, or an interventionist approach, such as Jack’s (1934), who recorded categories of behaviour that were either ascendant or submissive, classified children and then introduced to the submissive children a new game. As a result they appeared to be more confident in a new play situation. (Renshaw, 1981, p. 15.)
nominations, and peer interaction style — all these represent something stable, whereas the two other approaches, instrumental and dialogical, are more dynamic, focusing on the here-and-now constructions and the result of these constructions, instead of investigating the features or skills of an individual.

3.3.2. Instrumental approaches: interaction as tool

**Instrumental approaches**

- Core concepts: transfer, learning in context, tutoring, guidance, co-elaboration
- Focus on innovations, learning, knowledge construction
- Individuals’ viewpoints together
- A more relational approach: co-construction of knowledge
- Main interest concerning interaction: processes and product

![Figure 2. Main features of studies in line with instrumental approaches.](image)

Interaction can be investigated as context and/or means of cognitive development and construction of knowledge and shared meanings. In these works, the focus is on children’s construction of knowledge together with others with the help of tools and signs in a particular sociocultural environment. As Verba (1994, p. 126) describes, interaction is seen as a tool for cognitive development: “Children’s progress in acquiring knowledge takes place through guidance provided by an adult who monitors and supports the child or through cooperation with a more competent peer.” Besides, “research carried out in experimental settings shows overall positive effects of peer interaction on cognitive performance” (ibid).
Many studies that could be discussed under this title include also elements from individual-centered and dialogical approaches, including Eckerman’s (1996; Eckerman & Didow, 1996) and works at the CRESAS (Centre de Recherche de l’Education et de l’Adaptation Scolaire) in Paris: Stambak and Sinclair (1993), Stambak and Verba (1986), and Verba (1994), in collaboration with Bonica and Musatti. Even though the behaviour of an individual child may be observed and classified, the emphasis is on the socially constructed results of the construction instead of individual skills. Furthermore, even though the here-and-now constructions are investigated, as in dialogical perspectives, they are more likely to be discussed in terms of future developments. For example, in her article on cooperative formats in pretend play among 3- to 4-year-olds, Verba (1993b) summarizes:

The similarities between the main sociocognitive processes believed to operate in young children’s joint elaboration in different situations (object-centered activities, pretend play) and in older children’s problem solving reinforce the hypothesis that co-elaboration formats are built up during infancy and preschool years, enabling children to benefit from social interaction in different ways. Once constructed and consolidated, these formats can be emptied of their specific content and serve as basic sociocognitive structures for the acquisition of different types of knowledge. (p. 278)

Applying the ideas of Piaget (1959), various studies discuss sociocognitive conflicts among children in relation to particular themes or tasks. These works include experimental settings for observing how children’s understanding of a task varies and how conflicts are overcome. Vygotsky’s writings are also widely referred; particularly, the idea of a child mastering the cultural methods of reasoning (see e.g., Vygotsky, 1929/1994). In Vygotsky’s writings, the source of development for the child’s activities is to be found in the social environment. Children’s
higher psychological functions originally manifest themselves as co-operation, and “only afterwards (that) they become the internal individual functions of the child himself” (Vygotsky, 1935/1994, p. 353).

Instrumental studies have shown that from early on, 13-18 months old, children are engaged in interpersonal negotiations, coordinate their intentions, and adjust their roles during the episodes of play (Stambak & Verba, 1986). Verba (1993b; 1994) has also compared object-centered activities among familiar peers aged 2 to 4 years, 18 to 24 months, and infants 13 to 17 months. In each of these age groups, children engaged in different modes of collaboration, such as observation/elaboration, co-construction, and guided activity. Children used both nonverbal and verbal communication means to reach agreement and negotiate meanings.

Studies on school age children are more clearly in line with instrumental approaches than the mainstream of the studies on young children. Often, projects involving young children are based on interventions with the aim of providing support for pedagogical applications to improve the existent practices in day care centres, day nurseries, or preschools.
3.3.3. Dialogical approaches: interaction as being

**Dialogical approaches**
- Core concepts: play, peer culture, field, intersubjectivity
- Focus on meanings, emotions, and signs among children
- Ambiguity and indeterminism, bidirectionality
- When observing the individual: internal dialogues
- Main interest concerning interaction: microgenesis, co-action, emergence

![Diagram of dialogical approaches](image)

**Figure 3.** Main features of studies in line with dialogical approaches.

The terms *dialogical, dialectical, and dialogism* refer to a variety of theoretical-epistemological approaches and phenomena; see Josephs (2003) for an overview (also Markova, 1990; 1994; 2003; Markova & Foppa, 1990; Rommetveit, 1992).

In these approaches, dialogue is used as an ontological notion of dialogicality of human subjects’ being and development and as an epistemological notion of inquiry (Josephs, 2003). The ontological-epistemological starting point is that human production has a dialogical character (Lyra, 1998, p. 227): interaction and dialogicality are necessary in order to become and be a human, even though the social other is not always physically present.\(^{14}\)

\(^{14}\) Similarly, in the 1990s, various versions of cultural psychology re-emerged for discussion (Ratner, 1999; Valsiner, 1995; Valsiner & van der Veer, 2000). Valsiner and van der Veer (2000) distinguish dialogical perspectives as one of the three main directions within contemporary
In line with these approaches, I consider children to be subjects constructing themselves and the world around them in dialogue with the social world that constantly constitutes them. In dialogical action (Hermans & Kempen, 1995, p. 106, referring to Valsiner & van der Veer, 1988), a person is involved in a process of questions and answers or agreement or disagreement with a real or imagined partner. The other is present in co-constructing the action. In this sense, dialogue as dialogicality can refer to the history of interactions within (behind) objects. Thus, meanings are dialogical. (See also discussion in Section 1.1. *Dialogues with and behind the material.*)

In the works discussed in this section, the common nominator is not the interest in evaluating the individual’s behaviour or skills in the encounter with the other, nor the emphasis on the results of interaction, but the interest on the process of co-constitution and co-construction of self, mind, meanings, symbols, frames, actors, relationships, and/or culture. Following this, the unit of analysis is the episode (Carvalho et al., 1998), both the individual and the interaction (Branco, 1998; Branco & Valsiner, 1997), a relationship within a dyad (Fogel & Branco, 1997; Lyra & Rossetti-Ferreira, 1995), or dialogue (Markova, 1990; 1994; 2003).

Instead of inquiring the forms in which interaction exists in different ages, as in some individual-centered approaches, the question is: how does interaction occur and what is being constituted and constructed among children and how? Contrary to the individual-centered approaches, the specific behavioural categories are not established before the analysis of the material; rather, an interpretative approach is applied.

cultural psychology. *Dialogical perspectives of human psychological phenomena* “emphasize the notions of discrepancy, oppositions, negotiation, and conflict as productive (rather than destructive or “abnormal”) aspects of the theoretical constructions” (ibid., p. 389).
Interaction is not the “situation” or the “act” of one responding to the other — words and gestures are interpreted within the context of the episode.

If the characterization of Rossetti-Ferreira and colleagues (In press, 2007, p. 5/29) is applied, dialogical approaches can be defined as being in line with systemic approaches. To summarize, Rossetti-Ferreira and colleagues describe the common features of systemic approaches as following: the center of attention is on the persons in interaction and the interdependence, reciprocity, and synergism among the participants in the situation. In addition, the interest is on the reciprocal transformation of the phenomenon with its interdependent environment (ecological view).

Some contemporary works on child-child interaction as meaning construction in particular sociocultural contexts are in line with these ideas (see also Branco, 2003). These studies have focused on how children face and solve conflicts (Singer, 2002), how children construct “togetherness” (Hännikäinen, 2001) or “we-ness” in shifting and dynamic interaction (Nilsen, 2005), and how children in play enact fragments of routines and roles (Oliveira, 1988). Some interpretative analyses, such as Pedrosa’s and Carvalho’s (Carvalho & Pedrosa, 2004a; Pedrosa & Carvalho, 2006), have been influenced by ethological studies on animal behaviour emphasizing observation and description of behaviour in naturalistic environments. In addition, the use of ethnographic methods has shifted the focus from the individual’s activities and development to children’s activities as resources in dealing with questions of social experiences and social order in everyday life (Strandell, 1997, p. 461). The development of tools for video recordings support these detailed analyses of meaning construction.

As to research technologies and methods, previous studies on 2- to 3-year-olds include a wide range of procedures and settings. Studies have been made in psychology laboratories with individual children (Tomasello’s and his colleagues’ research at the Max Planck Institute for
Evolutionary Anthropology in Leipzig), dyads of peers (Eckerman & Didow, 1996), and infant-only trios (Selby & Bradley, 2003a). Alternatively, experimental situations have been created at day care centres with dyads or small groups of children (e.g. quasi-experimental by Branco, 1998). One of the main differences among these settings, also pointed out by Mueller and Lucas (1975), is that at day care centres children remain in contact for extended periods whereas in the laboratory setting children are usually invited to be together only for research purposes.

Material has also been extracted from video recordings of children plays at day care centres in “naturalistic settings” with the objects the researcher has provided (Verba, 1994; Verba, Stambak, & Sinclair, 1992; also in line with instrumental approaches) or with the objects already present at the day care centre (Kronqvist, 2004). In all these cases, children may be observed during a single session or longitudinally in repeated sessions with the same children.

**Negotiation of frames and semiotic conduct fields among children**

A co-constructivist (or social constructive) approach, following presuppositions of constructivism (Piaget) and the sociogenetic perspective (Baldwin, Mead, Vygotsky) has been applied in studies of children’s interaction. Branco and Valsiner (1997; also Branco, 1998; 2003) have been interested in how children’s goal orientations (internalized constraining system for action, feelings, and thoughts) are set up, coordinated, and reorganized, leading to transitions between co-constructed *intersubjective, interactional frames*. These interactional frames can be described as convergent or divergent semiotic grounds for message interpretation, depending on the nature of the goal orientations.

While their focus is on negotiating goal orientations among children, Branco and Valsiner (1997, p. 54) are among the few to mention the researcher as being present in the negotiation of the mutual system of
limits that is jointly constructed by all the participants in the research situation. During the interaction internalized constraints restrict the degree of freedom of the activities, i.e., they come to affect the development of the communicative and interactional history within the groups.

Another approach, also related to the co-constructivist approach, is discussed by Oliveira (1988; Oliveira & Rossetti-Ferreira, 1996; Oliveira & Valsiner, 1997), who has studied the role-coordination in children’s play. In this approach, interaction is seen as a “dynamic process of expanding or restricting shared semiotically organized conduct fields, occurring through coordination of roles” (Oliveira & Valsiner, 1997, p. 173). The analysis has focused on the coordination of the participants’ role/counter-roles pairs confronted with the roles (and implicit counter-roles) assumed by the others. In the enactment and confronting of the roles, the meanings are settled by the individuals (Oliveira & Rossetti-Ferreira, 1996, p. 182). Thus, in a study on children’s play, Oliveira and Valsiner (1997, pp. 120-129) observed that children could go back to experienced situations and substitute some objects for others. Children recombined the meanings being created and used an object as a semiotic marker.

**Studies on children’s peer cultures**

I have discussed studies on children’s socialization in my review of individual-centered approaches. Recent developments in the field of socialization studies, particularly within what is generally termed as the new sociology of childhood (Corsaro, 2004; Prout & James, 1990) include various works that are more dialogical in nature.

Widely cited are studies by Corsaro and colleagues that have shifted the focus from the social environment as a socialization agent on to children’s interpretative reproduction of culture. Corsaro’s and colleagues’ studies are examples of attempts to transcend the
interpersonal level of interaction to include reflections on the cultural context in children’s interaction. In this approach, instead of one way appropriation from the cultural context, children reproduce the culture interpretively. Children appropriate the information from the adult world to produce their peer cultures (Corsaro, 1992; 2003; 2004; Corsaro & Eder, 1990; Kyratzis, 2004; Strandell, 1995). Elsewhere, in the mainstream of the empirical work, the cultural setting is often reduced to a country of origin as a national culture (for review of cross-cultural studies, see Goudena & Vermande, 2002).

**Intersubjectivity**

Research on the development of intersubjectivity is in line with dialogical approaches, even though the mainstream usually focuses on intersubjectivity as recognition and coordination of intentions in mother-infant interaction (Trevarthen, 1998). In his definition of intersubjectivity, Göncü (1993, p. 186) points out a certain consensus among scholars: intersubjectivity refers to shared understanding among the participants of an activity. He refers to works by Bretherton, Kaye, Newton, Rommetveit, Rogoff, Trevarthen and Wertsch.

The literature on intersubjectivity emphasizes two radical changes during the child’s early years: the ability to share experiences with the emergence of spoken words after nine months of age and the development of intersubjectivity in pretend play around the child’s third birthday. In line with studies by Erikson (1972), Piaget (1946/1962), and Vygotsky (1978), Göncü (1993, p. 188) summarizes that in pretend play, children “use physical or psychological means to represent the meaning of another entity.” His interpretation is that the ability to understand others as intentional actors and to share attention to jointly observed objects in child-mother interaction prepares the child to develop intersubjectivity in peer interaction (p. 186-187; see also Trevarthen, 1998). However, even children younger than three years of age may
construct a shared pretend focus; even though the children do not explicitly express their desire to engage in play, they communicate their intentions using pretend enactments (p. 194).

Göncü (1993, p. 189) extends the hypothesis regarding the adoption of a shared pretend focus: “…it is plausible to seek support for a three-fold hypothesis: children’s social pretend play becomes shared with respect to its focus, its metacommunication, and its communication only after 3 years of age.” Following a review of some studies on pretend play, he concludes that intersubjectivity in pretend play develops on these three planes (p. 194).

In line with these works, on the basis of their studies on mother-child communication and shared intentionality, Tomasello & Rakoczy (2003, p. 138) write: “Two year old children, we have argued, engage in joint attentional activities and use symbols and artefacts in ways that evidence their understanding of self-other equivalence, perspectivity, and normativity.” In other words, similar to Göncü (1993) also Tomasello & Rakoczy (2003) discuss how young children demonstrate awareness of others as intentional actors.

A slightly different approach is provided by Matusov (1996), who argues for participatory intersubjectivity, intersubjectivity being a precondition for a meaningful communication. Matusov argues for the notion of intersubjectivity as coordination of individual contributions in joint action rather than intersubjectivity as shared understanding. Individual contributions can diversify or unify the perspectives contributing to joint activity. The process of contribution does not necessarily imply agreement; the collective construction works with diverse perspectives rather than consensus.

I will return to this discussion about intersubjectivity in Section 9.3. Emergence of a culture of recording sessions with water which presents the results of my inquiry.
Contemporary studies on infants

In the 1980s, various peer interaction scholars emphasized verbal language as a prerequisite for peer interaction. Bronson’s (1981, p. 112) description is a good example: “It is...only with the advent of language, toward the end of toddlerhood, that interactions in the world of peers would be expected to begin assuming a heightened significance as both an arena for engagement and a source of learning about the social world.”

Today, researchers pay increasing attention to the construction of meanings and joint action among children before they produce verbal language. Recently, some researchers have argued for a general relational capacity or clan mentality that would allow even babies to operate in groups, teams, or families (Selby & Bradley, 2003a; 2003b). Following this idea and the empirical evidence supporting the argument, children would not only be equipped with a dyadic program ready for attachments with their mother, as suggested in the mainstream of the developmental literature, but also be able to engage in diverse other relations ever since birth.

In their works, Selby & Bradley (2003a) criticize studies following the individual-centered approaches that focus on categorizing the individual’s behaviour:
Our argument has been that communicative behaviour of the kind pertinent to the hypothesis of “semantic primacy” cannot be discovered by frequency counts of generic categories defined a priori by adult researchers, and the significance of any single communicative act cannot be established by inferential statistics. We must therefore seek a way of discovering whether meanings are generated differently in each group of infants, changing over time as the group’s “conversation” progresses. These idiosyncratic group-generated meanings need to be sought out by more sensitive means than can be provided by a single catchall category like “SDB” [=Socially directed behaviour]. (p. 207)

In their two-stage case analysis of three infants being together, Selby and Bradley (2003a, p. 207) attempt to show how single action may be given different meanings as a consequence of the non-verbal unfolding of conversation within a group of infants.

### 3.4. Conclusions and implications

Theoretically and methodologically, this study is mainly in line with the relational and dialogical approaches discussed in the last part of the review. The basic assumption is that actions and meanings emerge in the situation on the basis of past and ongoing regulations among the participants. Furthermore, even though child-child interaction is the main focus, the meanings do not reside in children’s action but co-constructed among the observer (researcher) and the children. As an example of a different conceptualization, Stambak and Verba (1986) locate the origins of actions and thoughts within one person; while children share their own ideas with others and coordinate their intentions, the emphasis is not on how the ideas emerge in interaction.

As the negotiations during this project were done with various participants and among various interests, the dialogical approach was partially overshadowed by the other two approaches at certain stages of
my research. The project emerged in the context of institutional early childhood education and the developmental projects run by the National Research and Development Centre for Welfare and Health in Finland. Thus, I also discussed children’s interaction with the professionals of the day care centre with the aim of developing tools for collaborative learning and development. In discussions with the mothers of the children, professionals, and other participants, a particular child’s way of being and relation to other children sometimes gained more space than discussion about the group. A tendency to interpret some of the children’s movements as a sign of stable personality feature appears in these discussions (e.g., silence referring to withdrawal and shyness), regardless of the original intentions. Similarity in relation to the individual and instrumental approaches can be interpreted through methods; in my research, children were intentionally given certain objects to use, as is often done particularly in instrumental approaches in which children’s interactions are investigated in relation to specific tasks. These changes in data derivation will be described in more detail in Chapter 4, Deriving the corpus of material and in Chapter 10, Evaluating the knowledge construction.

The recording sessions analyzed in this work both resemble and differ from both the quasi-experimental work (Branco, 1998) and descriptions encountered in ethnographic studies (e.g. Corsaro, 2004; Nilsen, 2005; Strandell, 1997) where the attempt is to investigate children’s naturally occurring interactions without intentionally modifying the everyday routines and settings for actions. Interestingly, in line with ethnographic tradition, Strandell (1997, p. 447) criticizes the way research is often conducted about children’s play: “A great deal of our knowledge on children’s play stems from more or less experimental research designs where a solitary child is put to play alone with toys (Dunn 1988, 9), or where two or three children are put to play in arranged play situations, apart from what is going on around them.”
In this study, to respond to this critique, I attempt to show that depending on the question and reflexivity, no situation is problematic as such, nor is there a situation “unlimited” or “free” from the various constraints that a research project and various interests brings to the setting (see also Rutanen, 2004c; 2004d).
PART 2. THE INTERVENTION
4. DERIVING THE CORPUS OF MATERIAL

In this chapter, I will describe the intervention at the day care centre participating in this study and discuss the main changes that occurred during data derivation. The intervention took place in 1998-1999, as part of a wider project coordinated by the National Research and Development Centre for Welfare and Health in Finland (See also Introduction).

The final interpretation and analysis are done years after the intervention at the day care centre; thus, the viewpoints and contexts affecting my conceptions and interpretations have changed during the project. Figure 4 presents the duration of this research project, the time scales included, and the interpretative movements. Time 1 refers to the time between the first ideas of the study and the publication of the report. Time 2 refers to the flow of events in the individual video recording sessions. Time 3 refers to the episodes within sessions and related interpretations. Even though the interpretations done in 1998-1999 canalized the planning of the recording sessions, the final interpretations are done, a step further, from the perspective of 2007, while at the same time situating the events in the context of the intervention done in 1998-1999.
Figure 4. The time scales and the movements in the contextualized and changing interpretations involved in the study.

4.1. Institutional care of children in a welfare state: sketching the context

From the point of view of family politics and childhood social services the time of the field work, the end of the 1990s in Finland, was characterized by growing public discussions about children’s well-being. The economic depression of the early 1990s was over and the first evaluations about its social consequences started to emerge. Research, political discussions, and public debates alike clearly indicated long term influences, such as marginalization, among families facing financial difficulties. For a detailed discussion of the case of Finland, see Alanen, Sauli, & Strandell (2004).
Bardy, Salmi, and Heino (2001) have also examined the results of studies on political, social, economical, and cultural changes in the 1990s in Finland that have had an influence on children’s every day life. In general, children’s physical health has improved, but the researchers are more and more concerned about children’s social and psychological well-being. Bardy and colleagues (2001) conclude that one third of children were doing fine, a small amount of children are facing growing problems, and one fourth or even a third were not doing fine. These children may lack, for instance, basic security and care and a positive self-image (ibid., referring to Järventie, 1999).

In addition, as in many other European countries, the number of children has been diminishing: year 2000 less than 10% of the population were less than seven years old. On average, families with children under 18 years have 1.73 children. (Paajanen, 2002.)

According to the Act on Children’s Day Care (Laki lasten päivähoidosta, 36/1973), at the end of the 1990s, as today, families had the right to choose the appropriate form of support for them from among the services provided and/or financial support the municipality is obliged to provide. Day care services continue to be a subjective right of the child.

Day care centre (municipal or private) is not the most popular form of day care for the youngest children. Historically, in Finland, the role of the mother has been considered important for children’s well-being (Välimäki, 1998). In the turn of 1960s and 1970s, during the planning of the Act on Children’s Day Care which was to guarantee children’s subjective right to day care, Ainsworth’s and Bowlby’s studies on mother-infant attachment were discussed internationally. At the end of the 1990s in Finland, 55 to 58% children aged 9 months to 2 years stayed at home with the primary caregiver, typically the mother, who received financial support in the form of a home care allowance (Salmi & Säntti, 2001, statistics by the Social Insurance Institution of Finland and the National Research and Development Center for Welfare and Health; Laki
lasten kotihoidon ja yksityisen hoidon tuesta. [Act on the Child Home Care Allowance and the Private Care Allowance], 1128/1996). Around 22% of the families with children under three years of age chose the municipal services either at a day care centre or with a childminder in family day care. A total of 44% of 3- to 6- year-olds were in public day care centre, 18% stayed with a childminder in municipal service, and 15% at home (21.12.2000). In the last years, both the availability of family day care and the number of children attending it have been decreasing. Other than that, these figures have not changed radically.

Families with children work more hours per week than couples without children: in half of them one or both parents work more than 40 hours a week. A particular challenge to the day care service structure is the irregular working hours of both parents in one fifth of the families (Bardy & al., 2001).

The Ministry of Social Affairs and Health collaborates with the National Research and Development Centre for Welfare and Health in defining the basic principles for the municipal early childhood education (Government resolution concerning the national policy definition on early childhood education and care, 2003). The national policy emphasizes the fact that services offered to families should be based on the needs of the families and the children. The primary right and responsibility for young children’s care and well-being lies with the parents: the society’s role is to support parents in their educational tasks.

The national policy underlines the right of all children to secure environment, care, learning, and growth. The child has the right to participate, and his/her conceptions and thoughts should be considered also in institutional day care. Art. 6 the Finnish Constitution states that everyone is equal before the law and children shall be allowed to influence matters pertaining to themselves “to a degree corresponding to their level of development”. Related international documents were signed, when Finland ratified the Convention on the Rights of the Child in June 20, 1991.
The day care centres should follow the national policy and the *National Curriculum Guidelines on Early Childhood Education and Care in Finland* (2003) when planning their own, unit-specific curriculum. As there is no central governance or regulation of the details (such as the schedule), a variety of different practices are implemented in Finnish day care centres.

Many studies of institutional early childhood education have focused on adult-child encounters (e.g. Metsomäki, 2006; Puroila, 2002; Riihelä, 1996). These studies have shown that children are under surveillance and constrained by specially arranged spatio-temporal regimes. The caregivers exercise power over the children particularly as to the management of the daily routines. Despite the overall structure of the day care setting, controlled by the adults on the surface level, children are by no means passive. The literature on young children’s everyday experiences in institutions also highlights children’s active role. Children engage actively in negotiating the situations and at times clearly resist adult control (Lehtinen, 2000; Metsomäki, 2006; Puroila, 2002; Strandell, 1995; see also discussions outside Finland, e.g., Leavitt, 1994; Rönnberg, 2005).

Applying Erving Goffman’s (1974) frame analysis, Puroila (2002), has investigated the encounters between children and adults in nine day care centres in Finland. She identified five frames that organized the work of the day care staff. One of the frames was the *managing frame*; in this frame the goal of early childhood work was to avoid chaos and maintain order. This frame included the rules of behaviour set by the adults. If children obeyed the rules, the managing frame remained latent. When the child crossed the boundaries, the managing frame became activated. Puroila (p. 90) notes that in two of the day care centres, the rules concerning children’s behaviour were made explicit by setting written notes on the walls. Puroila noticed that within the managing frame, the adults had three particular types of expectations in relation to children’s behaviour. Children were expected to be constantly active, yet
focused one activity at hand and to finish the tasks before moving to the next task or activity. In addition, children’s movements running indoors in particular were controlled. Third, the use of loud voices and screaming were controlled, particularly in situations in which a group of children participated a teacher organized activity, meal times, and the rest hour after lunch. According to Puroila (pp. 90-95), the adults attempted to maintain control by, for instance, establishing clear daily routines and arranging children in the physical space in a specific way, such as paying attention to the sitting order during lunch hour. The adults also used a variety of gestures, such as gazes, raising the eyebrows, and moving the finger on top of the mouth as a request for silence.

Similar observations have been made elsewhere; in her ethnographic study, Leavitt (1994) describes situations in which caregivers exercise power by a rigid control of the daily routines. Adults attempt to control time and children’s bodies in time and space.

In this work, the original goal was not to investigate the structure of the educational settings or the adult control in the situations. Nevertheless, throughout the process, these aspects became an important and interesting element of the here-and-now flow of actions. Through the application of the notion of constraints, I included both the adults’ and the children’s actions in the analysis.

4.2. Description of the day care centre

In 1997, Children and Quality group at the National Research and Development Centre for Welfare and Health in Finland (STAKES) started the project Young Children’s Mathematics and Natural Sciences (Rutanen, 2000). While working on this project, I visited 11 day care centers. Various project meetings were held among the 27 participants of the project, consisting of preschool teachers and caretakers from nine municipalities.
One particular day care centre was chosen for this study on the basis of the personnel’s plan to begin a group learning project with 1- to 3-year-old children (the Water project), their interest in participating in the study and the close location to the capital area. The personnel of this municipal day care centre had participated actively in various projects coordinated by the National Research and Development Centre for Welfare and Health (STAKES) previously. The centre was situated outside the town centre, surrounded by a forest and close to a lake. The building had two floors: the downstairs area with two rooms and a kitchen, and the upstairs area that community members also used at night.

The play room was the space that children mainly used during the day. Some shelves were high up on the wall, and children had to ask adults for help if they wanted something from there, such as books or personal folders that included their drawings and photos. Boxes on the floor and on the lower shelves contained toys, different objects, and materials (cups, pieces, slices of wood, small rocks, pencils, and paper), that children could use during the day except during meal times and when it was time to go out or leave the centre. The room was also used for a morning meeting with the whole group and activities directed by the personnel, such as group work. Dining tables and chairs were in the other end of the room.

The sleeping room was generally used for children’s rest. Every day after lunch, the adults took out the beds from the wardrobes for the youngest children to have a nap; children could also rest on one couch and in small beds that were permanently in the room. The personnel

15 In addition, other day care centres of this town had also participated in other projects coordinated by STAKES. While I did not know the personnel in this particular day care centre, they had previous experiences in working with similar projects together with researchers and planners from the STAKES.
asked the older children to be quiet when they were close to that room after lunch. During the rest period, the light was off and the curtains closed. No toys or other materials were kept there.

The personnel and parents described the day care centre in a positive way; they used terms such as home-like and attractive. In my interpretation, they referred not only to the physical environment but also to other aspects such as flexible routines and personal relations.

The day care centre was attended by seventeen children, aged from one to five years. During the year of the video recordings for this study, four children left and four new children entered. The personnel consisted of two caregivers and one preschool teacher. Two months after the video recordings started, one of the caregivers was substituted by a male caregiver.

In the morning, the children arrived at different hours. After the morning gathering, the personnel had reserved time for “free play” and/or planned activities. Before lunch, the children went out to the playground. As is usual in day care centers in Finland, the personnel had lunch together with the children. After lunch, the youngest children used to have a nap, while the others were doing other activities, for example playing or drawing. At the end of the afternoon, the children had a snack and went out to the playground again.

The Water project

In line with the Young Children’s Mathematics and Natural Sciences (Luma) project ideas by the STAKES, the professionals at the centre had started a co-operative learning project with the children (1998-1999). The theme was water. Similar projects had been developed in this municipality previously (e.g., Karlsson & Riihelä, 1991; Kauppinen, 1999).

16 In the description, the term teacher is used to refer to the preschool teacher.
Riihelä, & Vesani, 1995). Following the project, the personnel divided
the children into groups of three to four children. The members of each
group were about the same age. Each group chose a name, for example
“Rabbits.”

Each group had a time reserved for an organized meeting 2-3 times a
month, in which they were the only ones present and worked in relation
to the water theme. The adult(s) wrote down observations and sometimes
took photos. The groups went to outings to the seashore and walking
tours to the lake close by. After the trips, the children discussed their
observations with the adult in small groups. Older children painted and
narrated stories, the youngest children played with sand and mussel
shells, for example. The adults also noted down their observations on the
children’s action and comments outside the reserved group time. The
group also sat together during lunch hours. The personnel arranged two
parental meetings, in which either the fathers or the mothers were invited
to build a toy with their child for water play. The personnel also had
three evening meetings among themselves. Towards the end of the
project, they said that the Water project had changed their way of
working with children. In their opinion, they listened more carefully to
what the children had to say, documented children’s actions, and valued
more children’s ideas and play. For more details about the project, see
Tiira (2000), who studied the promotion of participation among children
under three years of age.

During the academic year the physical space changed: there was
more reference to the Water project, particularly in the play room. The
children’s drawings and written thoughts about the theme were visible on
the walls, many of them lower than the adults’ eye level. The personnel
had developed regular size and A4 size photos of children playing and
experimenting with water. Every child had a folder to collect drawings
and copies of written documents made in his/her group. The groups
constructed aquariums with cardboard boxes placed on the tables. At the
end of the year, the day care centre also organized an exhibition.
4.3. Schedule of video recordings and discussions

The video recordings with two small groups of children started in August 1998 and continued approximately twice a month until the end of April 1999, with a break in December and January (Table 2). Video recordings were used to be able to register children’s actions in detail and to return repeatedly to the details in microanalysis.

Together with the recordings, throughout the year, I had various discussions with the adults linked to the project. I had most regular meetings with the teacher; we discussed our observations particularly in relation to the planning and implementation of the Water project. With the other personnel of the centre, three discussions were held focusing on the implementation of the Water project. Some of the discussions were tape recorded; in some, I took written notes.

In addition to watching and discussing the video recordings with the teacher, and later on in various research groups, I watched most of the video recordings together with the mothers whose children appeared on the tapes. These discussions were tape recorded. The aim was to register the mothers’ interpretations about the recording sessions and children’s behaviour, and invite them to narrate some experiences with the child at home. The mother’s interpretations of the child’s behaviour may differ from the researcher’s, who is less familiar with the children (Kamel & Dockrell, 2000; see also Tobin, Wu, & Davidson, 1989, for the use of videotape as a cue for interviewing practitioners). I discussed with the mothers regularly during the first semester (8 times) and once during the second semester. The teacher participated in some of these discussions. The mothers were present alone or in dyads, never all of them together.

Other interpretations were also gathered during the year of the recordings. I discussed the recordings in various occasions at the Children and Quality group at the STAKES. Because the recordings were part of the Young Children’s Mathematics and Natural Sciences
project (Luma), the discussions were focused on the questions of mathematical content in the situations and their relation to natural sciences. In addition, I watched selected episodes with two mathematicians of the Department of Mathematics and two lecturers of the Department of Early Childhood Education, at the University of Helsinki. This discussion was tape recorded. (Table 2.)

After these discussions, I made decisions with the teacher on questions such as where to record, with whom, what instructions to give, and what objects to provide to the children. In addition, various practical questions canalized the decisions made in relation to the recording settings, such as the schedule of the day care centre, children’s presence in the day care, the objects available, and children’s willingness to participate in the recording on a particular day.
Table 2. Schedule of the video recordings and discussions at the day care centre. Each box includes the discussions and recordings proceeded during one day. (The upper level of the box is above that particular date.) Video = Video recording situation; Teach = Discussion between the teacher and the researcher; Moth = The mother(s) and the researcher watch the tape(s); Staff = Meeting among the personnel and the researcher; Luma = Luma project meeting, the teacher and the researcher participated; Math = Meeting among mathematicians, teacher trainers, and the researcher to discuss the recordings.

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<th>AUG</th>
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In summary, the various discussions among the adults, particularly the interpretations of children’s actions and the goals of the projects, canalized the planning of the setting for the next recording session (Figure 5).

4.4. The video recordings: participants and places

At the beginning of the project, I chose two small groups of four children to participate in the recordings, one group at a time. As part of the Water project, the personnel had assigned children to these groups on the basis of their age. Members of group 1 were the youngest children and members of group 2 were slightly older (Table 3).
Table 3. Participants in the recording sessions; age in months at the beginning of the recordings.

<table>
<thead>
<tr>
<th>GROUP 1</th>
<th>GROUP 2</th>
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<tbody>
<tr>
<td>Jari (16 mon), Mikko (17 mon)</td>
<td>Martti (30 mon), Heidi (33 mon)</td>
</tr>
<tr>
<td>Eetu (25 mon), Riina (26 mon)</td>
<td>Lasse (33 mon), Jaakko (35 mon)</td>
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</tbody>
</table>

Members of group 1 did not attend full-time care. Jari joined the group in the middle of the semester. Because of these irregular hours, they were never all present in the situation at the same time. Among the members of group 2, Jaakko was the only one attending part-time care, the others attended full-time care. All of them had started to attend the centre the year before the recordings. Lasse and Heidi are twins.

The recording was planned to go on for about 20 minutes per group. The recordings were stopped if the children left the place or refused to be recorded. I used a hand held video camera, except during the first recording when the camera was equipped with a tripod.

In most cases, the recordings occurred indoors. The teacher invited the group to be recorded in the sleeping room, the kitchen, the play room, or the bathroom, depending on the day, while the other children remained in other rooms or outdoors. As there was the possibility that some of the recordings would occur also during mealtime or at the playground, an informed consent to participate in the study was requested from all the children’s parents. The personnel arranged a meeting with the parents before the recordings started. In the meeting, the teacher and the parents discussed the plan for the Water project, and I presented the ideas for this study. In the nine meetings I had with the mothers, we also discussed the aims of the study.

Throughout the year, as observations became more varied, the adults’ conceptions and intentions changed and the recordings became increasingly focused on two members of group 2, Martti and Heidi. (Table 4).
Table 4. Schedule of the recordings. Each column corresponds to particular location. The questions in the table indicate the main interests among the adults guiding the recordings on that day and the following sessions. The cells include:

A) The participants of the situation. Group 1: Jari=j, Mikko=m, Eetu=e, and Riina=r; Group 2: Martti=M, Heidi=H, Lasse=L, and Jaakko=J;

B) The duration of the situation in minutes.

The cells with **bold** font indicate that water was provided.

<table>
<thead>
<tr>
<th>Date</th>
<th>Sleep</th>
<th>Kitch</th>
<th>Play</th>
<th>Bath</th>
<th>Out</th>
<th>Mealtime</th>
<th>Upst.</th>
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<td><strong>GROUP 1: Jari=j, Mikko=m, Eetu=e, and Riina=r</strong></td>
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</table>

**Day** | **GROUP 2: Martti=M, Heidi=H, Lasse=L, and Jaakko=J** |       |       |      |     |          |      |
| 8/13 | M     | H     | 36   |      |     |          |      |
| 8/24 | M     |       | H25  |      |     |          |      |
| 9/15 |       | M     | H L  | J    | 25  |          |      |
| 9/24 |       |       | H L  | 8    |     |          |      |
| 10/2 |       |       |      |      |     |          |      |
| 10/14| M     | H     | J L  | 21   |     |          |      |
| 10/20|       |       | r    | M    | H L | 5        | J    |
| 10/28|       |       | M    | L J  | 15  |          | M L  |
| 11/2 | M     | H J   | 35   |      |     |          |      |
| 2/10 | M     | H L J | 31   | M H L | 9 | What occurs in sessions with group 2? |
| 2/19 | M     | H L J | 25   | M H L | 31 |          |      |
| 3/3  | H L   | 13    |      |      |     |          |      |
| 3/10 | M     | H L 21|      |      |     |          |      |
| 4/8  | M     | H     | 40   |      |     |          |      |
| 4/22 |       |       |      |      |     |          |      |
4.5. Selection of the sessions

Over the months, the focus of the study became more clearly defined. From the large corpus, I had to make selections for the microanalysis. Instead of investigating two groups, I decided to go into more details about the process of construction. First, I selected a group (group 2), then a dyad (Heidi and Martti) from this group. Eventually, from among the 36 recording sessions, lasting from 5 to 40 minutes, four sessions were discussed in a detailed analysis.

The criteria for the selection of the four sessions were the participating children, the timing of the recordings, and the objects provided. Heidi and Martti had an extensive participation in the recordings: they were present in 15 out of 36 sessions, from the first day until the last recording after eight months. In two sessions with the whole group 2 (1998/10/20a, 1999/2/19a), the recording was deliberately focused on Heidi and Martti because the other two members were moving around and were more difficult to follow with the camera. During the second semester, the recordings were done only with this group (Group 2). In the 33rd recording, Lasse was present in the room but remained outside the screen.

The selected sessions were all recorded inside the house and occurred during the first two months and the last two months of the recording period. These sessions included a basin or basins with water and other objects (Table 5). As will be discussed later on in this study, water provided an interesting starting point for the investigation instead

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17 This is in line with the criteria set by Pedrosa and Carvalho (2004; Pedrosa, 1989). They selected 11 episodes on the basis of two criteria: 1) at least two of the children who remained in the day care group the entire year were present and 2) on the basis of the time of the year when the episode occurred, so that there were some from the first months of the recordings, some from the middle, and some from the end.
of e.g. human-made objects (as toys). Children’s access to water is culturally (selectively) monitored and guided by the adults.

Table 5. The sessions selected for a detailed analysis. The number of the session is given on the basis of the whole corpus, including also recordings with the other group.

<table>
<thead>
<tr>
<th>DATE</th>
<th>DURATION</th>
<th>CHILDREN</th>
<th>AGE</th>
<th>OBJECTS</th>
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<tbody>
<tr>
<td>2 08/13/1998</td>
<td>36.07 min</td>
<td>Martti Heidi</td>
<td>30 mon 33 mon</td>
<td>Basin, plates</td>
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<td>4 08/24/1998</td>
<td>24.58 min</td>
<td>Martti Heidi</td>
<td>31 mon 34 mon</td>
<td>Brush, ladle</td>
</tr>
<tr>
<td>33 03/10/1999</td>
<td>20.59 min</td>
<td>Martti Heidi (Lasse)</td>
<td>37 mon 40 mon</td>
<td>Basins, cones, rocks, woods</td>
</tr>
<tr>
<td>35 04/08/1999</td>
<td>39.57 min</td>
<td>Martti Heidi</td>
<td>38 mon 41 mon</td>
<td>Basins, cups</td>
</tr>
</tbody>
</table>

All these four sessions included different instructions to the children; these differences among the situations will be discussed in the analysis.

4.6. Treatment of the material

Before I chose the four sessions for detailed analysis, I had written a general description of the content of all recording sessions. After this, I did a more detailed transcription of eight sessions with the selected group of children (group 2). All these sessions occurred indoors. I described the behaviour of the children with respect to actions, objects used, verbal and vocal productions, gestures, and movements. The transcription sheets consisted of five columns: each participating child had one column and an extra column was reserved for notes including the adults’ comments.
and movements (see Branco, 1998). In the description, I sometimes used also my written notes of the situation to add some of the details. For example, in session 33, Heidi and Martti glanced at Lasse, who is not visible on the video screen.

After the transcription in columns, together with more readings and discussions, I limited the focus to four sessions with Heidi and Martti. At that point, I also gained access to software called Transana. It is a free and open source software developed at the University of Wisconsin-Madison Center for Education Research for qualitative analysis with video and audio data (Source: http://www.transana.org/). With Transana it is possible to write a transcription of the data while having the video image running on the computer screen. The software also allows to make cuts (clips) of the video with the linked transcriptions, to arrange the clips in different collections, and to assign keywords to the clips. As Transana does not allow the use of columns in the transcriptions, I made new transcriptions in a plain descriptive text, now with more details in relation, for instance, to gaze, facial expressions, and physical proximity among Heidi and Martti, as well as their gazes and discussions with the teacher and me present in the situations (see Pedrosa, 1989; Vasconcelos, 1999; see also Appendix 4: Transcription conventions).

Various researchers have noted the difficulty of specifying the precise temporal limits of sequences or episodes within the flow of actions among children (Pedrosa et al., 1997; Strandell, 1995; 1997). I opted to keep the entire session as a starting point for the transcription in a narrative form, but also to cut the flow into parts, sequences, in order to handle the amount of the material. I noticed the difficulty of separating the flow of actions into parts. Sometimes it was possible to interpret the moments in which something changed in the flow, for example when the

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18 This model of transcription was applied from the works at the Laboratory of Microgenesis in Social Interactions at the University of Brasília, coordinated by Professor A. Branco.
theme of the discussion changed. Some of the sessions seemed to include a longer duration of the same configuration of actions, such as the question-answer game in session 33 (03/10/1999). Sometimes children brought elements from the previous sequences to their here-and-now construction. Keeping in mind the randomness of the criteria of cutting the flow, I paid attention to the previous and the following sequences when I focused on a particular sequence during the analysis. With the Transana software, it was easy to add details to the transcriptions, while watching the videos.

Even though the videotapes provide the main material of this research, the tape recorded discussions with the mothers, the teachers, and the mathematicians proved to be useful in interpreting and contextualizing the changes in expectations and interpretations during the months of the recordings (see Figure 4; Time 1). After the first round of transcribing the videotapes, I returned to the discussions. I transcribed those parts of the discussions that related to the children’s behaviour or our behaviour in the recording sessions. For example, I left out the parts in which we discussed the date of the next meeting. I did not use such a detailed transcription as to mark all the mumbling sounds, pauses, or intonations.19

In the analysis of the video recorded material, I applied both the theoretical ideas of the constraints and the ZFM/ZPA complex of child-adult relations in the sessions and the previous analyses on the co-regulated actions among children. In one of the first drafts of this report, I presented them separately. After a more detailed analysis, I came to the conclusion that the separation of child-child and child-adult co-regulation and negotiation of constraints is artificial in most cases.

19 I am grateful to Anna-Liisa Immonen at the National Development and Research Centre for Welfare and Health in Finland, who transcribed three of the tapes in detail.
In the following sections, I will first present the cases (session 2, session 4, session 33, and session 35), focusing on specific aspects of the negotiation of the constraints that characterize the particular session. Subsequently, I will illustrate the differences and similarities of the sessions in the summary of the findings and describe the changes that occurred from one recording to the next one. The structure of this interpretative analysis connects changes at three interlinked levels:

- Certain specific moments of change are interpreted within the context of the flow of actions of a particular recording session (Figure 6; Units 1 and 2),
- These changes are discussed in relation to the other selected sessions (Figure 6; Unit 3),
- The interpretation of these four recording sessions gains shape in the context of the whole corpus of material (Figure 6; Unit 4).

**Figure 6.** *The interlinked levels of the analysis.*
5. THE FLOW BETWEEN THE CHILDREN: SESSION 2

5.1. Setting: what is this situation about?

In the first recording session with this dyad (Session 2), the teacher invited the children to enter the sleeping room when other children were outdoors. In the middle of the room, the teacher had set a small chair and a table scaled to the children’s size. On top of the table, there was a transparent basin filled with water. When the children entered the room, the researcher (NR) was already in the room, close to a video camera standing on a tripod (Figure 7).

Figure 7. An illustration of the setting of the first recording session. The preschool teacher and the researcher are not visible on the video screen.
Extract 1, 08/13/1998, session 2, time 00.00–00.41.

“The video camera is zoomed to capture the table and the chair already present in the room. The moment the teacher opens the door and enters with the two children, the video recording is turned on. At first, only children’s legs are visible on the corner of the screen. The children are wearing t-shirts and pants.

Teacher: ( ) water. Come here. Niina is here. And Pirjo is here.

The teacher carries a chair in one hand; with the other hand she closes the door behind the children.

Teacher: Pirjo will close the door.

Both children stay close to her. Heidi turns to the door. The teacher moves towards the table.

Teacher: Do we put there ( )? Where do we put the chairs?

The teacher comes close to the table. The children follow her; Martti twists the hem of his shirt. The teacher sets the other chair on the floor on one side of the table (which is next to the side where the other is), and moves both chairs closer to the table. She moves the basin on the table closer to the children.

Teacher: Like this.

The teacher moves the chairs further away from the table.

Teacher: Here. Come sit here.

Heidi has arrived closer to the table, on the right side (from the camera), close to the teacher. Her head is bent down and she slowly rubs her head with her hand.
Teacher: Heidi, will you, sit here?
The teacher moves the chair close to Heidi and she sits down.
Teacher: Like that, good.
The teacher adjusts the chair closer to the table. Heidi rubs her face.
Martti smiles.
Martti: ( ) ((sound of excitement))
Martti sits on the other chair. He looks straight at the camera. The teacher passes behind Martti, moves his chair closer to the table.
Teacher: Pirjo will sit here.
She goes to sit on the floor, outside of camera screen. Martti follows the teacher with his eyes, holds his hands, and moves them around. Heidi also follows the teacher with her eyes. Then they look at the basin in front of them.”

The teacher introduced the setting by remarks about the situation (“…water. Niina is here. And Pirjo is here”), and questions that were commentaries rather than inquiries about opinions (“Where do we put the chairs?”). The children remained silent. They followed the teacher’s invitations (“Come sit here”, “Heidi, will you, sit here?”) and ended up sitting close to the table. Both children glanced around even though their bodily postures were different: Heidi withdrew behind her hand, while Martti observed the situation his head up and smiling. The teacher structured the setting nonverbally as well; she moved the chairs, led the children sit, and pushed both chairs closer to the table after the children were seated.

During this first minute of the session, the teacher canalized the children’s attention and movements towards the central point of the room: the table, the chair, and the basin. Thus, the Zone of Promoted Action was established towards the water in the basin. As the teacher arranged the chairs so that the children sat close to the table, their access
to certain other areas of the environment was blocked. The Zone of Free Movement (ZFM) was temporarily constructed for the children to face the camera and to have the water and the other child on his/her reach.

The children had been talking outside the room, but in front of the camera they became silent. The adults discussed afterwards how uncomfortable the teacher and the researcher had felt in this situation (Discussion 8/24/1998, see Appendix 3). As the adults were observing the children intensively, ready to pay attention to their comments and movements towards the water, the silence was both unexpected and disturbing for the adults. The children’s silence made the adults present further questions in order to the canalize children’s interest and movements towards the water. Silently observing the water was not enough from the adults’ point of view. (Extract 2.)

Extract 2, 08/13/1998, session 2, time 00.41 - 02.30.

“The children look at the basin in front of them.
Researcher: ‘What is in there?’
Martti looks at the basin, turns and looks behind his back. He turns back and stretches his hands, facing the teacher. He looks at the basin, moves his legs, and looks at the teacher again. Heidi looks at the basin, then at the teacher; she moves her fingers. Martti makes some sounds, whispers (not clear words). Heidi observes the camera.
Martti tugs his pants and looks at the teacher. Heidi looks at her also.
The teacher returns to the scene (she is visible on video); she bends towards the basin and taps the edge of the basin. She looks at the children.
Teacher: ‘What is in there?’((whispers))
Heidi: Water.
Heidi looks at the teacher.
Martti: Yes, water it is.
Both look at the teacher; then, Martti looks at the camera. Heidi looks at the camera also, then at the teacher. Martti turns to the teacher.
Martti: “Water”(.) “Water it is”
Heidi plays with her hands, twists her fingers in front of her; then, she puts them down. Martti moves on the chair, then begins to look at the table, moving his hands. (He looks like a person lost in his thoughts).
Martti blinks his eyes slowly (as if concentrating on the blinking); he looks at the table, then at the teacher. Heidi, also, looks at the teacher again.
Teacher: “Heidi, is it warm water?” ((Whispers))
Martti looks at the basin.
Martti: Yes.
Teacher: “Try, Martti. Is it warm water? (1) Try if it is warm water.”
Martti lifts his hand just slightly, close to his waist, and looks at the basin.
Martti: It is warm.
Teacher: “Try it.”
Martti: ( ) “warm water”
Martti looks away from the teacher. Heidi looks at the teacher. Both children look around.”

The children’s silence following the researcher’s question, and the fact that they were still not touching the water triggered further efforts on the part of the teacher to restructure the setting. To highlight the water again as the central figure, the teacher touched the basin and repeated the question. Both children observed the adult’s actions and attempts, and gave a single-word verbal response: “water”. As the verbalizations led to
no further elaboration, and because the children seemed to withdraw again from focusing their attention to the basin, more direct questions and initiations emerged: “Heidi, is it warm water?” Heidi neither answered nor touched the water to confirm the temperature. Martti gave an answer that led the teacher to encourage him: “Try Martti. Is it warm water?” The Zone of Promoted Action was now even more clearly set up for him to touch the water. Still, even though the message “Try Martti” was clear, the teacher’s whispering voice added another dimension to the request: her message remained vague, and not a forceful instruction. Even though the teacher attempted to direct the children’s interest to the basin (ZPA), she worried that the children would pay attention to her and not to the basin. She also attempted to avoid the microphone to record her voice, as the focus was supposed to be on the children.

While Martti moved his hand, he withdrew from touching the water. Heidi was holding her hands behind the chair. Martti was the one to speak with a loud and clear voice: he repeated the evaluation of the temperature: “It is warm” but following the teacher’s constant whispering he also lowered his voice.

During these sequences, the children’s actions were regulated by both the initiations by the adults and the movements and the presence of the other child (see Pedrosa, 1989). While the children engaged in observations and attempts to make sense of the adults’ expectations and instructions, they also observed the adults’ responses to the comments and movements of the other child. Thus, silence was co-constructed, even though this was not in line with the adults’ original plan. According to the adults’ original plan, only the adults were supposed to remain silent in the recording situations. After the first minutes, the children withdrew from using words for 17 minutes.
5.2. Negotiations of the liminal space

The sequences that followed the establishment of the setting showed the variety of the ways in which the children engaged in nonverbal movements, such as gaze, while being silent. Martti would start with repeated gazes and he and Heidi would elaborate them into imitative head shaking during the session.

While transcribing the session, I paid attention to the repeated looking away as compared to gazing. In the flow of actions, the way the children looked away was observable as a fast movement or a slow, exaggerated movement of turning the head first, and then moving the gaze towards a new direction. Even though the children were gazing at something they could have had their attention directed to something else instead. The starting point of the gaze and the direction to which the gaze returned occasionally appeared to be more significant than the actual direction of the gaze. Looking away sometimes interrupted the intensity of mutual actions but at times it was also elaborated as a focus of the ongoing actions. At times the gazes were repeated as if introducing a direction towards which to look.

After observing more clearly this elaboration of gaze, I concluded that during the first minutes of the session, Martti engaged in what I term here as a negotiations of the liminal space between two worlds (exploration of adult intentions/expectations versus co-regulated actions with Heidi) by using his gaze as a tool. He was sitting close to the table, between Heidi and the adults with camera (see Figure 7). This physical setting participated in creating a situation in which he alternated his gazes towards the adults and towards Heidi on his other side.

After three minutes, Martti made the first visible movement towards Heidi (Extract 3).
Martti’s slow, exaggerated blinking occurred in such a way that he seemed to be experimenting how it feels — and/or he did it to entertain himself. It occurred when Heidi remained withdrawn, observing the overall situation. Eventually, Martti’s movement of slow blinking became more focused towards Heidi (Extract 4).

Extract 4, 08/13/1998, session 2, time 4.08-5.09.

“Martti looks at the teacher. He turns his head to Heidi, then away, then, blinking his eyes, back to Heidi and looks straight at her. Heidi moves a bit in her chair, looks towards the teacher. Martti looks straight at Heidi (for a few seconds more than when moving around). Heidi turns her gaze towards him. Martti smiles, opens and closes his mouth, moves his tongue, and smiles at her. Heidi smiles too. After looking, he turns to the teacher, opens and closes his mouth. Heidi looks at the teacher also and moves her body on her chair. Martti turns to Heidi again, glances at the camera, opens and closes his mouth. Heidi looks at him. He opens his mouth and shows his tongue. Heidi smiles. Following this, he turns away
Martti’s first blinks towards Heidi led to no further elaborations. When Martti persistently looked at Heidi, she turned her gaze to him. While she observed his movements, he introduced new contents: he begun to open and close his mouth and move his tongue. Heidi observed Martti’s movements. Martti turned away, then shook his head and returned to look at Heidi. Now, Heidi’s attention was towards Martti. It was as if she had finally “woken up” in relation to Martti. She repeated Martti’s movement when he was turned away: she touched her head in a way similar to Martti’s. Therefore, both children’s movements were regulated by the presence of the other.

In this sequence, Martti used repetition and persistence of gazes to attract and secure Heidi’s attention. Martti’s gazes and blinks towards Heidi can be interpreted as signaling his willingness to initiate an interactive sequence (see Pedrosa, 1989). After the mutual attention was established, both momentarily returned to other things.

After three more minutes, an unplanned movement, a yawn, led to a qualitative change in the flow (Extract 5).

Extract 5, 08/13/1998, session 2, time 8.03-8.40.

“Heidi lifts her hands and looks at them (hands) closely. Martti observes Heidi. Heidi twists her fingers, looks at the camera and the teacher. Martti looks at her, breathes deeply, and leans towards her. Heidi looks at the teacher. Martti glances at the camera, then to Heidi, then to the
teacher. He smiles, looks at Heidi again, blinks his eyes slowly towards her. Heidi leans towards the table. She looks at the window and/or the teacher. Martti looks aside, then again at Heidi.

Heidi yawns. While this occurs, Heidi’s head turns, her body leans a bit forward and her eyes move from the window to Martti. Their legs touch under the table. They look at each other, smile a bit; then, Martti whispers something and moves to look at the basin. Both turn to look at the basin. Martti moves in his chair, glances at Heidi.”

Heidi had been looking away from Martti, not paying visible attention to him even though he had been gazing at her frequently. Now, while she yawned, her bodily posture changed slightly, becoming more favourable for an encounter with Martti. Here, the changes in her bodily postures canalized the attention; her gaze turned towards him. Heidi remained in that position and the children looked at each other as if contemplating one another for a moment, their legs touching under the table.

After the yawn, the children engaged in mutually focused co-adjustments. Both children also glanced away from each other, although they made similar movements (Extract 6).

Extract 6, 1998/08/13, session 2, time 8.40-9.07.

“Heidi moves her fingers, bends back, and looks at the teacher. Martti shakes his head (rapidly around), then smiles at Heidi. Heidi looks at him, leans towards him and smiles. She withdraws a bit, twists her fingers, and blinks her eyes twice while he is looking. Martti turns to the teacher. Heidi twists her fingers. Martti turns to Heidi. He blinks his eyes slowly at Heidi who now looks at him. Heidi twists her fingers, looks away. Martti glances at the camera.”
Heidi glances at Martti, then lifts her fingers towards her chin and moves them toward her mouth, now looking at the teacher. Martti glances at her also, then, looking at the camera, lifts his fingers towards his chin and moves them to his mouth in a way similar to Heidi’s. Martti does not look at Heidi, for a moment he seems to be lost in his thoughts. Nevertheless, he makes similar movements: both move their fingers on their noses."

In addition to mutual attention, the children highlighted some aspects of the other’s action with co-regulated movements (see Pedrosa, 1989, p. 175). By leaning and smiling towards Martti, Heidi communicated her availability to join the interactive sequence Martti had been proposing by various initiations already. With the movement, Heidi framed Martti’s actions as a proposal; Martti’s movements gained from Heidi’s gesture the status of a proposal and a frame for potential interactive sequence was established. Martti leaned towards her and his movement of leaning confirmed the frame. Heidi twisted her hands and moved one of her hands into her mouth. The movement continued and the hand moved towards the nose.

In addition to the gaze, the sequence above includes another movement: when Martti turned his gaze and moved his eyes and mouth, he also shook his head. At the beginning of the session, the head movements were linked to observation; Martti moved his head when randomly looking around. In this sequence, Martti shook his head without observing around. The movements now resembled the repetitive experiments with body movements such as the blinking.

The co-regulation of the actions was scripted neither by Heidi nor Martti, and the resulting configuration was unpredictable to both. In this case, the framing (Pedrosa, 1989) of the other’s actions occurred by imitation and elaboration.
Pedrosa makes a difference between framing and proposal, even though both have potential for regulation. In the framing of actions of the other, the child signals the availability to play; the actions of the other will gain the status of a proposal during the flow of actions. Pedrosa (1989, p. 177) explains: “when the child frames the action of the other, the child is being regulated by the other. It is as if s/he were attributing a status of proposal to the actions of the other.” The term proposal refers to the potential the action has for canalizing the activity further.

While it is possible to observe and interpret the potential for regulation, the origin of the proposals may remain unclear (Pedrosa, 1989, p. 178). An example of this could be Martti’s exaggerated blinking. His movements, blinking the eyes slowly, were not clearly framed on the basis of Heidi’s action, but more like exaggerated mundane movements of his own. He blinked slow enough to attract Heidi’s attention together with head turns and mouth movements.

After another three minutes, head shaking become the focus for both, the content of the imitative actions: it was no longer a movement Martti made to attract Heidi’s attention. Indeed, head shaking was a beginning for a sequence of various imitative actions (Extract 7).

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**Extract 7, 08/13/1998, session 2, time 12.32-13.20.**

“Martti shakes his head a bit, looks still at the teacher, blinks his eyes slowly. Heidi looks at the teacher, touches the chair behind her, leans backwards on the chair. Martti shakes his head, stops, shakes his head again, and looks back to Heidi. He blinks his eyes towards her, stares at her.

Heidi leans forward towards Martti, looks at him, and begins to shake her head like him. Both look at each other for a while, Martti moves his mouth a bit (bites his teeth together). Heidi follows him and does similarly. Martti observes her and then he turns away. He bends to look
over his shoulders, shakes his head and looks back at Heidi. Heidi looks at him, then glances over her shoulders to the door, and shakes her head. Heidi bends towards Martti. Martti looks at her and smiles. Martti looks over his shoulders to the other door and slowly turns back to look at Heidi. Heidi bends and glances over Martti’s shoulders towards the door at the same time with Martti. She turns her gaze to Martti and smiles widely. Martti smiles to her. Martti turns to look away from Heidi towards the teacher, puts his finger to his mouth, then turns slowly to look at the basin. Heidi looks at the teacher and leans back on her chair.”

Here, the children engaged in mutual adjustments in the form of imitation (Carvalho, Império-Hamburger, & Pedrosa, 1998, p. 168; Oliveira, 1988), imitation being a central form of reciprocal regulation among children (Pedrosa, 1989). Carvalho and Pedrosa’s notion of imitation is similar to Fogel’s ideas. Imitation does not consist of an individual acting on the basis of mental representations of the acts of the other — but it is co-regulated and emerges in the process of mutual adjustments. The actions of one always include some novelty in relation to the actions of the other. In imitation, information about the self and the other is created (Fogel, 1993; Pedrosa & Carvalho, 2006).

In these sequences, in addition to mutual adjustments between the children, the children continued to glance at the adults. They were aware they were being observed, they were attentive to the feedback and/or new instructions from the adults.
5.3. Confirming and re-establishing the joint action

5.3.1. From silence to verbalizations

Transana, the qualitative analysis software I used, creates a waveform of the videos which is a visual representation of the intensity of the video’s sound. The waveform of the session 2 illustrates how children use only a few sounds in the beginning. Seventeen minutes after the beginning of the recording the waveform changed its shape: more sounds emerged. The children started to use a wide scale of sounds from whispering to raised voice and high pitch. Instead of using various words, they repeated the syllables “ko” and “ka” in a variety of combinations with different strains.

The video shows how the elaboration of these verbalizations occurred right after the teacher had temporarily left the room. After her departure, the children relaxed; they started to make bigger movements together with verbalizations. This continued even though the teacher returned.

More precisely, after the teacher’s departure, Martti introduced verbalizations together with a new movement of bending to look under the table. Heidi joined immediately. The history of imitative movements that was already established during the session supported this immediate engagement. The teacher’s departure left an open space: temporarily, there was no possibility for her to present suggestions or instructions for the situation (Extract 8).


“Heidi looks at Martti while moving her tongue in her mouth. Martti glances at the camera, lifts his body, lifts his eyebrows smiling. Heidi
looks at him, lifts her body also. Martti turns back to her, whispers something to her. Heidi looks at him.

Martti: "( )"

Martti smiles and bends to look under the table. Heidi is close to him, touches his elbow. Heidi bends to look under the table too; at the same time Martti gets up.

Martti: "(Kokkk)"

Martti looks down again. Heidi looks at him, then also under the table. Martti looks at her (while she is bending under the table), then looks under the table. Heidi looks at Martti, then under the table (they are both bending down at the same time). Then, they both look at each other. Martti stretches his closed hand towards Heidi.

Martti: "(Kokokoo)"

Heidi looks at him, opens her mouth, both smile.

Heidi: "(kokakoka)"

Martti bends under the table and continues to whisper "kokakoka." Heidi bends also. Heidi gets up first, then Martti. Both laugh a bit and smile. Again, Martti stretches his fist towards her as if offering something. Heidi reaches towards Martti and grasps his hand, touches first the fist offered, then the other. Martti moves his other hand closer to him (his fist is closed as if holding something), then moves it in front of Heidi. Heidi touches Martti’s hand and moves her hand close to her mouth (she leans on the table). Martti lifts his fist higher and laughs. He touches Heidi’s hand close to her mouth. Heidi looks at him and touches his hand."

These first random verbalizations were related to Martti’s offer and Heidi’s movement of “eating.” An immediate agreement was established
that something emerged under the table to be offered and “eaten.” The children’s bodily postures and the rhythm of their movements were co-adjusted (see also Pedrosa, 1989, pp. 192-195). Eventually, they created a rhythm within the activity: they offered and “ate” alternating turns.

In summary, the words and the whole configuration of the game (taking something from the floor, offering, opening the mouth, putting something to the mouth, chewing) were transformed, from suspended information in the interactional field into shared meanings (Pedrosa et al., 1998, p. 171). “Kokaa kokoo” became the linguistic expression that represented the action of offering, eating, and chewing at another level of meanings. The random verbalizations became elaborated as an idiosyncratic code, i.e., a code having context specific meaning these for children (Pedrosa & Carvalho, 2006).

The different versions of verbalizations with the syllables “ko” and “ka” went also through a differentiation process as the function of these verbalizations and sounds changed during the session (see also Pedrosa et al., 1998, p. 170). The verbalizations acquired an actualization effect (Pedrosa, 1989, p. 249) and started to constrain the subsequent actions. With the simple verbalization “koka” or a variation of it, the children were able to return fast to the previously established exchange. For example, the exchange was returned at the beginning of the next recording session, session 4.

5.3.2. Laughter and playfulness

The children both smiled and laughed when they were engaged in mutual adjustments. With smiles, the children signaled their mutual attunement and willingness to engage in further elaborations. Like verbalizations, laughter also functioned as an organizing element. The laughter attracted attention: the children turned their gaze towards each other in case of a sudden sound of laughter. If the mutual attention was established already,
the children confirmed by laughter that the situation was pleasant and the elaboration continued further. The laughter defined the quality of the engagement. As Carvalho and colleagues (1997, pp. 166-167) observed, children can turn laughter into information about a particular aspect of a game.

Towards the end of the session, the teacher had brought more objects to the table: plates, and a few minutes later, a tea pot.

The children had been laughing, making sounds of eating, and making gestures of throwing something away. After the teacher set the tea pot on the table, Martti pointed to the tea pot and said “cake.” Heidi denied this suggestion with laughter and with a clear verbalization (Extract 9).

Extract 9, 08/13/1998, Session 2, time 34.55- 35.15.

“Martti: Kokku kokku.
Martti points the tea pot, moves his finger close to it. Heidi pushes his hand away.
Heidi: There is no cake. ("Cake" in Finnish is "kakku.")
Martti laughs and looks at her.
Martti: Kakkuuu: ((laughing)) kakkuu:
Heidi smiles. Martti reaches towards the tea pot again.
Heidi: There is no cake.
Heidi pushes his hand away again. Martti points to the pot.
Martti: Kookku.
He looks at Heidi. Heidi lifts her hand.
Heidi: There is no poo ((laughing)) ((“Poo” in Finnish is “kakka” and rhymes with “kakku.”))
Martti: Kokk-
Martti points at the tea pot again, smiles and looks at her.
In the beginning, Heidi denied Martti’s initiation/interpretation. “There is no cake,” she said. This first denial was a disagreement that led to further, playful elaboration of the theme. Martti repeated and continued to laugh. Heidi denied Martti’s gesture by saying “There is no cake,” smiling. The refusal moved away from “not being cake” to “not eating the cake.” Eating was mixed with drinking movements used in previous sequences.

With smiling and laughter, the nature of the situation was maintained playful (Strandell, 1997). Denial and refusal were elaborated as part of the rhythmic game of pointing and pushing between the children. Interlinked with more laughter, children also moved more than previously. However, they maintained the table as a concrete base for actions (ZFM): when they got up to wave with one hand, they held the edge of the table with the other.

5.3.3. Negotiating the boundaries between the children

At some points in the flow of co-regulated actions, the children seemed to enter into a negotiation of what is acceptable and what kind of actions and movements are promoted — in a similar way as when they were glancing towards the teacher to confirm the teacher’s reactions to their movements. The “ko” and “ka” verbalizations having been related to the turns of offering and eating, they also gained a function of canalizing the
actions towards already established movements, away from certain movements with which Martti felt less comfortable (Extract 10).


“Heidi moves her finger slowly towards Martti’s chewing mouth. Martti looks at it, pretends to bite Heidi’s hand, and laughs. Heidi pulls her hand away and laughs. She points towards Martti’s mouth again, he pretends to bite. Heidi pulls her hand away and laughs again. They go on chewing, pointing, biting and pulling, and laugh. Heidi points at Martti who pretends to bite. He laughs, stops chewing, and shakes his head. Heidi pulls her hand away, shakes her head also, and bends towards Martti. Martti smiles and looks at her. Heidi reaches to touch his eye; Martti pushes her hand away and turns his head away, looks at the camera, and laughs. Heidi touches his elbow, “walks with fingers” (tickles). He pushes her hand away laughing, looks at the camera and begins to make “koka koka” sounds.

Martti: “Kokaa koka kokk kokko kokko.”

Heidi looks at him, begins to make sounds also.

Heidi: “kokaa kokaa.”

Martti turns to Heidi again. Both move their mouths.

In this sequence, when Heidi reached towards Martti, he accompanied verbalizations with movements of withdrawal and protection. When Heidi reached toward him, he kept pushing her hands away. Heidi joined the verbalizations and mutual mouth movements were returned.

Here, the boundaries of the ZFM were negotiated by the children. Even though Martti did not clearly refuse or escape from Heidi’s movements and touching, he canalized the actions towards other movements. Both continued to laugh and to smile. The movements in
this sequence are an example of children’s areas of control: *even though children are sometimes given less possibilities to control the situation than the adult, they remain in control of their bodies and the ways in which the others can relate to their bodies.* This is the case of Martti suggesting the preferred form of touching and the boundaries of comfortable touching.

Later on, the children entered in a different emotional state that made the tone of their voices and movements more rigid for a while. The flow of actions (chewing and throwing away to the “trash”), was reconfigured by sudden verbal refusals (Extract 11).

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**Extract 11, 08/13/1998, Session 2, time 28.55-30.01.**

“*Heidi bends again towards the floor to grasp something. Martti moves his hand towards the floor, is about to bend to the floor. He moves close to Heidi’s face. Heidi pushes his hand away.*

*Heidi: Don’t!*  
*Martti looks at Heidi. Heidi touches her thumb. Martti bends back to his chair. She bends towards the floor and takes “something” into her mouth. Martti touches his panties and looks down.*  
*Martti: I take away!*

*Martti keeps looking and touching his panties, he does not smile. Heidi takes “something” from the floor and puts it into Martti’s mouth.*  
*Heidi: Take ( )!*

*Heidi looks at Martti.*  
*Martti: I don’t want! ((displeased tone))*

*He touches his mouth and throws something away, but now with less movement. He looks at Heidi, then at his laps. His hands are on top of his laps. Heidi bends towards the floor and puts “something” into her mouth. She chews. Heidi bends towards Martti and opens her mouth as if*
biting (but still not smiling). He does not smile, but looks at his feet and moves them around and touches them. Heidi glances at his feet, then bends towards the floor, takes “something” from the floor, and puts it into her mouth, looking at him. Martti lifts one foot. Heidi sucks louder than before. She moves her fingers in front of her mouth, moves her head, as if eating, observes Martti (wider gestures than previously). Martti turns to look at her. Heidi touches her mouth and throws something away.

*Heidi: “Yuck”*

*Martti looks at her and laughs.*

*Heidi touches her mouth and throws something away again.*

It is not easy to make a precise interpretation of the sequence, but possibly Martti pressed Heidi’s hand somehow hurting her, or she just refused Martti’s movement: “Don’t!” After Heidi’s refusal, Martti, in turn, rejected Heidi’s offer. Heidi returned to previously established forms: she repeated the movements they had done before. She chewed even louder, made the movements more visible as if introducing the return to the previous scheme as a form of reconciliation. Martti’s laughter was a sign of acceptance. The “throwing away” game continued.

In this sequence the children negotiated the frame of the actions on a metalevel. They stepped outside the frame of play for a moment (Heidi’s “don’t!”) as if pointing out the unwanted areas (outside the ZFM), but the refusal was soon was mixed with the play itself. Martti refused to have what Heidi was offering. He did not do it in a playful manner as part of the game, but with a very serious look on his face. Heidi offered a solution by emphasizing eating instead of pressuring Martti to accept what she offered (ZPA).

The return to a previously agreed base thus seemed to give a secure ground from where to restart the construction. The children engaged in
gestures and movements that were established and agreed upon between them previously, adding laughter as a sign of agreement.

5.4. Emergence of meanings and abbreviation

In session 2, the children had no toy or other material objects in their hands; however, they co-constructed a version of the give-and-take game (see e.g. Fogel, 1993) with their gazes, head, hand and mouth movements, and sounds. Towards the end of the session, this theme was elaborated towards throwing away in the “trash.”

Throughout the session, both children were regulated by the presence of the other. The regulation by the presence and actions of the other, however, did not imply continuous attention to the other. Martti gazed at Heidi various times; nevertheless, it was only after four minutes that Heidi observed Martti’s movements more closely when Martti was showing his tongue and smiling. The first head and face movements that led to a consensual frame of mutual attention among the children emerged from random movements of looking around at the teacher, the researcher, the camera, the basin with water, and the other child.

After the mutual attention was established, an action field among the children was reorganized; the rhythm and focus of the children’s actions changed. A consensual frame for mutual proposals and movements emerged. On the basis of previous movements, new elements were introduced and readily applied by the other. The movement of children’s hands started first around their own hands (touching their fingers), then around their own mouths and faces (making faces, blinking, chewing, rubbing the eyes), then towards the face of the other (taking and offering the food). The overall figure of the session consisted of imitative movements and new proposals for movements around the face, later on supported by various versions of the syllables “ko” and “ka”. It was only after 17 minutes, when the teacher had left the room that Martti
whispered the first sound related to the play; under the table emerged something to be offered by Martti and taken/eaten by Heidi.

In other words, the children did not only adjust their actions to each other’s actions, but adjusted their actions to the configuration of the situation with persistent meanings and the presence of the adults and the camera.

In previous literature, similar observations about co-regulated actions have been discussed theoretically. In the process of mutual adjustments, information is created, condensed, and discarded; what occurs is a synthesis of information. Carvalho and Pedrosa use the concept of correlation\(^{20}\) to refer to this reduction or condensation in which non-significant information for agreement is left out. Correlation involves an economy, an abbreviation (Lyra & Rossetti-Ferreira, 1995; Lyra & Winegar, 1997; Souza, Villachan-Lyra, & Lyra, 1997; see also Section 1.6. Abbreviation in meaning making and relationships development). Carvalho and Pedrosa (2004a, p. 91) describe: “Abbreviation creates a starting point for further communicative exchanges by condensing and simplifying a previous negotiation process into a conspicuous and unambiguous gesture or shared interpretation of gestures…” In addition: “…these representations come to be part of the group culture, in the sense of evoking similar episodes in later sequences of the group history” (Carvalho et al., 1998, p. 171).

An action (a movement or a word) evokes a shared constructed meaning (Carvalho, 2004, pp. 4-5). Pedrosa refers to Montagner (1978), who uses the concept of ritualization to refer to a similar process of “differentiation of actions, touches, odours, or vocalizations up to the point of acquiring value of signs” (Pedrosa, 1989, p. 34).

Carvalho & Pedrosa (2004a) describe ritualization as follows:

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\(^{20}\) In this context, correlation does not refer to a statistical relation between variables.
The ritualized gesture seems to be a sort of synthesis: it results from a process in which children jointly select, specify and establish one action or a sequence of actions. For instance, a child mimics and the peer reacts as if he/she has given the mimic a specific meaning. This does not imply intention on the part of the child who mimics; but it can imply that he/she can discover this communicative possibility and try to use this action, or another slightly different version, in other similar contexts. It is a sort of joint experimentation in which behaviours are tested about their communicative potential, and are eventually simplified and stereotyped. (p. 91)

In the session analyzed here as well, after different interruptions, the elaboration of the meaning of the movements and verbalizations was abbreviated. One single movement, the gesture of offering, evoked a similar sequence of movements previously constructed by the children.

After observing the actions for 30 minutes, the teacher re-arranged the material setting and brought three small plastic plates to the table. Despite of the teacher’s nonverbal suggestion for actions by providing more objects (ZPA), the children paid little attention to the new objects and quickly returned to their previously elaborated exchange. The children had been intensively engaged in throwing away, eating-and-offering movements. The plates were not clearly incorporated in their actions, but observed as a side plot. Martti verbalized similar sounds and made similar movements as previously. Heidi observed, after which they both engaged in the configuration they had co-constructed earlier: Martti putting “food” to his mouth, Heidi grasping it from him and chewing also. The children’s laughter got louder and the play was elaborated into gestures of throwing something to the floor, in the “trash.”

After one minute of observing the children’s “ko” and “ka” sounds, chewing, and throwing, the teacher moved in again and placed a tea pot on the table. Again, the children observed the teacher and the new object.
Soon, however the objects were left aside while the previously elaborated movements continued.

5.5. Discussion: negotiation of intentions, expectations, and occurrences

At the beginning of the session, in line with the teacher’s invitation ("Come, sit here"), her movement of pushing the chairs closer to the table was a sign for the children to remain seated, side by side, facing the camera. The children could not get up without pushing the chair further from the table, as they did after about 30 minutes, towards the end of the recording. In this setting, the furniture defined some of the boundaries of the Zone of Free Movement (ZFM), creating a field of acceptable possibilities in the session; in other words, what was accepted and allowed to occur in this recording situation. The children did not question these boundaries by leaving the chairs but remained close to the table, some part of their body touching the table or the chair, until the end of the recording.

Stretching and bending towards the floor and towards each other without getting up led to a co-construction of movements and meanings within the limits/possibilities of the physical space provided by the chairs and the table. The symbolic content of the play, eating and offering “food”, emerged within this setting which afforded this activity also by its symbolic content. The setting included a table and chairs as at mealtimes, and there was a basin of water on top of the table. The chairs were in such a distance from each other that they enabled the children to reach each other’s faces.

The adult expectations as to what to do with the water were transformed into suggestions and nonverbal gestures. Instead of touching the water as suggested by the adults, the children elaborated a play with facial expressions, gestures and “ko” and ”ka” sounds. With their bodily
postures, the children silently resisted the adults’ initiations and attempts to canalize their movements towards the water. During the recording session the teacher was the only one to touch the basin. After 25 minutes of recording, Martti made a few movements of mixing something above the basin, but did not touch the water.

As the situation included various simultaneous co-regulations among the participants, it is possible to talk of Zones of Promoted Actions in plural. The zones were constantly negotiated, both by the adults (what to do next in the situation), by the children and the adults (canalization towards the water), and by the children (in relation to their imitative feeding-eating movements within the session).

The future perspective was present in the unfolding of the here-and-now situation in terms of the expectations as well as possibilities for future constructions. The teacher’s and the researcher’s actions in the situation reveal some of their expectations, conceptions, and intentions. In line with their conception of a “creative” and “active” child, the adults had assumed that the children would come, sit down, and touch the water in the basin. In addition to this, it was assumed that the children might also do something else, as they were assumed to be creative, loud, and ready to engage in playful activities.

Furthermore, the adults had expected the children’s play or playful activities to include, at least, 1) manipulation of the objects provided, 2) verbal language use including some reference to the objects provided, and 3) the children’s attention to each other, to the objects and to each other’s use of the objects, rather than to the adults and the camera. At the beginning of the session, the adults had difficulties in defining whether the children’s actions were in line with these criteria, and this uncertainty resulted in the adults’ active attempts to canalize the actions towards these directions.

The children engaged actively in defining the situation by introducing novelty outside the adult sphere of expectation, but somewhat within the (fuzzy) boundaries of the ZFM that was established
at the beginning. They sat on the chairs and faced the camera. Eventually, as the children’s actions were considered by the adults to be playful and interpreted as implying a possibility that the actions would be eventually elaborated towards mutual engagement with water, their actions were not intentionally disturbed by the adults. After the children had started their mutual engagement, the teacher’s only clear attempt to renegotiate the ZFM/ZPA was when she provided more objects at the end of the session.

Previous studies present similar observations on how children use playfulness as a resource in organizing the situations and to exert power over adults’ attempts to canalize and define the situations. Corsaro (2004) describes in detail how children attempt to protect their interactive space from other children. Strandell (1997) has discussed playfulness as a resource that children may use in adult controlled situations. In playful situations, “children amused themselves a lot…often these situations were characterized by a very “dense” social atmosphere and an intense feeling of “togetherness” (p. 457; see also Hännikäinen, 2001).
6. PROMOTED ACTIONS: SESSION 4

6.1. Setting: abbreviated meaning negotiation

Recording session 4 occurred in the kitchen of the day care centre ten days after the previous session (session 2). Before the children entered the kitchen, the teacher had helped them to remove some of their clothes. In the session, Martti was wearing a t-shirt and panties, Heidi was wearing only panties. The teacher had invited the children to the kitchen to “play with water.” Children stood on a bench, close to the kitchen sink. A brush was on top of the sink. The teacher let the water run to the sink until it was halfway full. The teacher and the researcher stood on the children’s left side observing the situation. The researcher was holding the camera. (Extract 12.)

Extract 12, 08/24/1998, session 4, time 00.00-1.07.

“Recording begins. Martti looks at the camera, Heidi rubs her eyes. Martti smiles, begins to rub his eyes too. Both children keep their hands on top of their faces.

They glance at each other (from between the fingers), smile. Martti rubs more, Heidi glances and begins to rub more also.
First Martti, then Heidi put their hands down. Heidi observes Martti who looks at the sink and smiles. Heidi glances at her hands. Heidi touches the sink door handle. Martti glances at the camera.
Both turn their heads away from the camera, look to the other direction. Both turn a bit to look at the sink. Martti touches his shirt and begins to look at Heidi. Heidi moves her gaze towards him and both begin to smile. Heidi lifts her hand towards him. Martti lifts his hand, smiles.

Martti: Kokoo: ((whispers))

Heidi grasps the air with hand and puts her hand on top of her mouth. Martti puts something into his mouth also, chews. Heidi observes. Martti makes a gesture of taking something away from his mouth and throws it away on to the floor, smiling.

Martti: Kokaa ((whispers))

Heidi puts her hand in front of her mouth.

The teacher comes to the screen and turns on the faucet.”

At the beginning of the session, the children turned towards each other, away from the sink and engaged in similar facial and hand movements as well as the “koka” verbalizations they had constructed during the previous recording session. Thus, mutual attention and imitation among the children was established right from the beginning. Martti joined Heidi’s first movement (rubbing her eyes), attributing with similar rubbing and glances a status of proposal to Heidi’s movements.

The previously elaborated elements were introduced anew without the meaning negotiations being done all from the “scratch”: the negotiations were abbreviated (Fogel, 1993; Lyra & Rossetti-Ferreira, 1995; Lyra & Winegar, 1997; Souza, Villachan-Lyra, & Lyra, 1997), and a frame for a potentially interactive sequence was already established after the first movements. In this sequence, the familiar verbalizations (“ko”—“ka”) related both to the actual situation and to a previous interational configuration based on the previous recording session (see also Pedrosa, 1989, pp. 251-252). Here also it is possible to apply the ZFM/ZPA terminology to the children’s actions: with movements, eating
gestures, glances, and keeping a distance from the water, they promoted the actions (ZPA) towards mutual engagement and elaboration instead of touching or observing the water as suggested by the teacher.

Despite the differences in the physical setting as compared to the previous session, some similarities were obvious: the adults remained silent, observing the children, and the researcher was holding a camera. In this session, the children did not glance at the adults or the camera as much as they did in the first recording session (session 2). Here, children readily accepted the position standing close to the sink, in front of the camera, but not directly facing it. This was within the field of acceptable possibilities (Zone of Free Movement) for recording purposes.

The children’s movements were a powerful tool in relation to the teacher’s original initiations. Within a few seconds the children were tuned towards each other and shared a common frame of actions. In an attempt to promote the children’s actions towards the water (ZPA), the teacher went to turn on the faucet.

The children observed the running water for a short while before returning to their movements with their hands. They smiled, blinked, and repeated each others’ movements, even though their bodily postures continued to be turned towards the running water. Martti whispered “koko” sounds, Heidi smiled to him, and they moved their hands towards each other. Subsequently, they moved their hands down and looked at the water while staying close to each other. Their observations occurred in a co-regulated fashion, simultaneously.

Until now, the teacher’s suggestions were vague, even though she had directed children’s attention towards the running water (ZPA). It was unclear what the children were supposed to do with the running water. The removal of some of the children’s clothes implied that the adults assumed that children might get wet (ZFM), but the teacher’s initiations included no clear specifications as to how to act.
6.2. Persistent promotion of actions

As the children continued to be tuned in to a mutual elaboration of movements, and their movements gave no reason to believe they would soon be more interested in touching the water instead of just observing it (see also Discussion 9/15/1998, Appendix 3), the teacher interrupted the children with clearer instructions (ZPA). The teacher went to touch the water, talked to the children, and ran more water out of the faucet (Extract 13).

“The teacher interrupts the children, goes to touch the running water.
Teacher: Heidi and Martti, look at this!
Children look at her.
The teacher touches the water in the sink, looks at the children.
Teacher: ( ) here is water.
Martti: (Yes)
The children have their hands on the sink edge and look at the water.
Teacher: ( ) water.
The teacher lets more water run out of the faucet. Martti moves his body.
The teacher looks at the children and goes away from the screen.
Martti bends closer over the faucet, goes down a bit. Heidi bends down a bit also, then bends up slightly. Martti turns to look at Heidi and smiles. Heidi turns to him and moves her hands towards his face smiling. Martti turns to look at the water smiling, jumps a bit. Heidi puts her hands on the table (sink), bends over closer to the sink, then away from the sink. She looks at Martti’s hands and moves her hands. Martti points to the water and then removes his hands.
Heidi puts her hands on the door handle. She bends up, looks up, on the left side, closer towards the camera for the first time. Then she turns to look at the water.

Martti looks at the water running. Heidi raises her face slightly to look at the water, then up again.

The teacher goes to turn off the faucet.

Martti looks the faucet, smiles.”

After the teacher touched the water, the children bent towards the sink but held their hands away from the water. They looked around and at each other. Their simultaneous bending towards the sink seemed to be part of a mutual, already established game of imitation rather than an observation of the water as suggested by the teacher. However, the children followed the teacher’s initiations, if her initiations are to be taken literally, (“Heidi and Martti look at this!”), by bending towards and looking at the water. As the water was running abundantly, and the children still continued their movements without touching it, the teacher went to turn off the faucet. The children continued looking around and moving; they elaborated more intense movements and whispering. After one and a half minute the teacher entered the scene again (Extract 14).

Extract 14, 08/24/1998, session 4, time 5.06-5.40.

“Both look at each other, smile. Martti nods, whispers some sounds. Heidi whispers also.

Martti points to the floor in between them, looks at Heidi.

Martti: ‘( )’

Heidi looks at him, then points at the floor also.

Martti: ‘(Kok kok...)’ ((a bit louder))

Martti shakes his hands, looking at Heidi.
The teacher enters and lifts the ladle from the table, scoops water with it.

Teacher: Martti and Heidi, look what is here. Look what is here.
Both children look at the ladle. The teacher places the brush onto the sink as well and leaves the scene. Martti smiles. Heidi keeps her hands in front of her mouth. Both bend a bit closer. Martti looks at Heidi, smiles and whispers. Heidi smiles, bends a bit, keeps her hands on the door handle. She lifts her hands up, close to Martti’s face, grasps, keeps her hands close to his face. Martti looks at her, moves her hand away. Heidi moves her hands in front of her, then puts one hand again close to Martti’s face.”

In this sequence, children used the “koka” verbalization to refer to something in between them on the floor (or throwing onto the floor), similarly to session 2, when they eventually started to throw something into the “trash.” At this point, the teacher intervenes to suggest new directions for the actions (ZPA). The teacher underlined the presence of the brush and the ladle in the setting with a verbal reference (“look what is here!”) and by moving these objects. She also scooped water as an example. The children observed, as was verbally suggested by the teacher, smiled, moved simultaneously in a co-regulated manner towards the water. Then, they continued whispering and touching each other. The children were tuned in to each other even though they gazed at the water.

The children continued chewing, shaking their heads, touching their ears, and sucking their hands during the following half a minute until the recording was stopped. During the pause, the teacher went to talk to the children. She suggested again that the children could “touch and play with” the water. She also touched the water as an example. It was only when Martti set his hand to the water that the researcher re-started the recording. In other words, for a moment, for the video recordings to continue, the Zone of Free Movement (children standing close to the sink
and having the water on their reach) was set to equal the Zone of
Promoted Action (to touch the water). (Extract 15).

“"The recording begins again. Heidi holds the door handle. Martti has
one hand in the sink, he is touching the water. He smiles. Heidi bends
closer to see. Heidi moves her hand to touch the water also in the same
side of the sink.
The teacher comes to the screen again, touches the water in the basin
that is inside the sink.
Teacher: Look Heidi, here is water. Look.
The children glance at the teacher’s hand.
Martti: I try this?
Martti glances at the teacher.
Teacher: Yes.
Martti looks back at the water, smiles, touches more. Heidi moves to
touch the water with one hand. She smiles. Martti puts both his hands in
the water and slaps it with them. Heidi also puts both hands on to the
edge of the sink to slap the water. Heidi glances at Martti.
There is a slowing down, then they begin again.
Martti turns to whisper something to Heidi, bends a bit closer, Heidi lifts
one hand up, bends her knees as if getting closer to him, breaths deeply
as if being about to say something. Martti turns back to the water, so
does Heidi, her hand goes down.
Heidi bends closer, lifts up as if drinking or observing closer. Then she
lifts her hand, moves the hand on the water surface. Martti splashes and
observes Heidi’s hand.
Martti stops and whispers something, looking down.
Heidi moves one hand on the water. She looks down to her chest, wipes it. Martti looks down closer. He bends towards the water, so does Heidi. Heidi moves one hand, both lift up and Martti begins to move both hands in the water. Heidi puts another hand there too.

Martti looks at the camera. He whispers something, bends towards Heidi.

Heidi keeps splashing, makes a few wide movements, observes the water. Martti looks at the camera again behind Heidi.”

The children slowly started to move their hands on the water. Heidi bent towards Martti’s side but the teacher interrupted her. She suggested there is water on her side. She attempted to direct Heidi’s movements towards the water that was in a basin on the other side of the sink, closer to the camera, where there was more space to move. Martti, on the other hand, asked for confirmation: “I try this?” The teacher agreed. In this sequence, the teacher engaged in restructuring the ZPA differently for Heidi and for Martti. Instead of following the suggestion to touch the water on the basin closer to camera, Heidi remained turned away from the camera, having her back towards the camera, and touching the water close to Martti.

While touching the water as the teacher suggested, they were also tuned in to each other. The rhythm of their movements slowed down a bit before starting again. Martti whispered to Heidi, she bent close to him. They observed and followed each others’ movements. First, only one hand was used, then both. They started to move their fingers more in the water and Martti glanced at the camera behind Heidi. Subsequently, Heidi kept her posture and glanced at the camera only when the researcher moved it and Martti had glanced at the camera too.
6.3. Different positions in relation to the objects

After the children had started to touch the water, the teacher and the researcher remained withdrawn on the background. During the movements of touching and scooping the water with her hands, Heidi took the brush and the ladle from the sink. At various points Martti asked whispering whether he could have the brush and the ladle that Heidi was holding. Heidi did not seem to disagree: at some points she held the ladle gently, close to Martti’s hand. However, in these moments she did not hand the ladle over to Martti, neither did Martti take it. Heidi was attentive to Martti, bent closer, talked in a calm manner, nodded, and whispered to Martti. When Martti once gained access to the brush and the ladle, Heidi gently removed the tools away from him. During the session, Heidi gained the position of an expert in using these tools.

At some points, the adults thought that Martti appeared to be looking around as if wanting to get away from the situation (Discussion 9/15/1998, Appendix 3). He seemed to be bored of just observing, not touching the objects provided. Eventually, the children elaborated an exchange in which Martti had an active role even though Heidi still had the tools in her possession. Heidi begun to ask if the amount of water in the ladle was appropriate, and Martti had the power of making the decision, by saying “yes,” “no,” or “more.” In this game, Heidi could remain in the position of the skillful and knowledgeable tool user even though Martti had an important and active role in controlling the direction of the events.

During three short pauses at the end of the recording, the teacher and the researcher discussed whether to stop or continue the recording for it seemed to continue in a similar manner for a long time. Martti was again observing the situation while Heidi was scooping and pouring water. Martti had no access to the objects, and the adults pondered whether the situation should be restructured. Just before the tape finished, the
children engaged in louder, playful talk and laughter. Heidi commented that she did not have a shirt. Martti engaged in a discussion about the shirt and presented a new theme: someone eating. Both started to make voices and sounds, laugh, and play with words. Heidi offered “food” with the spoon to Martti (“eat!”).

6.4. Discussion: joint elaboration – different positions

During this recording, the teacher was persistent in her attempts to direct the children’s attention to the water. On the basis of the previous recording session, the adults were aware that the children could engage in intensive mutual actions without touching the water at all during the whole session expected to last around 20-40 minutes. The adults attempted to avoid a situation in which children would ignore the objects provided as occurred in the previous recording. (Discussion 9/15/1998, Appendix 3.) As a result, the teacher returned to the scene various times, opened the faucet, talked to the children and touched the water and the objects, attempting to canalize the children’s actions towards the water. She showed suggestions as to how the children could move the objects in the water.

Here, the ZPA was more explicitly defined than in the previous session, and the ZFM would become more clearly restricted towards the water (equating with the ZPA). Because this did not occur and the children continued their actions without water, the recording was paused. After the pause at time 6.11, the recording continued only after Martti had put his hand into the water. As the children’s positions in relation to the camera were a bit different, the teacher suggested Heidi to move a bit and touch the water from the other side of the sink. At this point, while the ZPA was slightly different for both children, both continued on the same side of the sink.
The physical setting included the possibility to stay close to the water and not touch it. It is possible that the children had internalized the ZFM in the sense that in the recording sessions, when there was a specific physical arrangement (including the benches close to the sink and the camera), they were assumed to stay in one place, close to the water. Had they left the place, the researcher would have stopped the recording. The session included similar whispering and a lack of verbalizations as the first recording (session 2). This underlined the particular nature of the situations with the camera and the researcher.

A new element in this session was the removal of some of the children’s clothes before the recording. At some points, when the water splashed on Heidi’s body or on Martti’s shirt, they glanced at their bodies and at the camera. The adults did not interrupt and allowed the actions to continue in such a way that the water went out of the sink onto the table (children pouring and scooping water), and, at times, on the children (Heidi pouring and both splashing water). In these moments, part of the ZFM was confirmed: because of the removal of the clothes, it was allowed and maybe even assumed to get (somewhat) wet in this particular situation.

In this context, as in relation to session 2, the question and use of the notion of free play becomes interesting. The adults had attempted to provide a setting for a free play as opposite to adult structured learning tasks or daily routines such as lunch hour at the day care centre. The attempt to provide a setting for children’s actions (play but also other action that might be difficult to clearly define as play), occurred within the constraints of the practical questions of how to make video registrations of the situations, and also with the attempt to make children touch the water — “play freely” with water.

Even though free play is a term widely used in the literature on early childhood education this analysis suggests that there is no free play as opposed to not free (Rutanen, 2004c): play always occurs within constrains (see also Valsiner, 1997). In addition to culturally, socially,
and historically structured environments, children also constrain their play among themselves. Play emerges within the limits/possibilities of the co-constructed interactional field of a particular setting.
7. WORLDS WITHIN ONE SETTING:
SESSION 33

7.1. Setting: cones, woods, and rocks as the starting point

Session 33 occurred seven months after the first recording (session 2). These children had already participated both in video recordings with water and other small group tasks in a variety of settings, such as indoors in the bathroom, in the play room, and during lunch hour, and outdoors in the sandbox and on a trip to the lake and the sea (see also Tiira, 2000).

The session occurred in the sleeping room. The teacher had removed the carpet that was usually on the floor and replaced it by a plastic tarpaulin. The objects presented to the children had a variety of shapes and weights (pieces and slices of wood, rocks of various sizes, and cones/seashells). Both children were wearing their usual winter clothes: pants, shirts with long sleeves, and socks. The researcher was in the room, holding a video camera. Lasse, a third child, was also present in the room, but refused to join the two children. He remained on the bed, observing the situation (not visible on the video screen).

When the recording started, the children were already sitting on the floor, holding some pieces of woods, rocks, seashells, and cones in their hands. Martti talked about seashells and dragons. The teacher joined with a question about the seashell. (Extract 16).
Extract 16, 03/10/1999, session 33, time 00.00-00.35.

“Martti and Heidi are sitting close to the basket. Heidi is holding small cones in her hand.

Martti: It eats it this seashell!

Martti shows the seashell to the teacher.

Martti: But soon soon a crocodile comes there!

Teacher: Hmm, ok. Can this seashell swim?

Heidi looks at the basket, then at Martti and the teacher.

Martti: Yes it can, but but but it ( ) the mouth like this slowly

Martti moves his hands around. Heidi glances at the door, someone looks in.

Martti: And it can clap like this and now I have new teeth here also!

Martti shows his teeth to the teacher. Heidi looks around and glances at the camera.

Martti: To swim but but but [ 

Martti looks down.”

With the question (“Can this seashell swim?”), referring to the object Martti was holding, the teacher attempted to canalize the discussion from Martti’s invention (crocodile) to the seashell that had been provided to the children, and to the water that the teacher was about to bring into the room. Again, there was an attempt to canalize the children’s interest and actions towards water (ZPA), even though water was not present in the room yet. As both the adults and the children had been engaged in various water-related activities during the past months, the teacher’s interest in discussing water or water related issues, such as swimming, was no novelty to the children (see also Tiira, 2000). Martti agreed that the seashell can swim and continued describing the eating mouth and
then his teeth. Following this, the teacher made more precise questions about the objects (Extract 17).

Extract 17, 03/10/1999, session 33, time 00.35-1.25.

“Lasse: [aaaaaaa ((sits on the bed, outside the screen.))]
Heidi looks at Lasse.
Heidi: What is Lasse saying?
Martti looks at Lasse.
Teacher: Lasse, come to see what is happening here, come. Heidi, what do you think that happens to your small stones if you put them in the water? What happens to them?
Martti looks at the basket and the stones. Heidi looks at the cones in her hands. Martti takes a stone from the basket.
Martti: Take a stone, here is a big stone.
Heidi: I don't know.
Teacher: Should we see? If we bring water here, should we see what happens to them?
Heidi looks at the adult, then at the cones.
Heidi: Yes.
Martti holds stones in his hands.
Martti: Here is a big stone.
Teacher: What happens to this stone if you put it into the water?
Martti: A dragon.
Teacher: It becomes a dragon?
Heidi glances at Martti.
Martti: Yes a dragon, this kind of ( ) dragon who has a tale here and it can make a bit of noise
The teacher begins to roll Martti’s sleeves up.
Lasse was present but refused to join the others and made some sounds on the background. Heidi paid attention to them and asked about Lasse’s words. The teacher led the discussion again to the objects, and more specifically to what would happen to them in water. ("If we bring water here, should we see what happens to them? “) (ZPA).

With the questions, she confirmed the children’s possession of the particular objects. Referring to the cones (the teacher assumed they were stones) that Heidi held, she said: “…what happens to your small stones…”, and referring to the stone Martti had, she asked what happens “to this stone”? Martti continued to talk about the dragon and the teacher interpreted Martti’s account as an answer, as a hypothesis of what would happen (“it becomes a dragon”). Heidi observed them.

After suggesting to put the objects into the water (“if you put it into the water?” ), while listening to the children’s comments, the teacher also rolled Martti’s sleeves up. This was now a preparation for the next move to re-structure the setting (ZFM): to provide the basin with water to the children. Heidi was observing the situation: she glanced at Martti and the teacher, and at her sleeves. In the next sequence, the teacher brought a transparent basin filled with water and set it onto the floor in front of the children (Extract 18).

Extract 18, 03/10/1999, session 33, time 1.25-2.28.

“Martti: ( )

Martti takes a piece of wood and a seashell from the basket. Heidi moves close to pick some pieces of wood.

Teacher: Ok, Pirjo will bring you water so you can see what happens to them.
Martti: Oh I put them to water put it. ("Oh" as a sound of being surprised))
Teacher: Here comes the water.
Both look at the adult. Heidi is holding pieces of wood in her hand. The teacher brings the water in a basin.
Martti: But I can put these to the water.
Martti lifts the pieces of wood, the stone, and the seashell. Heidi moves closer to the water, puts pieces of wood in the basin. Martti does the same. Heidi laughs.
Martti: "This doesn’t stay on the surface."
Heidi: These will stay also soon.
Martti moves the seashell from the bottom.
Martti: These stay also.
Martti glances at the basket, makes a sound. Heidi keeps her hands in the basin, looks at Martti, takes the piece of wood Martti is moving.
Martti: The stones are swimming.
Martti moves the stones. Both move their hands in the basin, then look at the basket. Martti takes a piece of wood from the basket.
Martti: Oh I found (.) this can swim also!
Heidi moves a bit further from the basin.
Martti: Oh! Stays on the surface.
Heidi: This also.”

The teacher introduced again the aim of the situation in the form of a question: “…Pirjo will bring you water so you can see what happens to them?” (ZPA). While she was already moving, without an answer, Martti agreed aloud that he would put the objects into the water. The children started to put the objects in the water and noted aloud what happened;
which one stayed on the surface and which one did not, which one “could swim,” which one could not. The children moved the objects and their hands in the water and talked about driving, i.e., which ones could “drive” fast. Both were touching the pieces but also glancing at what the other one was doing. Thus, even though the activities to set the objects to water were initiated by the teacher, the children engaged in the observations in a co-regulated manner: they repeated the observations the other had made, either confirming the observation with their own objects, or denying it. The adults, particularly the teacher, and the other child were the audience. The actions with the objects were canalized towards the water by both the teacher and the children themselves.

Both children’s ZPAs were overlapping in the sense that they were to engage in setting the objects in the water, but there were divergencies as both children had their own objects to use, corresponding to the construction created at the beginning of the session. When Martti reached towards similar cones Heidi had been using, she interrupted and took these cones to herself (Extract 19).

Extract 19, 03/10/1999, session 33, time 3.11-3.22.

“Martti moves more objects from the basket to the basin, including a small cone.

Martti: Oh what small ( )

Heidi: Give it to me!

Heidi takes the small cone from Martti’s hand.

Martti takes more pieces from the basket. Heidi bends to take the small cones Martti is touching.

Heidi: I take these now.

Martti puts a piece of wood in the basin, Martti glances at Heidi.”
When Martti noticed the small cones Heidi had been collecting, Heidi made clear that those belonged to her. In other words, the situation included undefined areas, some of which became explicitly negotiated, at certain points, as not possible or allowed fields of actions (outside the ZFM). In this case, the children negotiated the constraints of the situation in terms of the physical objects provided by the adults for the explorations. After Heidi’s movement, Martti withdrew and used the pieces of wood instead.

7.2. Novel themes emerging within the here-and-now with water

7.2.1. Return of the dragon

In addition to the manipulation of the objects provided by the teacher, the children developed an exchange with a hair attached first to Martti’s fingers. Interlinked and partly parallel to the exchange with the hair, the children engaged in a question and answer game about the pieces of wood they had in their hands. Here, the mutual engagement was still within the constraints of the ownership positions established at the beginning of the session: the children maintained their own objects even though they were engaged in joint actions.

After ten minutes of moving the objects, Heidi observed Martti arranging the pieces of wood in his hands. When Martti moved these pieces in his hands, arranging one piece on top of the other, Heidi commented twice: "Another wood." After these observations, both returned to their previous actions with the objects they had acquired. Heidi arranged the slices of wood and cones on the floor and Martti dropped his pieces of wood on the water. After half a minute, Martti asked a question that was difficult for the adult observer to understand.
Heidi offered an answer related to the pieces of wood Martti was holding (Extract 20).

<table>
<thead>
<tr>
<th>Extract 20, 03/10/1999, session 33, time 11.20-11.40.</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Martti lifts one piece, it falls behind the basin.</td>
</tr>
<tr>
<td>Martti: Oh!</td>
</tr>
<tr>
<td>He throws it back to the basin. Heidi lifts and drops a piece on the floor.</td>
</tr>
<tr>
<td>Martti moves his fingers in the water, looks at them.</td>
</tr>
<tr>
<td>Martti: Ihioot! ((resembles the word &quot;idiot&quot;))</td>
</tr>
<tr>
<td>He moves his hand, lifts the hand. Heidi looks, laughs, lifts a slice, and puts it on the floor. Martti moves his hands in the basin, glances at Heidi.</td>
</tr>
<tr>
<td>Martti: Who is the ihioot?</td>
</tr>
<tr>
<td>Heidi shakes the slice. Heidi points to a piece Martti has in his hand.</td>
</tr>
<tr>
<td>Heidi: That!</td>
</tr>
<tr>
<td>Martti lifts the piece of wood and lets water drip on the floor.</td>
</tr>
<tr>
<td>Heidi: Like this is (. ) pushes down everything.</td>
</tr>
<tr>
<td>Heidi moves up her hand, makes circular movements. Martti moves back the piece of wood, scoops water, moves it on one side, lets water drip.”</td>
</tr>
</tbody>
</table>

Martti moved his fingers trying to get rid of a hair attached to them. When he asked the question: “Who is the ihioot?” Heidi gave an answer referring to the piece of wood he was holding. According to Heidi, “idiot” was the piece of wood that “pushes down everything.” Both children left the conversation there. Soon, the hair had moved to Heidi’s fingers, probably through contact with the pieces of wood and water (Extract 21).
“Heidi looks at the slices and her hands, moves her fingers. Martti looks at Heidi. Then he lifts one piece of wood, allows the water drip on the floor.

Martti: ( )

Martti scoops more water and allows it to drip.

Heidi moves her fingers, moves the hair in her fingers, shakes her hand.

Martti looks at Heidi.

Martti: It’s a dragon!

Martti moves the piece of wood again to the basin, then drops it onto the floor.

Heidi: Take it away.

Heidi shakes her hand. Martti glances at her, smiles. He puts the piece of wood in the basin.

Martti: ( )

Heidi shakes her hand, puts it into the basin.

Martti: Here comes.

Martti touches Heidi’s hand in the basin. Heidi lifts the hand a bit, moves towards Martti.

Heidi: Take that away.

Martti: I will take it away.

Martti takes the hair away, moves his fingers.

Heidi: Oh:

Both look at Martti’s hand. Martti wipes it on the floor. Heidi shakes her other hand, points to the basin.

Heidi: Put it there.

Martti puts his hand on the basin, moves his fingers. Both observe.”
In this sequence many themes occurring throughout the session were interlinked. Martti was engaged in dripping water on the floor. When Heidi noticed the hair in her hands, Martti re-introduced the dragon theme he had been discussing earlier: “It’s a dragon!” Within the constraints of having access to their own objects (ZFM), they engaged in joint actions in relation to the new object, a hair. Martti took the hair Heidi held. Heidi observed and gave an advice about where to put it. The hair remained in Martti’s fingers. In the following sequence, he asked Heidi to help him and take the hair away. This is what Heidi did, and following that, she repeated the request “take this away”. Martti bent to take it, glanced at the floor, then, bent more. He managed to pull the hair away from Heidi’s hands, and it went to his hands. During these sequences, the children developed an exchange with the novel object that emerged outside the ZPA introduced at the beginning of the session (the exploration of the activities related to the objects provided and the water). The children, thus, engaged in mutual adjustments even though they maintained their own objects in use.

7.2.2. Question-answer game

Another mutual engagement was related to a question-answer game that emerged parallel to the exchange with the hair. Heidi had observed Martti arranging the pieces of wood (“another wood”). The discussion was returned with new questions that emerged after about three minutes (Extract 22).

Extract 22, 03/10/1999, session 33, time 14.19-14.35.

“Martti moves his fingers, Heidi lifts the slices of wood. Martti shakes the water with both hands. Heidi has one slice in both hands, opens the palms, keeps hands up, and looks at Martti.

Heidi: Which one is one, which one is two?”
Heidi shakes her hands, observed by Martti. One piece falls from Heidi’s hand. Martti lifts his hand to point at it.

Martti: Hmmmm, — this!

Martti bends towards the piece that fell, lifts it up.

Martti: “I will take it because it will really stay on the surface.”

Heidi takes the piece from Martti’s hand. Martti observes. She puts the slices on the floor, takes them back.

Heidi: “No, 'cause I will... I want...”

Martti looks at Heidi, then begins to shake the water in the basin.”

In this sequence, the movement, material, size, and shape of the physical objects canalized the flow of actions. First, Heidi asked questions about the slices of wood. Martti seemed puzzled by Heidi’s sudden question that had no link to their previous actions. Martti did not answer Heidi’s sudden question right away, but eventually came up with an answer as one piece fell and Martti solved the situation by pointing to it. Heidi accepted the answer but she refused to let Martti acquire the piece and took the piece back from his hand. She re-confirmed the original setting, the ZFM constructed among them, where the slices were for her and the other pieces of wood were for Martti. Subsequently, Heidi continued to ask questions (Extract 23).

Extract 23, 03/10/1999, session 33, time 14.45-15.10.

“Heidi touches the slices, lifts her hands up, looks at Martti.

Heidi: Which one is two?

Martti scoops water and puts the piece of wood back. He looks at Heidi.

Heidi: Which one is two?

Heidi taps her fingers together, looks at Martti. Martti looks at her, moves his hands up, looks at them.
Martti: Hhmmm — this! this maybe dangerous ( )

He moves the hair in his fingers. Heidi looks at him.

Martti: Here it is!

Martti moves the hair more. Heidi turns down to move the slices of wood on the floor. Martti bends his hand towards her.

Martti: Take it away.”

In this sequence as well, Heidi proposed a question to Martti (“Which one is two”?), holding the pieces. This time, Martti came up with an answer by showing the hair he had. He described the hair as being “dangerous,” a theme he had introduced at the beginning of the session. After he suggested Heidi to take the hair away, a negotiation about turn taking emerged. Heidi agreed to take it away if Martti did the same to her. After this exchange, Heidi continued to ask questions (Extract 24).

Extract 24, 03/10/1999, session 33, time 15.16-15.40.

“*Heidi moves the slices on the floor.*

*Heidi: Which one of these is one?*

*Heidi points to the slices, glances at the camera.*

*Martti moves his hand on the floor, wipes the floor.*

*Martti: ( That... I don’t know).*

*Heidi glances at him.*

*Heidi: This!*

*Heidi points to one slice and looks at Martti. Martti turns to look at the slices of wood.*

*Martti: Yes! It is!*

*Martti reaches towards the piece of wood. Heidi takes the piece, puts it on top of the other.*
Heidi: And then another on top.

Martti observes, Heidi turns to look at him.

Heidi: And (say) what is what is under?

Martti reaches to one of the slices.

Martti: (tttt hhat) ((sounds, no distinguishable clear word))

Heidi: Yes, good.”

In this sequence, Heidi once again tried to engage Martti, who was hesitant at first to provide answers. To Heidi’s first question: “Which one of these is one?” Martti said he did not know. Heidi suggested an answer and continued with a new question (“And say what is what is under?”). Heidi accepted Martti’s movement as an answer. Heidi scooped water and Martti moved the seashells and the pieces of wood until Heidi introduced a new question about the slices of wood. (Extract 25).

Extract 25, 03/10/1999, session 33, time 16.15-16.23.

“Martti moves the seashell on the water, Heidi arranges the slices of wood on the floor, puts one on top of the other.

Heidi: Would you like to tell now which one of these is the small one?

Martti glances at Heidi. Heidi opens her fingers wide.

Martti: I have told already!

Heidi collects the slices of wood away. Martti moves the seashell and the pieces of wood towards the floor.

Martti: I ( ) showed you.”

Following Heidi’s question, Martti claimed that he had told already. In this sequence, as in the previous sequences, I interpret Heidi’s questions to be related to the order of how to arrange the slices of wood, in the sense of what comes first (“one”) or what goes under (“which is
under?”). She made similar observations of the pieces of wood Martti was arranging before the question-answer game started (“then another on top”). Now, at this point of the questions, Martti made a move to get out of the position of giving answers. He started to introduce questions related to the pieces of wood and rocks to Heidi. Now, Heidi paused for a moment, then, came up with the answers. (Extract 26.)

Extract 26, 03/10/1999, session 33, time 16.23 -17.08.

“Martti puts the seashell and the pieces of wood on the floor, begins to lift one piece.

Martti: Do you know what, which one is zero?

Heidi glances at him.

Martti: Which one is zero?

Heidi lifts up and touches one of Martti’s pieces, a rock. Martti takes the rock, moves it above Heidi’s slices of wood, then drops the rock into the basin. Heidi observes. Martti touches the pieces of wood and the seashell.

Martti: Which one is six?

Heidi points to Martti’s pieces. Martti lifts one piece of wood.

Martti: You mean this?

Heidi nods. Martti drops it into the water. Heidi observes.

Martti: This stays on the surface.

Martti touches the seashell on the floor, turns back to Heidi.

Martti: -Which... guess who who is s- who is like this?

Martti moves his fingers, shows two fingers.

Martti: Who is [ who.

Martti shakes his hands, shows one, then two.

Heidi: [ one, two.
Heidi looks at Martti. Martti turns to move the seashell on the floor.

Martti: Is this -which.. eh ((frowns, as if not knowing what to say)) tell me what is my name?

Martti turns to look at the objects in the basin. Heidi moves her fingers on the edge of the basin, puts one finger out, then two.

Martti: (tell whatever)

Martti puts pieces one on top of the other above the basin.”

Here, Martti asked various questions that were not clearly related to the order of the pieces of wood neither the arrangements on the floor. He presented various questions and Heidi seemed uncertain of what Martti was after for, giving answers by pointing at the rock and the piece of wood he was holding. It seems that what mattered in the situation was the exchange, not the content of the answer itself. Martti confirmed “You mean this?” and with the confirmation, adjusted Heidi’s answer to the question. Martti moved the number theme from the concrete situation with the objects to questions about age. Martti moved two fingers and after the answer, Heidi continued to imitate Martti’s movements, observing her own fingers on the basin’s edge. The discussion was left aside for a moment while both continued moving the woods. The theme was again returned shortly (Extract 27).

Extract 27, 03/10/1999, session 33, time 17.08- 17.35.

“One piece of wood falls from Martti’s hands. Heidi moves her hand away, shakes it. Martti puts again three pieces of wood together, one on top of the other. Heidi observes, keeps her two fingers out, against the edge of the basin. Heidi reaches to touch the upper piece of wood.

Heidi: Look what there huiii!"
The piece of wood falls, Heidi shakes her hand. Martti smiles and makes sounds (ehhh). He drops the other pieces of wood into the basin, turns to touch the seashell on the floor, puts his hands into the basin, splashes. Heidi turns to touch the slices on the floor.

Martti: There, which one is zero?
Heidi glances at him and the seashell.

Heidi: Six!

Martti: You mean this one?
Martti lifts the seashell.

Heidi: Yes!

Martti drops it in the basin.”

In this sequence, Martti repeated the question: “which one is zero?” Heidi applied an answer from Martti’s previous questions (“which one is six?”). In fact, for an adult observer it was difficult to make the link between Martti’s question and Heidi’s answer. The questions and answers seem to confirm again that what is more important is not so much the content but the joint engagement in actions in a form of a question and answer game. Even answers that seem random are to be accepted for the game to continue. Sometimes it required a confirmation “you mean…?” about the given answer.

7.3. Negotiating the boundaries for the children’s explorations

The teacher withdrew from the conversation until the end of the session, when the children observed the water spilling onto the floor and made comments about it to her. At that point, the children sat close to the basins, and some water had spilled on the tarpaulin. Following the
question-answer game, the children started to scoop water in the basins with the pieces of wood. They did it rhythmically, first Martti, then Heidi, both repeating the words “put some water.” The scooping movements were getting faster and their voices louder. Martti closed his eyes for the water was splashing on his face. After that, the children stopped and paid attention to the floor getting wet (Extract 28).

Extract 28, 03/10/1999, session 33, time 18.16-19.22.

“Both scoop faster and faster. Martti closes his eyes, turns his head away a bit. Heidi turns away also. Martti turns back to look at his legs and continues scooping. Heidi scoops also. They slow down and stop. Martti turns to look at Heidi, laughs, puts his hand in front of his mouth, laughs. He looks at Heidi who smiles. Heidi turns to move the slices of wood on the floor a bit further from her.

Martti: Let’s splash again!

Martti splashes the water on the basin, looks at Heidi. Heidi moves the slices close to her.

Heidi: Yeeess!!

Heidi scoops water onto the floor, so does Martti. Both look at the water running on the floor. They stop, Martti lifts his hand to his mouth, laughs. Heidi smiles, laughs, turns to look at the camera. Martti puts his hands on the basin.

Heidi: Ooh!

Heidi turns to look at the hand she has on the basin edge. Martti looks down to the floor and his pants. He moves a bit. Heidi lifts one slice of wood, shakes it. Martti moves away from the wet place. Heidi points to Martti and laughs.

Heidi: What has Martti done under his butt?

Martti looks at Heidi who laughs.
Martti: Water.
Martti smiles and puts the piece of wood to the basin. Heidi moves away from the basin also. Martti touches the wet floor close to the basin. (Lasse is moving a car close to the carpet.)

Heidi: Hii! (Sound of excitement)
Heidi moves to take one slice of wood. Martti takes one piece that is close to the basin, throws it onto the floor, pushes it around. Heidi goes close to the basin again.

Martti: ( )
Martti arranges the pieces of wood on the floor, they stay up close to each other. Heidi moves the pieces next to her, touches the water with one of the pieces.

Heidi: Let's splash again.

Martti: Hh?
Martti glances first at her then at the pieces of wood.

Heidi: Let's splash again, ok?

Martti: “No”
Martti keeps arranging the pieces of wood next to one another.

Martti: No, ‘cause I do now ( )”

Thus, the children paused and paid attention to the water spilling onto the floor and onto their clothes. Martti lifted his hand towards his mouth, both laughed. They observed the teacher’s reactions and looked at the camera. Therefore, the children were engaged in joint actions with the water, as was the aim of the Water project, in line with the ZPA/ZFM structure re-negotiated in this session. Heidi laughed at Martti and the water under him (Martti’s “butt” getting wet). Martti stayed away from the wet spot, arranged the pieces of wood, and refused to splash more.
In the following sequence, Heidi made an explicit comment about the water running on the floor, the teacher made an agreeing sound to this observation (Extract 29).

Extract 29, 03/10/1999, session 33, time 20.00 -20.59.
“Martti rubs his hands together. Heidi looks at the teacher and moves the slices of wood.
Heidi: Water has been spilling.
Teacher: Hmmm. ((agreeing sound))
Martti touches the pieces of wood on the floor, lifts them and one of them falls. He lifts it up again.
Martti: Hey, do you want ( )
Heidi moves the piece in her hand and looks at Martti. Martti glances at her. Heidi looks at her hands. Heidi turns to move her slices of wood, they form again a line against the folding of the carpet. She throws one of the slices further. Martti begins to push his pieces down. Heidi throws one more piece. Heidi takes the pieces away, shakes her hand (that was on the water spot). Martti moves the pieces down, Heidi glances at him.
Martti lifts his body and looks at the water under him. Heidi throws her pieces further again. Martti looks at his hands.
Martti: I (.) I have had enough.
He sits down. Heidi moves the pieces. Martti glances at her hands, then glances at the camera, gets up.
Martti: I could leave.
The teacher comes to lift Heidi’s sleeves up.
Martti: I could leave.
Teacher: Are you ready?
Martti: Yes.
Heidi glances at Martti.
Heidi: I’m ready too.
Heidi gets up.
Martti: I have wet pants.
Heidi: Mine too.
Martti: But it does it does not matter a thing (...) does not matter a thing.
Heidi looks at the basin and the slices of wood on the floor, leaves the place.”

In this sequence, Heidi commented on the water on the floor. The teacher made a sound that was both agreeing and accepting: she confirmed that she had noticed there is water on the floor. In addition, in this context, the agreement did not refer only to the observation that there was water on the floor, but also to the acknowledgement that water running on the floor was acceptable, in this case. Therefore, in this situation, the ZFM was confirmed to be different from everyday circumstances in which the children were not encouraged to splash water on the floor outside the bathroom.

Martti started to move and said he wanted to leave. At the same time, the teacher went to fold Heidi’s sleeves in order to prevent them from getting more wet. This was a sign that Heidi would be welcome to continue even if Martti left. The ZPAs were once again slightly different, on the basis of the children’s previous actions. Remaining in the place, close to the water was now related to the ongoing recording. It had continued for 20 minutes because the children maintained in close contact with the water. In other words, at this point, the ZFM related to children in the recording situation was clearly defined differently from the ZFM of everyday actions.

In addition, if Heidi were to continue, it was likely, from the teacher’s viewpoint, that Heidi would also get wet. When the teacher asked Martti whether he was ready, he said yes and Heidi agreed with
him. Thus, the children associated wet pants with “being ready”; they said they had wet pants and wanted to finish. Nevertheless, at the end, Martti assured that having wet pants was ok: “…it does not matter a thing…”. The recording was finished; the children left the place and moved out of the ZPA/ZFM structure of the recording situation. The issue of wet pants was brought up to discussion again in the next recording session.

7.4. Discussion: relations to the objects constraining the actions

During session 33, the children moved and observed the objects provided for them right from the beginning of the session. Both the children and the teacher engaged in defining to whom the cones and pieces or slices of wood temporarily belonged, in this situation. In other words, the ZFM/ZPA complexes were related to access to particular objects, and were slightly divergent for the two children. Even though the children manipulated the objects they had in their control in a variety of ways, they also observed what the other did with his/her objects meanwhile. During the session, various movements, such as the exchange of the hair from one child to the other, the question-answer game, and the simultaneous scooping of water onto the floor, were elaborated within the constraints of both children having specific objects in their use. Neither the question game nor the scooping required them to give up the objects to the other.

Pedrosa (1989, pp. 202-206) identified similar phenomena in her material. She observed children being regulated by implicit rules in the child group, the “possession of the toy” being one of the rules. In this rule, the idea is that the first one who plays with the toy has the right to handle it. In Pedrosa’s material, the existence of this implicit rule became detectable in situations in which a child approached a toy another child
was playing with. If children constructed the play together, they both had the right to possess the toys.

The beginning of the session included moments in which the teacher entered a point of encounter with the **guiding ideas and assumptions about the recording situation and the children**, as well as the **here-and-now events**. The teacher had told me that in her everyday practice of organizing the daily routines and activities she attempted to take into account the children’s opinions and suggestions, hypotheses, and theories about various issues and events. On the other hand, her intentions in this particular session consisted of canalizing the children’s actions towards making discoveries about water with the objects provided. Not only did she want the children to agree with the idea of setting the objects into the water, she also aimed to write down the children’s hypotheses as to what might happen to the objects in the water.

When Martti talked about a dragon, the teacher had to evaluate whether this was a theme that could be accepted, to be in line with the aims of the recording session; in other words, whether the theme was within the boundaries of the ZFM/ZPA complex she was actively restructuring in the situation. As a solution, she accepted the answer as a **hypothesis of the transformation of the objects in the water**. As a result, the children were able to construct novelty (the dragon as a novel theme). Besides, through this interpretation (the dragon as a hypothesis) the teacher was able to consider the children’s actions to be in line with the aims (the ZPA field). She adopted a position of a curious listener making connections between the children’s suggestions and the aims of the situation (ZPA — children discussing their hypothesis about the objects). The talk about a dragon fit also the image of a creative child having playful hypotheses about everyday events.

Later during the session (13.55), Martti had a hair attached to his fingers. He moved it around and made comments about it, the same way he commented on the objects provided by the teacher: “**it does not stay on the surface.**” Thus, he negotiated the application of the new object
(hair) within his reach (ZFM) to the field of the ZPA. As the teacher had asked “What happens to them?” Martti now applied the exploration and observation of the water, promoted by the teacher, with his engagement with this novel object.

Enhanced through the teacher’s comments, the rolling of the sleeves at the beginning of the session was a sign that the children were allowed — and encouraged — to touch the water and move the objects in it (ZPA). Furthermore, the rolling of the sleeves showed the children that from the teacher’s point of view, the children’s movements with water were allowed to be wide enough to the point that they would wet their clothes (ZFM). In addition, the removal of the carpet and the placing of a plastic tarpaulin under the basins was something out of ordinary. Normally, the floor should not get wet, unless the situation is related to cleaning the floor. Now, the adults had set a tarpaulin suggesting that water might spill. When the children splashed and scooped water, they glanced at the teacher and the camera. They may have been either confirming whether the situation was still within acceptable limits (ZFM) or wanting to share their joy about the splashing water, or both.
8. THE RESEARCHERS AND THEIR AUDIENCE: SESSION 35

8.1. Setting: explorations and observations about water

By this time, the professionals at the day care centre had showed interest in children’s observations and play with water for many months. The group had engaged in specially arranged Water play/exploration situations 13 times (Tiira, 2000). Before the recording in the sleeping room, the teacher had helped the children to remove most of their clothes. In the situation, Martti was wearing long underwear and a T-shirt (with long sleeves), Heidi was wearing a pantyhose and a t-shirt. (It was the beginning of April, the end of the cold period of the year.) The carpet was again replaced by a plastic tarpaulin as in session 33.

When the recording started, the children approached a basin that was already on the floor. They started to scoop the water while the teacher brought in another basin filled with cold water (Extract 30).

Extract 30, 04/08/1999, session 35, time 00.00-00.32.

“The children approach the basin and sit down next to it. Heidi takes a yellow cup and scoops water out of the basin. Martti takes a small blue cup and scoops water out of the basin too. Martti has the smaller cups,
Heidi the larger ones. Heidi pours water from the yellow cup into the green one.
The teacher enters. Martti touches the water in the basin in front of him.
Teacher: Here [ come more.
Martti: [ ouch ouch
Martti glances at the teacher who places another basin on the floor close to the one that is already on the floor.
Heidi moves the cups on the floor. Martti pours water to the basin with the blue cup, puts the cups down, and shakes his hands. Heidi pours water from the blue cup into the basin. She moves closer to the basin the teacher just brought. Martti takes the green cup. Heidi scoops water with the blue cup, Martti scoops water with the green cup. Martti smiles, lifts the cup, glances at the camera.
Martti: Oops (.) ohoups!
He looks at the cup. Heidi pours water from the blue cup to the yellow cup. She does not look at Martti.”

At the beginning of this session, the children started to scoop the water with the cups right away, without any visible hesitation. Neither did they nor the adults discuss in detail what they were about to do or supposed to do; instead, both sat down close to the basin on the floor, without observing the camera present in the room. The ZFMs had been co-constructed in repeated recording settings throughout the year and the children entered this particular situation with the expectations formed on the basis of their experiences in the previous sessions.

The teacher withdrew from the scene after setting the basins on the floor. It was sufficient the teacher provided the objects (basins and cups) and the invitation to come to do “water stuff” (ZPA), and the children readily engaged in manipulating these objects in the water in front of the
camera. It was only when Martti started to scoop that he showed the cup to the camera instead of glancing at the camera as a novel element like in the first recording session.

Both children continued scooping and pouring water. After a minute Martti made a first verbal account of the temperature of the water — this attracted the teacher’s attention to continue the discussion about it (Extract 31).

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**Extract 31, 04/08/1999, session 35, time 01.27 –01.52.**

“Martti lifts the red cup, glances at the teacher smiling.

**Martti:** *Oops (.) this is col- (.) this is hot water.*

While talking, Martti puts his finger into the red cup. Heidi puts the cups into the basin, moves the green and the blue ones together.

**Teacher:** *Is it?*

**Martti:** *Hmmm*

Heidi lifts the blue and the green cup, places them one against the other. Martti bends away from the basin, looks at the cups on the floor.

**Teacher:** *What about you Heidi, how is your water like?*

Heidi looks at the teacher. Martti looks at Heidi.

**Heidi:** *It’s cold water.*

Martti looks at Heidi when she presses the blue and the green cup together, then glances at the teacher. Heidi puts the green and the blue cup into the water together with the red and the yellow ones.

**Heidi:** *Cold water.*

Martti scoops the water inside the basin in front of him with the blue cup.

**Martti:** *I have warm water.*

Martti scoops with the blue cup and glances at the teacher.

**Martti:** *I have warm water.*”
Both Martti and the teacher directed and maintained the attention on the temperature of the water. First, the teacher provided two basins with cold and warm water for children to touch (ZPA). Martti made sounds of the water hurting him (“ouch ouch”), then, commented on the water to the teacher: “Oops (.) this is col- (.) this is hot water.” The teacher followed this observation with further questions and turned to Heidi to include her in the discussion. Heidi’s attention was drawn to a certain feature of the situation, namely, to the temperature of the water (ZPA). After Heidi responded her water was cold, Martti repeated his water was warm.

Thus, through the formulation of her questions, the teacher participated in defining the access to the basins: the left one was available for Martti and the right one was available for Heidi. With the question “how is your water like?” the basin in front of Heidi was defined as her water. By responding “I have warm water,” Martti agreed with this definition and actualized his access to the other water basin.

8.2. Securing the attention of the audience

In this session, the teacher remained in an active position; she made sounds of agreement as if being an attentive listener when the children showed the cups or commented on their observations to her. The sounds of agreement served as a way of engaging in communication with the children without using words. The teacher also asked questions, particularly when one of the children made sounds of being surprised. She attempted to promote more detailed verbal descriptions of the children’s observations about water. (Extract 32.)
Extract 32, 04/08/1999, session 35, time 2.15 -2.35.

“Martti glances at Heidi’s cups. Heidi uses the yellow cups as a lid again, presses both cups in the basin and then lifts them again. Martti scoops the water in front of him with the blue cup and lifts the cups.

Heidi: Why why here comes water here [ inside =
Martti: [ here is ((glances at Heidi))
Heidi: = water [ ( )
Martti: [ here is this much water.
Heidi looks at the teacher, keeps the cups in her hands.
Teacher: Why does the water come?
Heidi takes the yellow cup from the red cup and the water it contains falls onto the floor.
Heidi: Oh!
She looks at the cups and puts the cups back together. Martti moves the blue and the orange cup closer to him.
Heidi: I don’t know.
Heidi keeps the cups close together. Martti shows the orange one to the camera (to the direction of the researcher behind the camera), then looks at the teacher.
Martti: Here is just a little water.”

After Heidi had glanced at the teacher, the teacher asked for clarifications; i.e., the ZPA, for Heidi was now restructured towards more elaborate verbal accounts. Heidi did not elaborate the issue more; she answered: “I don’t know” and the teacher left the issue at hand. Meanwhile, Martti continued to talk about the water and his movements, showing the cup both to the camera and the researcher behind it as well as to the teacher.
During the session, the position of the teacher as an active listener was maintained even when the topic of the discussion momentarily shifted away from the water and the clothes getting wet. Martti described his age and hand movements to the teacher the same way he made observations about the water. Heidi, although she was glancing at Martti and the teacher, ignored Martti’s verbalizations and continued to move the cups without joining the theme. The topics Martti introduced were related to his age, numbers, and airplanes. Numbers were one of the topics in which the personnel had paid increasing interest throughout the year because of the Young Children’s Mathematics and Natural Sciences project in which the day care centre was involved. Thus, instead of canalizing Martti’s attention to the water, the teacher paid attention to his descriptions and wrote them down.

The reporting of observations and actions towards the teacher became *mutually constructed* by the children; while talking aloud and glancing at the teacher, the children also glanced at each other and observed each other’s actions. Later on in the session, Martti invited the teacher to “look” when he scooped and poured water. Heidi poured and scooped water too, and glanced at the teacher. The requests to pay attention became more direct when Martti started to repeat the teacher’s name. (Extract 33.)


“Heidi scoops water with one cup, pours water into the green one.
Martti pours water into one cup, glances at the teacher.
Martti: ( ) Pirjo, Pirjo!
Teacher: Yes?
Martti: That puts this much water, look even.
Martti scoops more water into the cup. Heidi pours water out of the green cup to the blue one.
Teacher: Oh ( ) lot of water ((with silent voice))

Martti: Look, now I will turn off it's (joy of life)

He presses the blue cup on top of the green one, glances at the teacher. Heidi looks inside the cups, the green one filled with water on top of the blue one and observes the water dripping. Martti lifts the cup up.

Martti: “Puuh” now fire turned off it's (joy of life)

Martti pours water into the basin. Heidi separates the cups, looks at the blue one.

Martti: Now fire turned it [ off.

Martti scoops water.

Heidi: / Hey wha- ( . ) here is also.

Then she looks at the green cup in her other hand.

Martti: Look, now I shoot with this ( . ) now I [ shoot with this.

Martti scoops more water, glances at the teacher. Heidi looks under the cups.

Heidi: [ What on earth?

Martti glances at Heidi. Heidi pours water into the basin.”

After Martti had repeated the teacher’s name and glanced at her, the teacher commented on Martti’s movements, confirming her attention to Martti’s movements with the water (ZPA). Martti continued to introduce new topics: “turning off it’s joy of life” that remained a bit unclear for the adult observers. Heidi commented the observations she made, but in a silent voice, as if talking to herself.

Martti talked more than Heidi, while Heidi, at times, moved her cups silently. The teacher showed more interest in Heidi’s movements (such as her pouring experiments, as defined by the adults after the session) than in Martti’s “shooting.” As at the beginning of session 35, also here the teacher attempted to provoke Heidi to provide verbal descriptions.
The teacher responded to Martti with sounds of agreement while trying to engage Heidi in the discussion. In other words, the teacher promoted slightly different actions in relation to Heidi than to Martti (partly overlapping, yet slightly different ZPAs). (Extract 34.)


“Martti moves the cups up. Heidi places the cup in the basin, then puts one cup inside the other while they are filled with water, pours water. Martti looks at the teacher and laughs. Martti moves the cups behind the basin. Heidi moves the cups in her hands. Martti pours the stick from one cup to the water.

Martti: Hey, this doesn't stay at the surface.

Martti takes the stick. Heidi pours with the cup.

Martti: [ ((shooting sounds))]

Heidi: [ when I do this

Martti: Look at this (. ) Look at this Pirjo! ((to the teacher))

Martti lifts the stick, puts it back into the water while looking at the teacher. Heidi looks at the teacher also.

Heidi: Hey [ ( )

Heidi looks at the teacher, lifts his hand.

Martti: [ Pirjo, look at this ] ( ) =

Martti moves the stick, smiles. Heidi pours water onto her hand.

Heidi: [ when I do this

Martti: = ((shooting sounds))

Heidi’s cup drops into the basin.

Heidi: Whoops!

She looks at the teacher. Martti moves the stick.

Martti: Look [ here
Heidi: [poured over the hand]
Heidi looks at the teacher.
Martti: Pirjo look, Pirjo!
Martti glances at the teacher, makes shooting sounds. Heidi moves the cups together and then detaches them. She puts the cups into the basin, presses them against the basin.
Teacher: Does it stay on the surface?
Heidi glances at the teacher, then looks at Martti’s hands. Meanwhile, Martti moves the stick, makes more shooting sounds.
Martti: ( ) air
He moves the stick in the basin, Heidi observes.
Martti: Now it stays on the surface.
Moves a bit more.
Martti: Now, it stays on the surface, Pirjo. ((towards the teacher))
Teacher: “hmm”

In this sequence, Martti talked to the teacher, addressed her by the name and repeated the request to “look” various times. He moved a stick he had found on the floor. Heidi moved the cups, poured water and pressed them together. The teacher observed both, but addressed Heidi with a question, following Martti’s observations: “Does it stay on the surface?” Heidi’s movements, pouring, pressing, scooping, partial descriptions (“[when I do this”), sounds of being surprised (“Whoops!”) and glances at the teacher maintained her interest and led to the question of getting more explicit descriptions of what she was “discovering.” In other words, the teacher attempted to promote more elaborate verbal descriptions from Heidi (ZPA). However, it was Martti who answered the question, and repeated twice how it “stays on the surface.”
The children used different strategies to secure the teacher’s attention. Heidi focused on the description of what happens, e.g., “I pour a bit (.) comes a bit of water”; “I will take this”, and glanced at the teacher. Martti addressed the teacher more directly, e.g., “Hey, Pirjo, look at this.” The amount and volume of the verbalizations had increased since the beginning of the session. Even though the teacher was the main audience, the children invented a variety of more and more impressive observations in relation to each other. The other child was both the audience and the co-constructor — even though the teacher remained the one to whom the children showed the movements and the cups.

8.3. Updating the boundaries of the explorations

Similar to the previous session, the children paid attention to the floor and their clothes getting wet. This occurred already at the beginning of the session (Extract 35).

Extract 35, 04/08/1999, session 35, time 1.52- 02.07.

“Heidi leaves the cups inside the basin and gets up a bit. She lifts her leg, looks at the floor. Martti scoops the water. Heidi glances at the teacher, touches the wet floor around her.

Martti: This is [ ( )

Heidi: My / pantyhose will get wet.

Heidi touches the floor. Martti looks at her and moves the blue cup inside the water.

Teacher: It doesn't matter, you have a spare pair there.

Heidi: Yes (1.0) ((Heidi touches the floor)) Oh, there?
Heidi points to the bed. Martti turns to look in the direction she is pointing to, keeps his hand inside the basin.
Teacher: *In your box.*
Heidi: *Yes.*”

In this sequence, two minutes after the beginning of the recording, Heidi looked towards the teacher and commented that her pantyhose will get wet. Heidi presented wet clothes as *a probable end result.* The teacher assured it would not be a problem, as the possibility had been taken care of by reserving a spare pair of pantyhose. Thus, getting wet was explicitly confirmed by the teacher to be within the boundaries of the ZFM. At the end of session 33, Martti had used the same words, *“it doesn’t matter.”* Having wet clothes close to their skin was therefore acceptable for the children. It was now also acceptable from the teacher’s point of view, as there were dry clothes reserved to be used after the session.

During the following minutes, both children continued talking aloud about the amount of water and water filling the cups. Martti repeated *“waterfall”* when he was pouring the water away from the cups. Finally, Martti paid attention to his pants getting wet and the previous discussion about spare clothes was reiterated (Extract 36).

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Extract 36, 04/08/1999, session 35, time 5.33-5.52.

*“Martti looks and touches his pants.*

*Martti* A bit went to pants.

*Heidi* moves the cups in her hands, opens them and puts them together.

*Martti* glances at the teacher, looks and touches the pants.  
*Teacher: It doesn’t matter, let’s pick up a dryer pair for you.*

*Heidi* glances at Martti and puts the cups into the basin.

*Heidi: You do have a spare pair ((with a calming tone)).*
Martti moves the cups behind the basin. Martti scoops water with one cup and pours water into the cup behind the basin. Heidi touches the cups in the basin in front of her.”

The teacher and the children engaged in discussing explicitly the setting and accepted actions (ZFM) in this situation. After Martti’s concern, Heidi repeated the teacher’s words; even though her pants were getting wet, it did not matter — there was a spare pair. It was agreed by all that “being wet” would not necessarily mean the recording would have to finish as it had finished in the previous session.

The sequence above is also an example of the children’s attunement to the situation; while they were both, occasionally, engaged in separate activities with different objects side by side, they shared the same interactive space. Heidi was focused on moving the cups in her hands but she also paid attention to what Martti was saying and doing, and to the situation as a whole. She was able to relate and respond to Martti’s concern.

Subsequently, Heidi reiterated observations concerning the possibility of water making her clothes wet. She shook her wet hands, glanced at her short sleeves, and commented to the teacher: “I have sleeves a bit shorter they don’t touch the water here.” She shook her hand and made a comment on it being cold. She also glanced at her pantyhose.

As the scooping continued throughout the session, more water was spilling out of the basins. At times, the children would glance at the water on their clothes and on the floor. After twenty minutes, in a moment of a major water spill, they glanced at the teacher, and Martti commented on the event (Extract 37).

“Heidi presses the cups together, the water is spilling out onto her pantyhose.

Heidi: Whoops:
Heidi glances at the teacher. Martti looks up to Heidi, then at the teacher and laughs. He lifts the cups up. Heidi looks and touches her pantyhose.

Martti: Came over it ( )

Martti laughs and takes the blue cup out from the orange one. He looks at the blue cup.

Martti: Let’s see ( ) oh: it’s empty!

Heidi opens the cups, lifts them up.

Heidi: Empty!

Martti glances at her. She scoops more water.”

In this sequence, Martti laughed and commented to the teacher that Heidi’s water was spilling (“came over it”). Heidi touched her wet pantyhose; all the water went on the pantyhose and she observed the cup: “empty!” an observation similar to the one Martti had made about his cups (“Let’s see ( ) oh: it’s empty!”). The teacher remained silent, even though the children glanced and looked at her laughing. It was clear now to all that the clothes were definitely getting wet. The explorations and observations about water were linked to water spilling onto their clothes, within the boundaries of the ZFM/ZPA structure. The children were engaged in jointly constructed observations: they started to observe more clearly what the other did and applied the words the other had used. In the following sequence, they both said: “Let’s look” instead of only Martti inviting the teacher to “look.” Martti repeated Heidi’s observations of “nothing” being or coming.
The children started to move the cups in a way that more water was spilling on their hands. When they talked about water spilling on their hands, they lifted the cups towards the teacher and glanced at her. Suddenly, Heidi’s hand slipped on the basin and more water splashed on her sleeve (Extract 38).


“Martti moves the stick in the water. Heidi scoops and looks at the water in one of the cups. Martti looks towards the bed and another door. Heidi slips (accidentally) on the water, her hands get wet. Heidi: Whoops!: (.) ((Heidi looks at her hands and sleeves)) A lot of water splashed here. Heidi lifts two cups, glances at the teacher. Martti looks at Heidi, puts the stick into the water, touches his pants with another hand.”

Heidi glanced at the teacher after more water spilled on her as if observing the teacher’s reactions. Meanwhile, Martti observed the amount of water on Heidi’s clothes and touched his pants also. Following this accidental splash, the children begun to splash and pour water on top of their clothes (Extract 39).


“Heidi puts the cups into the water and moves them there, splashes the water. Martti takes a cup, pours water on top of the stick. Water is spilling onto his pants. He touches them. Martti: On my pants (.) It doesn’t matter a thing. While saying this, he turns to look at the teacher, and shakes his head smiling. Heidi gets up, looks at his legs. Then she looks at the carpet, lifts
the plastic. Martti scoops more water and pours more water on top of his hand and pants.

Martti: Look what I do!

Heidi moves and shakes the tarpaulin (the water is running on it).

Martti: Whoo became a bit wet here.

Martti touches and lifts his pants, then scoops water out of the basin.

Heidi takes the green and the red cup, lifts them.

Heidi: There is warm water inside (.) Whoops ((she presses the cups together, water spills out))

Martti pours more water on his pants.

Martti: Water ( ) /

He glances at the teacher, continues pouring water.

Martti: ] water goes away from my pant- pants.

Heidi pours water on her pantyhose. She claps the cups together, scoops more water. Martti scoops more water. Heidi lifts the two cups and presses them together.

Heidi: Like this.

Martti scoops more water and pours it on his pants. Heidi pours the water out, puts the cups together again. Martti pours more water on his pants, scoops again and pours more. Heidi turns the cups upside down.

Heidi drops the cups into the basin one by one. Martti touches his pants and scoops more water and pours. Heidi keeps the cups inside the basin, lifts them again and pours.

Martti: Whoo (.) it is cold here.

Martti touches one part of his pants and looks at the teacher.”

More and more water was spilling on the children’s clothes. Martti observed the teacher and returned to use the phrase he had used in the
previous session (session 33), similar to the teacher’s words at the beginning of this session: “It doesn’t matter (a thing).” He begun to pour more water, to make his clothes completely wet, also observing the teacher’s reactions. He said: “Look what I do,” “water goes away....” The teacher did not interrupt but observed Martti’s movements. Thus, these movements of making clothes wet were within the limits of the ZFM. In this sequence, the children also linked the observations about the water (temperature, water spilling) to their wet clothes. The water spilled out of Martti’s pants and the pants were “cold.” Originally, these were the observations also promoted by the teacher (ZPA), now reintroduced by the children in the context of pouring water on their clothes.

Martti continued pouring water until Heidi’s cup fell and he went to get it back to her. Heidi poured water on her pantyhose once, and continued to scoop with the cups and to press them together. After a few minutes, Heidi paid attention to her wet sleeve; in addition to her pants, her shirt was also wet. She laughed about it and started to pour more water on her hands. Following this, she returned to pour water into the cups and addressed Martti a question reminiscent of the previous session (“who claims that this is empty?”). Martti focused on pouring water on his pants, spreading the water all over them. As he looked at and smiled to the teacher, Heidi did not insist on her question and observed him instead.

Soon, as the children were pouring more water, they started to pay attention to their wet shirts (Extract 40).

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**Extract 40, 04/08/1999, session 35, time 34.52-35.07.**

“Martti puts his hands back into the basin in front of him. Heidi glances at Martti. Then she lifts the red cup and pours water on her hands.

_Heidi: Whooouu: uh_

_She shakes the cup up._
Heidi: Where did it fall?

Martti touches his shirt.

Martti: Here.

Heidi looks at him, then glances at the teacher.

Heidi: Needed to put the sleeves up.

Heidi shakes her hand.

Martti: Now, came water here.

Martti touches his shirt on his elbows. Heidi looks at him.

Martti: Here is ( ) needs to set to dry.

Martti glances at the teacher. Heidi turns to put the cups into the basin.

Martti puts his hand into the water in front of him.”

Heidi paid attention to her hands and sleeves getting wet. She confirmed to the teacher that “needed to put the sleeves up.” Martti touched his shirt, showing where it was wet. Martti also glanced at the teacher and commented that “needs to set to dry.” Again, the adults remained silent, observing the situation and the children engaged in more scooping and pouring even though their clothes were wet (ZFM).

8.4. Water that hurts and spills everywhere

In psychology, medicine, and psychopharmacology, ice-cold water has been used to cause pain to the subjects on the basis of a variety of research interests, such as to investigate the effects of specific medications or therapeutic treatments. For example Conley, Toledano, Apfelbaum, and Zacny (1997) used periodic forearm immersions into ice-cold water (2°C) and into warm water (37°C).

Throughout this session, the children observed the temperature of the water and made sounds indicating how it was painful to touch it as it was
too cold or too warm. Right in the beginning, the water was described as
cold by Heidi and warm by Martti. Martti made sounds (“ouch ouch”),
commented on the temperature and provoked the teacher to engage in
questions about the temperature.

Throughout the session, water temperature (cold, warm, hot) and
water as a hurting substance became linked with the question of where
the water was. First, Martti paid attention to the wet floor, while Heidi
touched the water in the basin in front of her (Extract 41).


“Martti glances at Heidi’s cups. Heidi puts them back together. Martti
moves his legs on the floor, looks at them, the floor is wet.

Martti: Cold water.

Heidi attaches the cups together in front of her, puts the cups in the basin
and glances at Martti. Martti moves the cups in his hands. Heidi touches
the water, glances at Martti. Martti puts the cups into the water in front
of him; then, he lifts the green one, glances at Heidi’s hand.

Heidi: Ouch!

Heidi lifts her hand out. Martti touches the floor with the other hand.
Martti lifts the green cup with water in it, touches the orange one, and
lifts the blue one. Heidi lifts the cups from the water and opens them,
pours some water out.”

In this sequence, Martti commented the water on the floor: it was “cold
water.” Heidi observed Martti, put her hand into the water in front of
her, paused, and glanced at Martti. When Martti glanced at her hand, she
commented: “Ouch!” as if the water would be cold enough to hurt. Here,
Heidi’s movements assigned a status of proposal to Martti’s movements
and comments. Nevertheless, after Martti had touched the floor, both
children continued with their previous movements without elaborating
the issue further. Both continued to scoop and to pour, followed by
observations about water spilling out and filling the cups.

Later during the session (after 24 minutes), the negotiation was
retrieved in an abbreviated manner, linking the painfulness with the
temperature of water. Heidi observed the water on the floor and made
comments about it: “I (.) oh (.) water (.) also there.” Both children
engaged in touching the wet floor and made sounds indicating it would
hurt (Heidi: “Ouch”; Martti: “Ouch, it was cold!”) The children applied
the idea of water being first cold then becoming warm, then cold again,
depending on the context. For Martti, the water outside the basin was
cold, whereas inside the basin, when mixing it, it was warm. For Heidi,
the water on the pantyhose was cold, but warm when poured on to her
hand. The water in the basin (touched by her hands), on the other hand,
was cold.

Towards the end of the session, the children elaborated a game of
offering and touching the water — of water that hurts. They had already
elaborated the touching in a co-regulated manner and a new element,
offering water, was rapidly included to the flow of actions. Heidi offered
water to Martti who found it painful to touch. The “ouch ouch” sounds
and the expressions on Martti’s face were an indication of this pain. He
put his hand into the water in the basin in front of him as if to seek to
relieve the pain Heidi’s cold water had caused. However, the water in
front of Martti was not as painful to Heidi as Heidi’s water was to Martti.
Heidi touched Martti’s water and noted: “Quite warm.” Eventually, Heidi
made gestures indicating that the water in front of her would be painful
to her too.

Again in this session, both children gained particular positions in
relation to the explorations with water. Martti became the one to touch
and evaluate, whereas Heidi gave Martti the possibility to choose where
and what to touch from the cups Heidi was offering to him: “Which
water do you touch now?” This is again a case where children negotiated
the ZPA/ZFM structure among them and canalized their actions towards specific directions (offering/evaluating/right to select).

After ten minutes of touching and offering, the movements involving water changed: both children begun slowly to splash the water instead of just touching the water in front of the other (Extract 42).

Extract 42, 04/08/1999, session 25, time 37.10-37.54.
“Martti puts his hands into two cups. Heidi puts her hands into two (other) cups. Heidi lifts two cups and some water spills out. Martti laughs.
Martti: Ouch ouch!

Martti puts his hands into the basin in front of him. He glances at the teacher. Heidi lets the cups fall to the water, shakes her hands. Then she shakes the water and lifts her hands. She glances at Martti. Martti also mixes the water inside the basin. Both make laughing sounds.
Martti: This is ( ) machine ( . ) ouch!

Martti shakes the water, water splashes onto his face. Martti turns away, looks at the camera, turns back and wipes his face with his shirt. Martti observes Heidi, who pours water in between the basins. Heidi touches the water inside his basin.
Martti: I will do like this.
Heidi pours more water into Martti’s basin, then touches the water.
Martti: This way.
Martti shakes the water.
Heidi: Water, it didn't come.
Martti touches the water inside Heidi’s basin. Heidi scoops more water and pours it.
Martti: Ouch ouch ouch!
Martti puts the hand in the water in front of him and mixes it. Heidi touches the water in front of Martti, then mixes it.
Heidi: It didn’t ( ) this is so warm.”

The children’s movements alternated from touching and pouring to shaking and splashing. The shaking was getting faster and faster until it reached the point of a “machine,” as Martti described it. Martti emphasized the change in the movements with his comments: “I will do like this”, as Heidi was now temporarily more focused on pouring. After his repeated “Ouch ouch” sounds, Heidi engaged in mixing again.

With the growing movements and excitement, the children started to glance more often at the teacher and the camera as if to evaluate how the adults reacted to the intensity of the movements. The adults remained withdrawn, thus, confirming that the splashing and the fact that water was spilling onto the floor was within the boundaries of the ZFM, even though water spilling onto the floor was not usually accepted in the day care centre. The children splashed, stopped, laughed, and watched (Extract 43).

Extract 43, 04/08/1999, session 35, time 37.54-38.55.
“Martti splashes the water in front of him. Heidi throws the cup into the basin in front of her. She mixes the water in front of her.
Heidi: ((laughs))
Martti: ((laughs))
Martti looks at the water and wipes water from his face. Heidi looks at him. Martti glances at the teacher, smiles. Heidi looks at her shirt.
Martti: Look Pirjo, this splashes.
Martti splashes the water in front of him. Heidi shakes the water also. Heidi stops, laughs, and touches her wet t-shirt. Martti stops also and
moves to the other side of the basin, now facing the camera. Heidi splashes the water again (eyes closed). Martti begins to splash also, glances at the front (to the direction of the teacher).

-Martti: Look at this.

Heidi glances at Martti and continues to splash. She looks at her wet t-shirt. They both stop at the same time. Heidi touches her wet t-shirt.

-Heidi: Whoops, the shirt became wet ((laughs))

Martti bends to look at her shirt. Heidi begins to splash water, Martti joins in. Heidi laughs. She stops and looks at her shirt. Martti glances at her, stops also. Heidi starts again, Martti also, he smiles, looks at the camera.

-Martti: This is a fountain.

Both stop at the same time and laugh. Heidi glances at Martti, both begin to splash again, then stop. Heidi looks at her wet t-shirt. Martti lifts a cup and drops it, Heidi glances at it. Both begin to splash again.

-Martti: This is a fountain.

-Martti looks at the teacher.

-Martti: It goes over.

They both glance at the teacher, then stop. Martti looks and touches his wet t-shirt, Heidi looks at him and laughs.

-Martti: Came to the shirt!”

In this sequence, the children begun to splash so that water was spilling onto the floor and onto their shirts. They developed a joint rhythm of splashing, stopping, laughter, and glancing at the teacher. At times it was impossible to identify clearly the direction of the children’s gaze; they could have been looking at both the teacher and the researcher with the camera. At this point, it seems the gaze was now increasingly related to
the sharing of the joy, accompanied with laughter. Occasionally, Martti would invite the teacher to watch instead of just gazing at her. This was similar to the comments he had made and the way he had been showing the cups in previous sequences; he would explicitly describe and show the teacher what he was doing with the water, as had been promoted in the previous sequences (ZPA). Heidi laughed and noticed her shirt getting wet; Martti bent to observe it too, and observed later his own shirt getting wet. Now, all agreed that ZFM included water running on the shirts – as long as explicit observations were made also.

Eventually, when the children’s clothes were all wet, the teacher started to introduce a new direction for the children’s actions (ZPAs): to finish the splashing and change the shirts, aiming at ending the recording session (Extract 44).


“Heidi touches her T-shirt too, looks at it. She begins to splash.
Teacher: Let's go and change the shirts?
Heidi stops and glances at the teacher.
Heidi: It doesn’t stop yet.
Martti touches his t-shirt. Heidi splashes, then looks at him.
Martti: It’s not at all.
Martti touches his T-shirt, scoops water from the basin and pours it onto his shirt. Heidi looks at him.
Heidi: ((laughs, then with a serious tone)) Why do you water it?
Martti pours more water. Heidi turns, takes a cup and pours water onto her shirt. Martti looks at the teacher.
Martti: ((laughs)) “
After some more splashing, the teacher first asked “Let's go and change the shirts?” Heidi interpreted this question as an invitation to stop considering that “changing shirts” would mean the situation would end. In other words, the ZFM of the recording situation did not include watering the clothes. Heidi responded: “It doesn’t stop yet.” Both children agreed that they were not ready yet. Martti observed his shirt and said: “it’s not at all” and begun to pour more water on to the shirt. The teacher’s question about the shirts directed Martti’s attention to the shirt and contributed to his action of getting it “all wet.” Heidi seemed surprised first, then joined Martti in the activity of pouring water. Children’s mutually constructed ZPA was now defined as simultaneous watering, contrary to the adult initiatives. To get the shirts all wet emerged as a goal for the children, who started to pour more and more water on the dry spots. The teacher and the researcher engaged in more persistent negotiation of putting an end to the recording session (Extract 45).


“Heidi looks at Martti, then pours more water. Martti touches his shirt.
Teacher: Should we go and change the shirts? Let’s go?
Heidi looks at Martti.
Martti: No ( )
Researcher: Is this water thing going to be over soon? You have been doing it for a long time already.
Heidi splashes again. Martti lifts two cups, then drops them and touches his shirt again. Heidi observes.
Martti: There is no water here.
Martti points to his hand and pours more water on it.
Martti: I will put water there?
Martti scoops water and looks at the teacher when lifting the cup. Then he begins to pour water.
Heidi: And there is no either.
Heidi scoops water and pours it on her sleeve.
Heidi: Oh more still.
Heidi pours more water on her shirt. Martti scoops more water, pours on his shirt.
Martti: Have to put water here too.
Heidi keeps pouring also.
Teacher: Let’s go and change the shirts.
Heidi: Not yet still.
Heidi pours water, then shakes her hand.
Martti: Not yet still.
Martti twists his shirt. Both pour more water.
The teacher gets up from the floor, the recording ends.”

The adults started to make more suggestions, repeating the rhetorical questions indicating that the action was moving on the limits of what was possible and allowed (the ZPA/ZFM structure of this particular moment, after almost 40 minutes of recording). At one point, Martti looked at the teacher and asked: “I will put there water?” Since there was no answer, he lifted the cup and poured water. In response to the questions, children observed their shirts and noticed they were “not yet” ready — the shirts had still some dry spots left and they had not reached their mutually constructed goal of getting their clothes wet. In this sense, even though the children were not ready, the adults, eventually, decided that they
were indeed ready (being too wet to continue the recording session). The ZFA/ZPA boundaries were temporarily defined in an explicit manner. The recording was stopped and the teacher went to move the basins away from the children.

8.5. Discussion: children as water researchers

In this session, the children had internalized some of the boundaries of the ZFM for the recordings sessions on the basis of the previous sessions. Right from the beginning, they sat close to the basins without moving from the place, moved the objects provided, and talked about their observations (temperature or amount of water) and movements. The movements and verbal comments were also promoted (ZPA) by the teacher’s further questions (“what happens”; “why…”) and sounds of agreement. Heidi attracted the teacher’s attention with movements that included fewer descriptions than Martti’s. With the questions, the teacher attempted to find out more details about Heidi’s intentions and observations. Now, the ZPAs were slightly divergent for both children.

At some points, as the movements became more intense, the children talked more at the same time. Martti asked the teacher to watch by repeating her name. The teacher had encouraged the children to make observations and report their findings, but at the same time her attempt was to withdraw from the situation; in other words, to direct the children’s focus to the objects (ZPA), not to herself. As the children now addressed her directly, her attempt was not successful and she felt partially uncomfortable about the initiatives (Discussion 4/22/1999, see Appendix 3).

Throughout the session the children and the adults engaged in negotiating the boundaries of the ZFM, particularly in relation to what was the acceptable amount of water spilling onto the floor and clothes, and in what way. A few minutes after the beginning of the session, the
water running on the floor and on the clothes (boundaries of ZFM to be negotiated) was linked to the observations that the teacher also promoted (ZPA). The children observed that water on the floor was “cold.” This was acceptable because the promoted action had been to observe “what kind of water” there was. The carpet had been replaced by a plastic tarpaulin as in session 33. This way, the adults communicated the possibility of water spilling out of the basins to the children, which had happened in the previous session.

In the analysis of the sequences above, I have paid attention to the negotiation related to clothes. In children’s everyday life, clothes are visible and continuously present as objects of negotiation with the adults. They are partially controlled by the children themselves because they are close to their bodies and carried by them, but at the same time largely controlled by the adults who provide access to clothing and assistance in dressing. In their work, Kindermann and Valsiner (1989) discuss the cultural ecology of dressing, which made me pay attention to our relation to the clothes — and the way we (un)dressed the children for the situations. As Kindermann and Valsiner emphasize, since the child is dressed for different occasions in a variety of ways, he or she becomes knowledgeable about the culture’s norms of bodily exposure in different settings. Furthermore, “…related to this differentiation is the way in which caregivers react to clothes being dirtied — the child has to learn that this is less acceptable for some clothing than for other” (p. 37).

This notion is applicable to the question of clothes getting wet in the recording sessions. As this was not normal in everyday situations at the day care centre, the children and the adults engaged in redefining the limits. Thus, it was now stated that, in these circumstances, getting wet was both possible and allowed (ZFM). Getting wet is something that the adults were also prepared for by having a spare pair of clothes and this was brought up several times in the discussion between the children and the teacher. The ZFM and the ZPA, therefore, begun to get blurred in
relation to the clothes getting wet. The ZPA was temporarily outside of the ZFM of everyday situations, in which clothes are to remain dry.

During the session, the adults had to determine whether splashing water would be considered as “doing research with water,” therefore acceptable. Did the children make observations when they splashed the water and poured it over their clothes? Did the children make their clothes and floor wet, or did they get wet because of their explorations with water? To what point could this continue — when would the limits be reached?

In this session, since getting wet was within the boundaries of the Zone of Free Movement, as established by the children’s glances and the adults’ silent approval, it started to form a probable end result for the children’s actions. Thus, instead of accidentally getting wet while studying water, there was eventually a jointly constructed agreement that in studying water children will get wet.

When the children made comments about getting wet, they observed the teacher’s reactions. She agreed both verbally and nonverbally that it was acceptable to get wet. When the water splashed more or the children started to pour water on themselves, they glanced again at the adults to observe their reactions. The teacher’s silence could be interpreted as an agreement that at least that particular amount of splashing and/or pouring was acceptable in this context. Finally, when the children’s goal was clearly to make their clothes all wet, the teacher engaged in redefining the boundaries of appropriate behaviour within the recording session (ZFM). Indeed, rather than water “going” on their clothes being likely and acceptable, the children were now actively watering their clothes. This was more problematic from the adults’ point of view, because it was not clearly defined as exploring water like the previous movements had been.

The children and the adults were both engaged in negotiating the limits of (the performance of) the play the adults were observing. The teacher did not give precise verbal instructions of what to do; rather, she
observed, ready to interrupt and set the limits when needed. The boundaries of the appropriate and inappropriate were not defined in advance but continuously restructured and reflected upon in the here-and-now unfolding of the actions. (See also Winegar’s (1988) analysis of the co-construction of snacktime procedures and conventions in a group of 31- to 57-month-old children and adults).

In this session, laughter became synchronized with movements in a co-regulated manner (see also Pedrosa, 1989). The children highlighted the intensive moments, including splashing the water, with laughter and squeals of joy. The laughter and the movements children made with their hands indicated that the situation was pleasurable. When one of them made movements indicating that the speed and volume of splashing would diminish or stop entirely, the laughter and movements of the other diminished too. And again, as the intensity of the splashing increased, the squeals of joy became louder. Thus, the children positioned the adults as the audience for their splashing and pouring.
PART 3. DISCUSSION
9. CHANGING NEGOTIATIONS – FROM OBSERVERS TO WATER RESEARCHERS

9.1. The (dis)continuities\textsuperscript{21} of the flow between children

As both previous works and the material discussed here point out, children’s actions are co-regulated and emerge in relation to the others’ actions (Fogel, 1993; Carvalho et al., 1998; Oliveira, 1988; Pedrosa, 1989; Pedrosa et al., 1997). In this research, the adjustment of the actions to the others’ occurred, for example, by repeating the actions partially or entirely, by adding something, or by substituting some of the actions of the other. In many moments, the children entered in an intensive flow of actions characterized by intense mutual attention and amusement. The situations could also move fast from conflicts to laughter. In addition to various verbal and nonverbal codes, physical proximity or distance-functioned as a medium for communication.

Ethnographic studies on day care centres have also described the child-child interactions as a continuous unfolding of movements and meanings (Corsaro, 2003; 2004; Nilsen, 2005; Strandell, 1997). In the

\textsuperscript{21} The term (dis)continuities applied from Silva (2003).
material discussed here, the adjustments were not simply fluent, coherent, and continuous. Indeed, the flow of actions included pauses, ambiguities, dissolutions, repetitions, returns, and new beginnings as possibilities for reorganization. The flow was subject to breaks and its figure dissolved into various acts and movements that often seemed separate and unrelated.

The events and the actions were neither planned nor clearly foreseen by anyone. Some actions attracted more than others the other child’s and the adult observer’s attention by being novel, standing out from the flow. At times, the flow of actions got a new direction after a new, distinct movement, a loud sound, or a verbalization. Random events such as changes in bodily postures or the movement of the objects could lead the construction further.

Various initiatives functioned as experiments of the possible routes for children to take, as explorations of what is possible to occur within the setting. Some of these initiatives were elaborated further by one of the children or both of them, which led to the reorganization of the flow of actions. The children elaborated new moments on the basis of such initiatives, when they were able to relate to the new initiative and incorporate the novel feature into their actions. An individual’s actions could also remain singular suggestions or random movements that seemed not linked to the other’s actions. Single elements did not always alter the flow towards a new configuration to emerge. The novel element was more distinguishable from the general flow when it included both distinct sound and related movement.

The observations in other works on children’s interaction show results similar to the analysis in the previous chapters. When discussing communication between young peers, Pedrosa and Carvalho (2006, p. 13) describe episodes that suggest

…a constructive role of free peer interactions in at least two major — and related — directions: The differentiation of communicative codes
from gestures, actions, linguistic segments and prelinguistic vocalizations, and the constitution of a “peer culture” in the here-and-now of the group, on the basis of the potential permanence of shared codes (Corsaro, 1997; Carvalho et al., 1998; Pedrosa & Eckerman, 2000).

Session 2 includes an interesting case of elaboration of shared meanings; variations of “koka koka” verbalizations emerged as a linguistic sign that can be interpreted as part of the dyads’ culture. Previous negotiations were condensed into a shared interpretation of a gesture and a random verbalization became elaborated as an idiosyncratic code to constrain the actions further in these recording sessions.

In previous literature, Carvalho, Pedrosa and colleagues have identified some of children’s interactive processes showing different modalities of reciprocal regulation: from attention orientation to construction of play, communicative codes, and meanings through the framing of the ongoing actions in the group, proposals, rhythmical adjustments, imitation, and other mechanisms (Carvalho et al., 1996; Pedrosa, 1989; Pedrosa & Carvalho, 1995). As discussed in previous chapters, these modalities were also interpreted in the material here.

The mechanisms of role/counter-role coordination among 2- to 4-year-olds observed by Oliveira and Rossetti-Ferreira (1996) are very similar to the processes identified by Pedrosa (1989) and present in this material. The mechanisms of coordination Oliveira and Rossetti-Ferreira observed included: “…observation of the partner, synchronization of gestures, taking up a role incited by a rite or a rhythm, immediate reciprocal imitation, alternation of turns, taking up a role incited by an object and delayed imitation” (p. 200).

Even though the flow was not always harmonious and smooth, as a whole, the material obtained with these two children presents only a few episodes that include clear conflicts of interest. Verba (1994) made a similar observation in her analysis of modes of elaboration among
children. She concludes that “interaction between familiar children in activities of their own choosing without adult intervention apparently involves some kind of implicit collaborative contracts that minimizes the conflictual mode of co-construction” (p. 136).

In all the sessions, it was very clear that the mutual adjustments did not occur in a “vacuum” comprising just the children. Judging from their gaze, the children altered their attention to the various elements of the situation: to the objects, to the camera, to the teacher, to the researcher, and so on. The children’s mutual adjustments emerged in relation to the adult observers, in relation to the presence and initiatives made by the adults.

For example, in session 35, it was often difficult to define to whom the children were talking. They seemed to address both the adults and the other child simultaneously. Their adjustments in the situations included the adults indirectly, i.e., mediated by the objects, and directly when the adults engaged in the here-and-now construction of the actions.

9.2. Similarities and differences among the sessions

The recording settings included narrowed-down sets of possibilities for children’s actions (Kindermann & Valsiner, 1989; Valsiner, 1997). A certain material-physical-social configuration was established as potential of regulation and constraining the action of the children. The arrangements canalized children’s actions to certain direction as possibilities and limits, even though the actions were not determined by the setting. Only some out of various possibilities for regulations among children, among adults, material setting, and other elements became actualized (See Figure 8. Regulations are illustrated by the shaded area in the figure). In theoretical terms, novel items emerged from quasi-defined
constraint systems that included undifferentiated regions (Valsiner, 1997, p. 208).

The boundaries of the Zone of Free Movement (ZFM) and the Zone of Promoted Action (ZPA) were re-organized and negotiated following the adults’ observations in the situations. Again, within these limits and possibilities, the children started to construct their actions and thus recreate the setting. The children’s co-regulated actions emerged both in

Figure 8. Illustration of the dynamics during the recording day. The black star-shaped lines represent the possibilities present for interactions, relations, and regulations among various components on various levels (semiotic, organic, physical; verbal, nonverbal). The grey lines represent regulation potentials not possible to be actualized in this particular session (hypothetical, following, previous, or future sessions). The shaded area represents the regulations occurred/occurring (actions and meanings constructed) by the participants.
relation to the adults’ presence and their active structuring attempts. The children did not only follow the verbal instructions, but attempted to find out the implicit intentions. The children also engaged in constraining their actions, by negotiating the ZFM/ZPA structure among themselves as described in detail in the previous chapters. This is partly overlapping with the ZFM/ZPA structure the adults engaged in constructing. The adults observed this and attempted to restructure the environment further according to their assumptions, expectations, and goals.

The following figures illustrate and summarize the main differences and similarities between the sessions in relation to these active negotiations. (Figures 9-12; See also Figure 8, illustration of the dynamics during the recording day).

The flow between the children: session 2

![Diagram showing the flow between the children during session 2]

Figure 9. Dynamics during recording session 2. The black star-shaped lines represent the possible and the promoted regulations (ZFM/ZPA). The boxes with the dashed lines represent children’s actions and meaning constructions.
Setting
- Table, chairs, basin.
- Instruction to “come to play.”

Adult initiatives and canalization (ZPA)
- Providing the water, the table and the chairs.
- Questions and (vague) suggestions about the water, attention directed to water.
- Questions at the beginning followed by silence.
- The teacher provides cups, attempts to initiate play with water.

Co-construction, actions, and meanings among children
- Negotiations of the liminal space, glances at the adults.
- Martti initiates actions towards Heidi.
- Flow of actions, ignoring the adults’ initiatives.

Co-construction, actions, and meanings in relation to the water
- Flow of actions ignoring the water offered.

Expectations, limitations, possibilities: what was possible and allowed (ZFM)
- Uncertain for the children.
- Children remain seated and whispering close to the table.
- Redefinition between the children in relation to the body and touching.

The main figure(s) / configuration(s) of the session
- After silent observations of the situation, children ignore the adults and the water. They elaborate a play with hand movements, random verbalizations, and facial expressions.

In session 2, the adults’ instructions to the children were implicit and their suggestions about the nature of the situation were not very clear. The researcher and the camera were new elements in the situation at the day care centre. After a few questions and attempts to direct the children’s interest towards the water (reorganizing the ZFM/ZPA relationships), the adults remained present, observing the children like in all the other sessions. In this session, the children developed a playful
activity among themselves with a few words including a variety of hand movements and facial expressions while remaining seated and within the focus of the camera. Meanings emerged in an abbreviated manner and the field of actions became reorganized as a new linguistic code emerged to constrain the actions. After the first attempts to direct the children’s interest towards the basin with water, the adults allowed this elaboration. However, they did engage in suggestions by providing new objects (reorganizing again the ZFM/ZPA) at the end of the session.

**Promoted actions: session 4**

![Diagram](image)

**Figure 10.** Dynamics during recording session 4. The black star-shaped lines represent the possible and the promoted regulations (ZFM/ZPA). The boxes with the dashed lines represent children’s actions and meaning constructions.
Setting
- Kitchen
- Instruction to “come to play” and “do things with water.”

Adult initiatives and canalization (ZPA)
- The teacher’s suggestions related to the water, water running.
- More suggestions, touching water.
- Pauses in recording and discussion with children.

Co-construction, actions, and meanings among children
- Heidi uses the tools. Martti observes. Discussion of these positions.

Co-construction, actions, and meanings in relation to the water
- Touching, scooping, blowing, and pouring. Martti observes and gives opinions about the use of tools.

Expectations, limitations, possibilities: what was possible and allowed (ZFM)
- The children remained close to the sink. Silent whispering in the beginning.
- Movements towards the water; give-and-take similar to Session 2 was not allowed.

The main figure(s) / configuration(s) of the session
- After silent observations and joint actions, engagement with water. Heidi uses the tools, Martti observes.

In session 4, the adult’s instructions for the children were more explicit than in the first recording (session 2). Clear verbal suggestions and illustrative movements were provided by the teacher. At first, the children engaged in similar movements as in session 2, but then, as suggested, engaged in touching the water. The adults emphasized that in this situation (recording of “water play”) the children should touch the water, otherwise the situation would be over. When the children were moving their hands in the sink, in the water, in a variety of ways (ZFM), the adults’ goal to get the children to touch the water (ZPA) was
achieved. Heidi held the objects, but eventually, they elaborated a game in which Martti had an active role also in deciding how much water Heidi should scoop with the ladle. Within the restructured ZFM there was still space for a variety of possible movements between the children within the constraints they constructed themselves, differently from the adults’ expectations of both children holding the objects the same amount of time.

At the beginning of the session, the adults did not make clear the expectations or the limits of the situation (ZFM); the suggestions were vague ("look" and turning on the faucet). At this point, instead of touching the water, the children elaborated their mutual, imitative actions. It was only after the instructions were clear enough that the children engaged in touching the water.

**Worlds within one setting: session 33**

![Diagram](image)

**Figure 11.** *Dynamics during recording session 33. The black star-shaped lines represent the possible and the promoted regulations (ZFM/ZPA). The boxes with the dashed lines represent children’s actions and meaning constructions.*
Setting
- Basins and objects on the floor.
- Instruction: “Let’s see what happens to these in water.”

Adult initiatives and canalization (ZPA)
- Providing the water and the objects, removal of some of the clothes.
- The teacher’s questions about the objects and the children’s hypotheses.
- After the beginning, the teacher withdraws.

Co-construction, actions, and meanings among children
- Both collect their own objects and use them in the water. During the session, other plots and discussions among children.

Co-construction, actions, and meanings in relation to the water
- Both did experiments with their objects. Pouring, mixing, and dropping to water. Scooping together at the end.

Expectations, limitations, possibilities: what was possible and allowed (ZFM)
- The children remained in the same place, set the objects into the water.
- The water started to spill on the floor. Some scooping ok.

The main figure(s) / configuration(s) of the session
- Experiments with wooden objects, cones, and rocks. Question-answer game among the children.

In session 33, the teacher introduced explicitly the direction of the events: “Should we observe what happens to these?” The teacher acknowledged the possibility of the floor getting wet and replaced the carpet with a plastic tarpaulin. (Preparation of the ZFM that was somewhat different from the everyday setting). In this session, the children started to make observations in line with the adults’ questions, paying also attention to what the other was saying and doing with the objects he or she had gained access to. They also engaged in mutual
adjustments whose focus was somewhat different from the teacher’s initiations, yet, within the boundaries of the ZFM: the exchange of the hair, the question-answer game, and the rhythmical scooping of water. The children now remained close to the objects, touched them without moving around. When they got up and said they were “ready,” the recording was finished.

The researchers and their audience: session 35

Figure 12. Dynamics during recording session 35. The black star-shaped lines represent the possible and the promoted regulations (ZFM/ZPA). The boxes with the dashed lines represent children’s actions and meaning constructions. The two arrows of the same size represent the bidirectional initiations among the children and the adults.

In sessions 10/20/1998 and 2/19/1999, two other children were also present. It became difficult to record the actions of the whole group, as they moved around in the room. The recording was focused on Heidi and Martti who moved less and remained closer to the objects provided.
Setting
- Basins and cups on the floor.
- Instruction to come to “do things with water.”

Adult initiatives and canalization (ZPA)
- Providing the water and the cups, removal of some of the clothes.
- Teacher’s questions, particularly to Heidi. Separate ZPAs for both children.
- At the end, suggestions to finish the session.

Co-construction, actions, and meanings among children
- The children observe water. They both scoop and pour and describe verbally their actions and the amount and the temperature of water.
- Both related their actions towards the teacher. (A few times to the camera, when the teacher is away).

Co-construction, actions, and meanings in relation to the water
- Immediate scooping, pouring, and touching. Verbal accounts about how the water is and what happens. Observations towards the adult audience, the teacher more actively engaged.

Expectations, limitations, possibilities: what was possible and allowed (ZFM)
- The children remain close to the water and the cups. Both face the camera and describe their actions aloud. Verbal negotiation about the boundaries, regulate the actions.

The main figure(s) / configuration(s) of the session
- The children making observations about the water and investigating it, narrating particularly to the teacher. Exploring the boundaries of allowed — not allowed.

In session 35, while the adults’ instructions were not verbally formulated, the setting was arranged with two different kinds of waters (cold and warm). The ZFM/ZPA structure was now implicitly defined, on the basis of the previous sessions. During the session, the teacher engaged in conversations with the children. From the beginning, the
children started to make observations about the cups and the water and reported them to the teacher. They engaged in mutual adjustments in the form of a game: touching the water in front of the other, “water that hurts.” Finally, towards the end, they elaborated a rhythmic splashing and pouring of water interrupted by the teacher, restructuring the ZFM boundaries. Perceptually one of the most salient features of the session was related to the changes in the definitions and descriptions about the water in the basins. Water gained the position of an actor (see e.g. Latour, 1993; 1996; Law, 1997a; Pels, Hetherington, & Vandenberghe, 2002); it did something in relation to the children, it hurt, moved, and made them wet while they were investigating it.

In summary, during the months of the recordings, the adults canalized the children’s actions in various indirect and direct ways, with explicit and implicit signs and directives. As the adults observed the children’s actions in the (given) situations, there was a change of focus in their attempts. In sessions 2 and 4, the attempt was to make the children touch the objects provided. Even though the teacher’s verbal interventions were short in relation to the total duration of the sessions, her questions about the objects played a role in defining the nature and the function of the objects. In session 33, she asked questions about the water and the objects set in front of the children to elicit accounts on what the children were observing while moving the objects and touching the water. In session 35 the children started the scooping and pouring without any hesitations. By now, the adults’ intentions and expectations were clear enough for them. The actions were regulated by the personal senses based on the internalized experiences in previous situations. In the beginning of the previous sessions, the children had been more attentive to explore the adults’ changing intentions and expectations. However, in all the sessions, during the unfolding of the session, they explored the changing and ambiguous boundaries of what is expected and allowed.
9.3. Emergence of a culture of recording sessions with water

What was the link between the different actions that emerged in the here-and-now situations as to the changes that occurred within the recording sessions during the months?23

Even though the physical arrangements with particular objects and instructions included variability from one situation to the other, the sessions begun to form a chain of somewhat similarly structured settings. The teacher had prepared the children for the recording either verbally (with instructions), physically (pointing to the direction of the objects or/and taking some of their clothes off) or both, or in some other way. Within this variability, some of the constant elements included the camera,24 the lack of other children, and the adults’ attention to the children. Even if other members of the group 2 were present in some of the sessions, the focus of the recordings was increasingly on Heidi and Martti (see Table 4). They were at the centre of the adults’ attention, interpreted as forming a dyad of “water researchers.” (Discussions 2/10/1999 and 2/19/1999, see Appendix 3).

I agree with Matusov’s (1996) and Hermans’ and Kempen’s (1995) ideas by assuming that there was some common ground among the children and the adults even before they entered the recording situation. The participants did not have to begin the construction of joint activity or understanding all from the zero. In participating in sociocultural practices and using sociocultural tools, people establish intersubjectivity without being in direct contact with all the others who mediate the practices (Matusov, 1996). This idea is similar to dialogical action discussed by Hermans and Kempen (1995).

23 An early version of this section was published by Rutanen (2007).
24 For an analysis of the camera as an actor, see Rutanen (2004a).
Hundeide (1993) uses the concept of *interpretive background*. According to this notion, on the background for interpreting an utterance or the thematization of some action or event, there is an interpretive background that is assumed to be known by the participants. She argues that we establish long-term agreements, or “contracts” that regulate the content and the direction of the relationships and the interaction between the interlocutors. “These stabilized contractual relationships create a background in relation to which reciprocal actions gain meaning” (pp. 440-442).

On the basis of the observations made in this study, one may suggest that children need some time, more than just a few minutes, not only to observe the setting and the objects but also to try to make sense of the general interpretative background (Hundeide, 1993) before they engage in symbolic play with the objects offered by the adult experimenter. Both children and the adults present in the recording sessions were tuned into making sense of “what was going on,” even though there had been discussions and planning among all the participants in advance.

Instead of just mutual elaboration among the children, the recording sessions included a complex *network of meanings* (Rossetti-Ferreira et al., 2004) continuously in movement and unfolding among all the participants somehow involved (children, personnel, researcher, mothers, research group etc.). *The video recording, saved on the tape, was only a small excerpt of the complex flow of all the different events occurring.* Figure 13 illustrates some of the elements on the background affecting negotiations in the here-and-now situations.
The history of co-adjustments among the staff, mothers, researchers

1. with other children in the day care
2. among these two children

Figure 13. Negotiations before, during, and after the first recording session.

In addition to the participants in the recording sessions — Heidi, Martti, the teacher, and the researcher — various other persons participated in the situations indirectly. Heidi and Martti had been attending the day care centre before the intervention. Since they were already familiar with each other, their background included a history of mutual co-adjustments. It is safe to assume that they had already engaged in negotiating a variety of positions and meanings among them (Pedrosa, 1989); they had created convergent frames (Branco, 1998; 2003) for actions, as well as participated in the construction of a peer culture with particular routines, codes, and meanings with other children (Corsaro, 2003; 2004; Corsaro & Johannesen, in press, 2007).

The participant children had also a joint history with the teacher; they had been engaged in various co-adjustments with her previously. Both children had their own particular expectations, observations,
intentions, and perceptions related to the different aspects of the situations: both had their particular personal history and subjective, embodied positions (viewpoints) within the situation.\footnote{See also Lewin (1943): field for the individual including momentary situation (personality and psychological environments) and the general life situation (past experiences, expectations, and embodiment).}

The research group, the other personnel of the day care centre, and the mothers participated in the discussions about the ways to arrange the situations. Before the first recording, the link between the researcher and the children had been the researcher’s discussions with the personnel, with the mothers of the children, and, particularly, with the teacher. As the children, all the adults involved had diverse expectations and intentions in relation to the project. Even though the personnel’s observations were taken into account, the planning was in line with the goals and interests set for the research project outside this particular day care centre by other researchers, research traditions, and, especially, contemporary discourses about children and childhood (e.g., Dahlberg et al., 1999).

The adults’ observations in this situation made the teacher and the researcher reflect about the concept of child, play, and “doing research.” The adults revised the expectations and goals and planned the set-up for the following sessions with other indirect participants.

The negotiation of the boundaries for the flow of action in the here-and-now situation begun even before the recording session started. The constraints for actions were not only physical and external such as the space, the objects provided, or the adult’s instructions, but also internalized — what was possible and expected to occur on the basis of the joint history of similar situations previously.

Throughout the sessions, in addition to a previously shared common ground, a shared and jointly constructed interpretive background started
to emerge among the children and the adults. Heidi, Martti, and the adults participated in creating a joint history of the recording sessions that would be on the background before each new recording session. The other researchers, staff, mothers, and other children continued to be indirect participants, although with less emphasis for they were not present in the situations and not participating in the meaning making during the sessions (Figure 14).

![Diagram of Negotiations at the end of the intervention (session 35).](image)

**Figure 14.** Negotiations at the end of the intervention (session 35).

Applying Fogel’s (1993, p. 159) definition of culture as “the set of stable consensual frames in a social system” and "the active, interpretative process by which individuals create frames for meaningful relationships” (p. 160), one can argue that the participants created a culture of the recording sessions with water. Within this particular culture, the social field that emerged was intrinsically interlinked with the changing physical environment.
The recording sessions showed that children, even when they are given the possibility to “play,” may refuse to take the objects offered by the adults (see also Rutanen, 2004c). Children can be actively resistant and act against the adults’ expectations. Children can remain silent. In addition, in contrast to the original positioning, the children reversed their positions from being observed to that of being observers. They observed the adults and invited them to join the flow of actions by talking and showing the objects. In summary, the adults and the children entered the recording sessions with different expectations and various roles-counter roles (Oliveira, Guanaes, & Amaral Costa, 2004) that were constantly co-constructed within this interactional social field. The negotiation of the roles and positions occurred throughout the sessions; both convergent and conflicting roles were in a dialogical process in relation to each other and within themselves.

This material does not allow for a discussion of the longitudinal social or cognitive development. Nevertheless, questions may be asked in relation to the development of children’s actions and adult’s canalization of the actions towards culturally acceptable forms within the context of this (research) intervention. We adults entered the situations with our intentions and goals, although somewhat implicit and unclear, while the children observed us and attempted to make sense of the situation. During the months of the recordings, the children’s actions and their intentions in relation to water (what the situation is about) were both canalized towards the accepted forms of investigating water, which had been the original purpose of the recording sessions. The goal was neither clearly stated by the adults for eventually anything occurring during the situations was regarded as an interesting indication of the children’s creative behaviour. The process was complex, chaotic at times, non-linear, and not clearly predictable by anyone. However, on should notice that the change was not unlimited, but included conservation (Magnusson & Cairns, 1996, p. 19). The variety of changing constraints
supported, in a correlated manner, some of the directions for the actions more than the others.

The children engaged in a symbolic play with the objects provided (water, rocks, the pieces and slices of wood, cups). This finding is interesting when compared to Striano’s, Tomasello’s and Rochat’s (2001) studies that discuss the difficulties children had in engaging in symbolic play with “boring” objects. One of the main differences in this study in comparison to the method used by Striano and colleagues was that children were given plenty of time to observe the setting and begin to investigate the objects. In Striano’s and colleagues’ pilot study 30 seconds were allowed after adult introduction of the objects, 1 minute after each three adult modeling phases, and, following the test, a 30 seconds baseline period without adult demonstration. No peers were present: only the child, the adult experimenter, and a parent.

In summary, for each participant, the social, material, and symbolic environment was present in the form of potentials for action and meaning making. Following this idea, the context of the children’s actions is a network of possibilities, potentials for action. Some are actualized, as the child is brought to day care, invited to a certain room, and given instructions etc. The variety of potentials remains on the background when some of the potentials emerge as a figure of related actions taking place. In the unfolding of the flow of actions, some movements and meanings become more likely to occur than others, making a way to new opportunities and novelty. As the results show, children are, in a co-regulated manner, participants in this cultural canalization taking place in the here-and-now.
10. EVALUATING THE KNOWLEDGE CONSTRUCTION

“...we are part of nature and our knowledge about it is related to our own transformation”

(Najmanovich, 1995, p. 69).

10.1. Children and adults as participants in research

Contemporary works in sociology of childhood criticize the unreflexivity of works within the field of developmental psychology (also Burman, 1994). Besides questioning of the role of the researcher (Christensen & James, 1999; Christensen & Prout, 2002; Corsaro, 2003; Eder & Corsaro, 1999; Mandell, 1988) the discussion has centered around the issue of whether the research proposals and methodological choices position children as objects, subjects — or even further — active participants in implementing the research (Christensen & James, 1999; Christensen & Prout, 2002; Grover, 2004; see also Alanen & Dufva, 2001; Elbers, 2004; Karlsson, 2005; Mauthner, 1997; Punch, 2002 for case analyses). In these studies, the viewpoint has changed from teaching children and evaluating the results to how children change adults’ way of understanding the world and children as part of it. In other words, in line
with women’s studies with discussing the concept of gender (Saarinen, 2003), reflexion about the position of the researcher is underlined in a generational context (Alanen, 2001).

As Grover (2004, p. 82) reminds: “…the United Nations adopted in 1962 a Convention on the International Right of Correction. Yet, children effectively have no “right of correction” when it comes to the stereotypes and negative images of the young and classes of the young that often emerge from the social research.” Similarly, Prout, and James (1990, p. 29) remind us that: “the social sciences are not neutral commentaries of childhood but active factors in its construction and reconstruction. There is a need then to offer children the opportunity to define themselves through collaboration in the research effort, rather than to be defined solely by adult interest, biases, and agendas.”

The literature underlining the participatory role of children often leaves children under 7 years of age out of the discussion. Instead, the focus is mainly on older children who already possess the communicative capacities to articulate their experiences and question the definitions proposed by the researchers. Young children thus represent a more difficult area when it comes to suggestions and policies concerning children’s participatory role or sensitivity to children’s perspective in studies (see Karlsson, 2005; also the ambiguity of the child’s “voice”, see Komulainen, 2007).

In their work on children’s symbolic use of objects, Striano and colleagues (2001) discuss the difficulty in engaging children in the activity the study is set up to evaluate or measure. In case of a conflict between the researcher’s expectations and child behaviour, children are interpreted either as active (“refusing”) or incapable (“failing to produce”), depending on the researcher’s conception.

Striano and colleagues (2001) note that children uniformly found the setting of their pilot study “unenjoyable.” The study included plain objects and one child at a time was “left to their own devices to see if they would spontaneously generate symbolic activities.” In the
subsequent study, Striano and colleagues provided “a rich physical infrastructure for symbolic engagement in the form of a many-roomed doll house with many toy furnishings and potential symbolic activities” (p. 443). In other words, they did not focus on investigating on what the children did instead of playing symbolically, but restructured the setting and offered a variety of materials to play with following an adult model.

Hundeide (1993, referring to works by Hundeide, 1977; 1989; 1991; Light & Perret-Clermont, 1991; Rommetveit, 1979; Smedslund, 1977) discusses the issue of diverse expectations and intentions of the participants, relevant also in this study:

…in any experimental or educative situation there is the problem of convergence or divergence of meaning or intersubjectivity between the experimenter and the subject’s definition of what is going on, what is the intention, the task and what would be an appropriate reply. If there is a divergence between definitions, the child’s responses will necessarily appear deviant or incorrect according to a norm on the experimenter’s expectations, and there is then the problem of how to interpret such deviant replies – as a deficiency in the child’s cognitive competence (Piaget and the psychometric tradition) or as deficient intersubjectivity and sharing of background premises between experimenter and child. (p. 447)

The implications of the latter position would be that “what we experience as deviance in the child’s responses, the task is not to judge these according to some external standard, but rather to uncover the premises from which such replies would appear reasonable and plausible” (ibid., pp. 447-448). This is the notion I have opted to work with in this study.

In my inquiry, children were not only objects of observations but also subjects actively participating in reconstructing the situations. The teacher and the researcher set some limits but the children engaged themselves in negotiating the boundaries and the events within these limits. The children were positioned and they positioned themselves as
researchers: they observed, investigated, and announced their observations about the objects. In this sense, they agreed with the position provided to them. They sat in the same place most of the time, facing the adults and the camera. At times, they presented their observations to the camera. They also refused to fit the role of observable objects in various ways: they did not touch the objects provided, they did not talk spontaneously but only responded to the teacher’s questions, they observed and invited the adults to join in, and they tested the limits of the acceptable behaviour (for example when splashing the water).

The data in this study are derived within a particular setting. A day care centre was selected among the centres that participated in the project coordinated by the National Research and Development Centre for Welfare and Health in Finland. This link made possible an easy access to the centre, yet, it also added the challenge of adjusting together the various expectations the teachers had and the roles assumed and attributed to me as a researcher and as a representative of a government sponsored project. In addition of being a researcher, I was a coordinator, a tutor, a friend, and an assistant to the teacher. Being one of the coordinators of the Luma project I was concerned about the planning of the next step for the project. I was also in the role of a tutor in the Water project, as the videos were used for planning the project.

For the children, I remained an adult outsider who showed up every now and then with a camera. The teacher usually marked my presence by referring to “things with water” or “water play”, for example: “Niina came. Today we will do things with water.” When I stayed the whole day at the day care centre, I observed the events, and talked with the teachers or with the children who approached me. During the recording sessions, I talked less than the teacher. I was also less responsive to the children’s glances and comments, standing behind the camera. The difference in our position was visible in session 35. The children were talking and showing their cups to the teacher, engaging her in the actions. When the teacher left the room (at 22.22), the children continued to talk without
glancing to the camera and/or me. Eventually, Martti showed the cup to the camera. At the same time, the teacher returned and she was again positioned as an observer of the explorations.

### 10.2. Using videorecordings and video camera

What is particular about the recording sessions in this study? One difference in relation to the previous works discussed here is that *the recordings were not made only in function of the study*. Various participants and interests were behind the recording situations: the Young Children’s Mathematics and Natural Sciences project (Luma), the children’s Water project, and the interest to study what occurs among children, how they manipulate the objects provided, and whether the interaction and manipulation would change during the year. For the most part the children were taken into different settings with implicit or more explicit instructions. Only some of the recordings were made about the everyday actions of the day care centre (at lunch time, children outdoors).

I took the stance that the participants were engaged in the process of constructing the data during the whole project, not only during the short video recorded sessions. The video recorded material was a random excerpt of a complex flow of events. The use of the video camera included various choices of narrowing down the amount of material already when I was at the day care centre. The questions concerning this selection included: who to follow when children were moving around in the room? If some children moved and turned their back to the camera, move or stay? In case of a disagreement among children, interrupt or not? When was the right moment for the recording to begin, when to pause, when to stop? Even though the remarks made by the adult during pauses were not registered on the tape, they were part of the configuration of the sessions. *On the basis of such observations of the*
material, it was appropriate to define both children and adults as participants of the study, even though the adults were not visible on the videorecorded material.

Previous works have paid attention to the possible effects of the camera in recordings with children. Jordan and Henderson (1995, p. 5.0 Camera effects, 1/3) describe how 3-year-olds initially come up to the camera, gesticulating and making faces. Five minutes later they hardly glance in its direction: “Experience shows that people habituate to the camera surprisingly quickly, especially if there is no operator behind it”.

In the sessions described here, the presence of the camera did not “fade out of (children’s) awareness quite rapidly” as Jordan and Henderson suggest. I was standing behind the camera — a fact pointed out by these authors as hindering the process. The presence of the camera and adults close to it often remained as a central figure, as a structuring element in the recording sessions, and was thus considered in the analysis of the situations. The children’s attention to the camera and/or to the adults alternated from close observation to leaving them on the background. In this study, this co-construction process, mediated by material artefacts, was considered central instead of conceptualizing it as an unfortunate “side effect” or a problem hindering a “natural situation” to develop.

The adults’ behaviour together with the presence of the camera and other special arrangements made the situations very exceptional when compared to the everyday situations at the day care centre (see also Rutanen, 2004c; 2004d). On the other hand, the year included other alterations to the everyday rules and routines because of the Water project. In some other situations, children were allowed and encouraged to play with water while the adults observed and wrote down what the children said. As during the recording sessions, the teacher took written notes, some of which were discussed later on with the children.
The teacher invited the children to the recording sessions by using specific terms.\textsuperscript{26} We pondered about the words to use to invite the children; this issue was brought up both in discussions with the teacher, the research group, and with the mothers. Rather than using the word “do research/study/investigate” (“tutkia” in Finnish) the teacher and I preferred eventually to use “play,” “do things with water,” or “water stuff.” The children themselves adopted the terms we used during the project.

10.3. The methodological cycle in this study

From the methodological point of view, the study went through continuous changes. As the implicit or explicit theory determines the general direction for data derivation methods, the details were constructed only after the beginning of the visits at the day care centre. In addition, the nature of the phenomena investigated — and defined during the process — added constraints to the data derivation.

The focus changed as a result of joint discussions on the boundaries of the object of the study (about this process, see also Rutanen, 2004b; 2004c; 2004d). The transforming boundaries of the focus were

\textsuperscript{26} In his work on the social-pragmatic approach to language acquisition, Tomasello (2001) addresses the issue of adults exhorting children attend to certain aspects of a situation. He writes that linguistic symbols are used by human beings to invite others to experience situations in particular ways (pp. 132-158), and, further that, “children learn words as an integral part of their social interactions with other persons, an important part of which are their attempts to understand what adults are trying to get them to do and their own attempts to get adults to do things (Bruner, 1983; Nelson, 1985; Tomasello, 1992b)” (p. 136).
negotiated among all the participants in discussion, on the basis of empirical material and literature while the written aim and goals of the research were established before and they changed during the process. Besides, multiple interests by the participant children and adults got negotiated between and during the video recorded situations. The lenses (Amorim, 2002) canalized the observation and led to different conceptions and interpretations of actions of the child or events related to the child, as well as interpretations about the focus and relevance of the study. Various questions were asked, such as: what is it possible to study with this data, what questions can one ask? What is this phenomenon and in what terms is it possible to talk about it? (Figure 15.)

Figure 15. The methodological cycle with various alternative routes after the recording session had occurred.
Expectations, notions, and observations alike were evaluated and the data collection was changed depending on the feedback received in the situations. After the situations, in case of surprises and conflicts of expectations and interpretations (of the situation), there were various alternative routes to take. The adults’ perception of what was going on in the situations and what the children were doing, were related to the adults’ conceptions of “what exists” and “how x that exists looks like.”

If the situation that occurred at the day care was not in line with the image of the child, learning or knowledge construction, either the image had to be changed, questioned, and re-elaborated or the collection of the material (setting, children, objects, or instructions etc.) needed to be adjusted to be able to record the events we were interested in.

There were attempts to canalize the children to visibly produce certain phenomena that would fit the image of the child. Because of this feedback from observable events, children and adults were also jointly transforming the boundaries of the phenomena of the focus of the study and in such a way directing the definition of the phenomena. All these redefinitions and adjustments were included in the process of data derivation. Figure 16 presents some of the main changes during the intervention (recordings) on the field. From learning focused approach the interests and discussions moved more towards what is occurring between children without clear definitions of what “play” or “learning” are about.
The study emerged in a context of projects related to the evaluation of the quality of the social services, attempting to apply ideas from ethnographic approaches and interpretative methods to study children in the field of early childhood education. It was involved with mathematics, the social construction of knowledge, and interaction as social psychological phenomenon. The difficulty to establish a dialogue among these different fields became obvious during a meeting in which some episodes from the day care centre were watched and discussed by three mathematicians. For the preschool teacher and the caregivers, children’s everyday worlds included reference to mathematics in the form of for example repetition of numbers and manipulation of objects of various sizes and shapes. For the professional mathematicians, on the other hand, the children’s nonverbal manipulation of objects was not enough to be interpreted as “mathematics.” The inclusion of the term “mathematics” and the following discussion was a reminder of how difficult it is among professionals in the field of education to escape from evaluating
children’s actions against a predefined scheme of the content areas addressed at schools later on.

After the recordings at the day care centre, various steps were also taken in the treatment of the material. Depending on the readings, discussions, and resulting theoretical lenses, the material was derived and treated differently at various points (Figure 4; Time 1). Transcriptions became more detailed or differently structured, tape recorded discussions gained more emphasis at some points etc. Figure 17 is an illustration of these movements occurring after the video recordings were finished.

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**Figure 17.** Illustration of various moments in data translation after the recordings on the field were finished.
As an example, the ways of transcribing the video material were related to data derivation in terms of promoting some observations and interpretations over others. As I already had the same sessions transcribed in columns, I could notice the differences in these two ways of translating the here-and-now events into writing. The columns visualized the temporal simultaneity, convergence, and/or divergence of the children’s actions, and the narrative form visualized the flow of the events from the point of view of the interlinkedness of the children’s actions and meanings emerging and being negotiated.

In general, during this study, the original interest from interaction among children shifted towards initiations from the adults, then to bidirectionality in negotiation among the participants, and finally to changes taking place during the research period.
11. CONCLUSIONS: FROM INTERACTION TO INTERACTIONS

“…people can inhabit quite different worlds in the same space”

*(Cherrington & Chamberlain, 2005, p. 11).*

During this study, one particular event was an important turning point for the theoretical and methodological construction and analysis. At the Brazilian research group (CINDEDI), I showed some of the video recordings and discussed the events with the researchers. Various questions were raised about the situation and the children’s behaviours. From the Brazilian researchers’ perspective, the situations appeared very different from mine. Indeed, for them, the children to be appeared very silent and restrained.

In Brazil – unlike in Finland, children are used to observe how adults use water without hesitations: e.g. in cleaning, water is thrown straight from a basin on tiled floors — unlike in Finland. Children take showers at day care centres and in some centres they have the possibility to play with water in showers outdoors. Water is a resource for refreshment, but also a resource with limits. The relation to water varies from one region to another and even between different families: it might be indeed restricted to a particular use only. Thus, in these discussions it became obvious that what I saw on the tapes, namely, children being and doing
things with water, is a socially and culturally structured and co-constructed phenomenon.

While water is a universal, natural source, any contact with water is socially and culturally regulated. Water is a necessity for survival, but it can also be dangerous and represent a threat (see e.g., Rinne-Koistinen, 2004). Around the world, 4,000 children die every day of diseases related to water and sanitation problems. One third of the world’s population inhabit areas with problematic access to water; this includes more than 125 million children under five years of age without access to a pure source of drinking water such as public standpipes or rainwater (UNICEF, 2006).

In Finland, children are used to the fact that water is available for use from the water faucets in kitchens and bathrooms. As Finland has more than 56,000 lakes larger than a hectare (Hallanaro, 2002) and a long coast line, children also live at a close distance from natural waters. Even if the practices in the families are varied, in general, children are used to have an easy access to waters (swimming, drinking, and washing). However, this access, water intake and manipulation, is selectively monitored and guided by the parents, caretakers, or older siblings.

In all the encounters with water, children develop their relation to it: they learn about it, they readjust their movements to it, and develop their attitudes towards it. More importantly, they learn about the cultural ways of being with it and the others’ relations to it as their usual contacts with water occur in the presence of others.

In this study, I investigated children’s interactions as spaces of construction where negotiation of constraints of actions, emotions, and meanings occur. The work focused on a microanalysis of the emergence of actions and meanings interlinked with the social, material, and cultural environment of these particular (research) situations. The situations included water as an element, as an object of interest, and a tool for actions.
The conceptual instruments I applied in this study proved to support one another in the analysis of the intervention embedded in multiple levels of interactions. Carvalho’s and Pedrosa’s elaborate work on young children’s interaction was useful to conceptualize and analyze in detail the microlevel of here-and-now processes of co-regulated construction of actions and meanings both between the children and among children and adults. The concept of abbreviation elaborated by Lyra, Silva, and Rossetti-Ferreira also turned out to be insightful. In addition, Fogel’s studies on the co-regulation of communication supported Carvalho’s and Pedrosa’s studies and the development of the conceptual structure.

The Network of Meanings perspective was a heuristic tool, a guiding theoretical and methodological framework for understanding and exploring the changing, multilevel phenomenon of meaning making with various participants, embedded and interlinked with a complex cultural, social, historical, economic, and material context. It gave insights not only for the analysis of the here-and-now flow of actions but also for a reflective analysis of the role of the researcher in data derivation and knowledge construction in this particular cultural process throughout the year during which the recordings were performed.

Valsiner’s concept of constraint was essential for finding a starting point for the analysis of the flow. Even though the Zone of Proximal Development (ZPD), following Vygotsky, has been applied to actions among children, the previous discussion on the ZFM and the ZPA has been based on mother-child interactions. Nevertheless, the zone concepts were fruitful to analyze explicitly the different intentions, initiatives, and suggestions the children negotiated among themselves that also canalized the flow of actions. Somewhat similar analysis would have been possible

\[27\text{In these works, the more acknowledgeable peer is assumed to take the position of the adult in providing the resources and assistance for development.}\]
also with e.g. the theoretical framework provided by Branco (1996; 1998), focusing on the negotiation of goal orientations. In this dissertation, I opted for the zone concepts and the notion of constraints as the literature related to them provided more support on how to include the adults in the analysis. With zones I was able to examine the bounded indeterminacy of the transformations of this case — the materiality of the intentions and expectations and the cultural canalization of actions, socially co-constructed, renegotiated, internalized, and externalized during this process. Moreover, the zone concepts provided insights in how to conceptualize and investigate the movements within and between the possible and the actual actions occurring.

According to the definition, the ZFM is a socially constructed cognitive structure. In the analysis, this was a challenge. At first, I paid attention to the physical setting and the adults’ instructions. Only after various readings and rewritings, some hints about the participants’ internalized conceptions of the possibilities and limitations started to emerge.

These theoretical tools provided means to examine different aspects of the real-life phenomenon studied here. However, all the theories applied are also complex and include divergences in emphasis. In exploring the link between these theoretical concepts and the flow of events in the here-and-now, field was a useful metaphor to discuss the complexity of the situation. What became relevant was to apply the plural regulations, instead of discussing a singular regulation among the changing elements of the interactional space; various regulations occurred simultaneously and even in conflicting manners. In addition to the here-and-now, the children’s behaviour was also regulated by the codes and meanings already established.

I found more useful to apply the theoretical notions of action (in context) than to enter into the wide discussion about play. (For reviews, see e.g. Karimäki, 2004; 2005). The children moved constantly in the intersection and boundaries of playfulness, play, and non-play in all the
sessions, even within the same events or moments. Thus, the focus of the study was moved intentionally from particular actions with water (as to be considered a play with some conceptualization) to all kinds of uses of water and objects provided in the situations.

In this study, childhood is not conceptualized as a preparatory stage to adulthood. Instead of discussing either children or adults as more acknowledgeable participants than the others, the focus has been on the negotiation of conceptions, intentions, expectations, and meanings. All the participants are engaged in learning, observation, discoveries, and meaning making: novelty (for all participants) emerges in the flow of actions. Both the adults and the children developed in co-regulated actions.

In addition, children should not be considered as similar in their perceptions and personal senses derived in the situations. All participating children had their own, subjective yet socially co-constructed relation to the negotiations taking place in the particular situation. Each child has a particular history and point of view. Besides, in this case, the adults’ initiations were not similar to Martti and Heidi, as discussed in the analysis. Related to these different positions, both children selectively transferred and internalized particular parts of the co-constructed semiotic system to a part of their personal culture. Furthermore, this internalized personal culture reorganized both children’s action fields in slightly diverse ways.

One of the crucial problems in educational applications and scientific knowledge about children concerns the attempt to understand children’s perspectives by mapping children together as a homogeneous class. One could ask if a change in perspective is required: instead of “us,” adults, and “them”, children, the goal should be to understand the perspectives brought together in action. Similarly to adults, children negotiate various worlds together in every day situations — the intentions and expectations by adults, the intentions and initiatives by other children, the physical
and symbolic affordances by the physical environments, just to name a few of the elements.

A particular image of the child was emphasized at the beginning of this project: a child who plays, enjoys and is creative rather than a child who refuses, withdraws, or remains silent (for a critique of this image, see e.g., Lancy, 2002). The goal was first to study how children are, not what they should be or are about to become. This is a posture emanating from the critique of mainstream developmental psychology, where children are assessed and compared to a figure of normality at a certain age or developmental stage (Burman, 1994). Throughout this study the unified image of a child and an adult in relation to children, was replaced by various images, and the aspect of becoming gained another emphasis. Thus, the study is developmental, focusing on the microprocesses of emergence.

On the basis of this particular intervention, one is able to underline the importance of a reflective analysis of the practices and research carried out in day care centres. One can ask: what kinds of behaviours are afforded or hindered at the day care centres? What kind of various, ambiguous, and maybe even conflicting rules and constraints are there, and how are these concretely present in the practices? Can some practices aiming at improving children’s participation hinder the adults’ perception of the children’s initiations and attempts to engage the adult?

Many projects are dedicated to improve the living conditions of the children of the world. Sociological studies play an important role in providing information about the situation and historical and cultural setting of the every day life of a specific child. However, this knowledge should be complemented with information about the child’s specific ways of perceiving, acting, and interacting in different situations. The way even a very young child is engaged in constructing meanings in her/his every day life may differ surprisingly from the assumptions of the politicians, researchers, and professionals working with children, sometimes even the parents. Similarly to adults, children negotiate
among various worlds in every day situations — the intentions and expectations of the adults, the intentions and initiatives of other children, the physical and symbolic affordances of the physical environments, just to name a few of the elements.

Further questions have emerged during this work. Even though I discuss the nonverbal communication and embodied meanings emerging in children’s actions, this study does not consider them in details. Various contemporary theoretical-methodological works could provide interesting routes to elaborate the work further. For example, Soffer (2001) and Burkitt (2003) both offer phenomenological methodology and the idea of embodied perception of Merleau-Ponty as an answer to the problems of social constructionist emphasis on language and discourse as taking place between persons. Similarly, works by Hermans and Kempen (1995, p. 103) on dialogical action “add another significant dimensions to the study of psychology and culture: the role of the body in human action.”

While this work aims at providing a reflective theoretical-methodological discussion and criticism to the mainstream of (non-developmental) child studies, some of the challenging questions could be still developed further. Curt (1994) and Stainton Rogers, Stenner, Gleeson, and Stainton Rogers (1995) formulate well the questions that should be introduced in relation to all works with children: How to do child psychology that does not take child as a decontextualized biological being? How to do child psychology that is both sensitive to the knowledge constructed historically, but also self-reflective and critical to the positions and dominant discourses in knowledge production?

This study presents one step towards a reflective, participatory practice in qualitative research. With further multi- and crossdisciplinary collaboration and critical discussions among all the participants, these questions could be addressed in a more elaborate manner in works that investigate children’s everyday experiences together with a reflective analysis of childhood as a socially constructed phenomenon.
REFERENCES


& A. M. A. Carvalho (Eds.), Rede de Significações e o estudo do desenvolvimento humano (pp. 69-81). Porto Alegre: ArtMed.


Rainio, A. (Forthcoming, 2008). From resistance to involvement: Examining agency and control in a playworld activity. Accepted for publication in Mind, Culture and Activity.


Gender and education in the global, local and transnational world conference, June 2-4, 2004, Helsinki.


Qualitative Forschung in der Entwicklungspsychologie. Kölner Studien Verlag.


APPENDIX

Appendix 1

Number of abstracts encountered (18 keywords), three databases.

<table>
<thead>
<tr>
<th>Key words</th>
<th>PsycIN</th>
<th>ERIC</th>
<th>SosAb.</th>
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<tr>
<td>Interaction AND dyads</td>
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<td>Peer AND coordinated action</td>
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<td>2</td>
<td>-</td>
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<td>Play AND toddlers</td>
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Appendix 2

Criteria for literature review selection.

<table>
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<tr>
<th>If the study is related to child(ren) 0-4,5-years old.</th>
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<tbody>
<tr>
<td>Excluding the ones in which focus is on psychopathology, psycho diagnostic, testing, assessment, screening, or diagnosis of developmental disabilities, therapy, or intervention. Studies of Theory of Mind (unless discussed in relation to pretend play). Also excluding mother-child interaction, childrearing, or social coaching, contribution of attachment security to social adjustment, assessment of social competence, teacher ratings, teacher-child interaction (unless the teacher is interacting with more than one child), caregiving by adults.</td>
</tr>
<tr>
<td>OR/AND</td>
</tr>
<tr>
<td>Nursery school, day care, or preschool as a context and focus of the research on children. Also kindergarten if the children’s age is under four years. Excluding same as above; teachers’ and adults’ perceptions, interview with children or task performance measurement (unless related to play or interaction).</td>
</tr>
<tr>
<td>OR/AND</td>
</tr>
<tr>
<td>Videorecordings, observation or/and microanalysis as a method and focus on children.</td>
</tr>
<tr>
<td>OR/AND</td>
</tr>
<tr>
<td>Development of children less than four years, related to interaction. Excluding same as above.</td>
</tr>
<tr>
<td>OR/AND</td>
</tr>
<tr>
<td>Focus on children’s interaction or play. Excluding same as above; teachers’ or parents’ understanding, children older that 4,5 years (unless methodologically related), promoting positive interaction, intentional teaching, training or developing motor, social, cognitive, emotional, or literacy skills or play behaviour by teachers.</td>
</tr>
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</table>
Appendix 3

List of tape recorded discussions during the year.

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>8/24/1998</td>
<td>Heidi’s and Lasse’s mother, Martti’s mother, and the researcher watch the first tape (8/13/1998)</td>
</tr>
<tr>
<td>9/15/1998</td>
<td>Heidi’s and Lasse’s mother, Martti’s mother, and the researcher watch the previous tape (8/24/1998)</td>
</tr>
<tr>
<td>9/15/1998</td>
<td>Mikko’s mother and the researcher watch the previous tape (8/24/1998)</td>
</tr>
<tr>
<td>9/24/1998</td>
<td>Heidi’s and Lasse’s mother, Martti’s mother and the researcher watch the previous tape (9/15/1998)</td>
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<tr>
<td>10/2/1998</td>
<td>The teacher and the researcher watch the tape recorded during that day (10/2/1998)</td>
</tr>
<tr>
<td>10/2/1998</td>
<td>Heidi’s and Lasse’s mother and the researcher watch the previous tape (9/24/1998)</td>
</tr>
<tr>
<td>10/14/1998</td>
<td>Eetu’s mother and the researcher watch the previous tape (10/2/1998)</td>
</tr>
<tr>
<td>10/14/1998</td>
<td>Heidi’s and Lasse’s mother, Jaakko’s mother, and the researcher watch the previous tapes (10/2/1998, 10/14/1998)</td>
</tr>
<tr>
<td>10/28/1998</td>
<td>Eetu’s mother and the researcher watch the previous tape (10/14/1998)</td>
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<tr>
<td>11/2/1998</td>
<td>Jaakko’s mother and the researcher watch the previous tape (10/14/1998)</td>
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<tr>
<td>Date</td>
<td>Event</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------------------------------------------------------</td>
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<tr>
<td>11/2/1998</td>
<td>Two teachers and the researcher watch the tape recorded during that day (11/2/1998)</td>
</tr>
<tr>
<td>12/18/1998</td>
<td>Discussion with mathematicians, professors, and teacher trainers about the recorded situations</td>
</tr>
<tr>
<td>2/10/1999</td>
<td>The teacher and the researcher watch the tape recorded during that day (2/10/1999)</td>
</tr>
<tr>
<td>2/19/1999</td>
<td>The teacher and the researcher watch the tape recorded during that day (2/19/1999)</td>
</tr>
<tr>
<td>3/3/1999</td>
<td>The teacher and the researcher watch the tape recorded during that day (3/3/1999)</td>
</tr>
<tr>
<td>3/10/1999</td>
<td>Heidi’s and Lasse’s mother and the researcher watch the previous tapes (2/10/1999, 2/19/1999, 3/3/1999)</td>
</tr>
<tr>
<td>4/22/1999</td>
<td>Three teachers and two researchers discuss the Water project and the recordings</td>
</tr>
</tbody>
</table>
Appendix 4

Transcription conventions.


? question mark indicates raising intonation
xx:x colon indicates stretching of sound it follows
"xxx" " signs indicate decreased volume
XXX capital letters indicate increased volume
= equal marks indicate contiguous utterances (i.e. no pause between the utterances)
( ) parentheses indicate inaudible utterance or the transcriber’s doubt about hearing a passage
(.) period within parentheses indicates micropause
(2.0) number within parentheses indicates length of pause in approximate seconds
[ ] brackets indicate overlapping utterances
- hyphen indicates unfinished word
(( xxx )) material within double parentheses are transcriber’s comments or notes about the situation