Children’s health and developmental delay
Children’s health and developmental delay: Positive functioning in every-day life
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Abstract


The general aim of this thesis was to gain understanding of what patterns of child and environmental characteristics that promote and sustain health and positive functioning of children with and without developmental delay or disabilities. The focus was on promotion of strengths and competencies rather than on prevention on risk factors, with an emphasis on children’s functioning in everyday life. Both cross-sectional and longitudinal studies were conducted on representative samples of children.

In Study I, participation in school activities were used as an outcome of positive functioning of children with disabilities. The findings indicated that autonomy, locus of control, child-peer interaction, and availability of activities were most influential in relation to participation in a pattern of child and environmental factors. No significant difference was found across groups in type and degree of disability. Study II was conducted to gain knowledge of how young children perceive health. The interviews revealed that children perceived health in a multidimensional perspective, well represented by the health dimensions of ICF. The children largely related consequences of health to engagement. In Study III, engagement was used as an outcome of children’s interaction with their natural environment. The focus was to describe how children with and without developmental delay, divided into homogenous groups according to a pattern of child-environment factors, engaged in developmentally appropriate behavior in their preschool and home environment. Groups of children with different patterns showed similar outcomes of engagement. Children with developmental delay were represented across groups, implying that developmental delay was less of a factor by itself influencing level of engagement. Study IV was longitudinal and the aim was to identify pathways of children’s engagement over time of children with and without developmental delay. Child-peer interaction seemed to promote high level engagement, while developmental delay only showed to be influential of low level engagement over time if combined with behavior problems. Children without developmental delay or behavior problems were met with greater teacher responsiveness, and at the same time teacher responsiveness predicted stable patterns of high level engagement or change to higher level engagement over time.

The general finding in this thesis supported a multidimensional perspective of health and positive functioning, in where developmental delay and disability is viewed as a function of child and environmental characteristics. The results are discussed in a systemic perspective, in where the role of the delay or disability, as of other factors related to health and positive functioning in the child-environment system, is determined by a multitude of factors. The dynamic and nonlinear character of children’s development makes it difficult to predict children’s future functioning from isolated factors, such as disability or developmental delay. Thus, a disability or developmental delay only becomes a risk factor of health, when combined with other risk factors that decrease children’s functioning in everyday life.

*Keywords*: health, positive functioning, participation, engagement, children, developmental delay, disabilities, health promotion, person-oriented, longitudinal

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Publications

The thesis is based on four original papers. Further on they will be referred to by their Roman numerals.


II. Almqvist, L., Hellnäs, P., Stefansson, M., & Granlund, M. (accepted). ”I can play!”: Young children’s perceptions of health. Pediatric Rehabilitation.


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Introduction

Children’s Health

Most people, including parents, researchers, practitioners, and people in general, would probably agree that enhancing children’s health and development should be one of the most prioritized objectives in our society today. We all wish to give children the best possible start in life, the best possible development, and the best possible outcome at any point in life. This notion constitutes the foundation for this thesis, what child- and environment characteristics can be identified to ensure the best possible life for a child born in our society today? Are these characteristics the same for children with and without developmental delay? Thus, the aim of this thesis is to gain knowledge and insight in the processes and outcomes of health, conceptualized as positive functioning, for typically developing children as well as for children with developmental delay.

Overview

In industrialized societies, children’s physical health has been largely improved during the last decades. Using universal comparable measures of health such as mortality rates we can clearly see that children are experiencing much better health circumstances today than earlier. Infant mortality in Sweden has decreased to 3.1 per 1000 live births and is expected to continue to decrease, partly explained by improved neonatal care and better health promotion and preventive care for mothers, infants, and children (Boström & Persson, 2001). The health situation for families and children has also largely been improved by a focus on immunization, regular health screenings, better information about nutrition, and general family and child policies making it possible for parents to give their children a good start in life.

Health, however, is nowadays defined in much broader terms than as optimal physical functioning independent of any disease or disability. A person may have a disease or disability and still be considered healthy (Seeman, 1989). The World Health Organization stated already in 1946 that “health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity” (WHO). This definition has been criticized for being too idealistic and unachievable. Health has also been viewed in functional terms, as a resource for living, not the object of living (Ottawa Charter for Health Promotion, 1986). One of the priority aims in the Health For All vision (HFA) of the World Health Organization (WHO, 1999) is to give all people the opportunity of a
high quality of life throughout their entire lifespan. Further, WHO states its view that people’s welfare is related to the degree to which their health permits them to participate in and benefit from every-day life. This functional perspective has been adopted by several organizations and institutions among others the American Board of Children, Youth, and Families (Shonkoff & Phillips, 2000). This organization defines health as “the extent to which individual children or groups of children are able or enabled to develop and realize their potential, satisfy their needs, and develop their capacities that will allow them to interact successfully with their biological, physical, and social environments!”. This is consistent with holistic perspectives of health that view it as the ability to realize personal life goals or at least to feel in control of every-day life (Dines & Cribb, 1993; Nordenfeldt, 1995; Schneider, 1991). It is also consistent with Target 4 for WHO’s HFA project where it is stated that by the year of 2020 young people in Europe should be healthier and better able to fulfil their roles in society: “children and adolescents should have better life skills and the capacity to make healthy choices” (cited in WHO, 1999, p. 28).

Although the majority of children in Sweden and many other countries experience better physical health, psychosomatic problems, such as anxiety or low self-esteem, have become increasingly more common among young people in Sweden since the 1980’s (Janson, 2001; Köhler & Berntsson, 2002). Nearly a fourth of all children in Sweden today complain about daily psychosomatic problems such as headaches and stomach aches. These kinds of problems seem to be twice as common among children in families with lower socio-economic conditions and in families where the parents are less satisfied with their life. At the same time, social and economic inequalities are becoming more apparent in almost all countries in Europe (Swedish Public Health Report, 2001; WHO, 1999). A comprehensive effort by families, communities, and society as a whole must be made to continue promoting children’s health in a broader perspective directed towards positive functioning in every-day life.

There are several reasons why a particular emphasis should be given to children’s health and health promotion, both in their own right and as future adults (Köhler, 2004). First, children constitute a considerable proportion of the population and yet are a vulnerable group in the society, dependent on adults for support and security. Second, the health condition of children mirror the country’s general social standard and constitute the foundation for the allocation of resources within the country. Third, the knowledge, attitudes, and behaviors towards health issues, and the basic health conditions in childhood lay the foundations for future health
and well-being. Last, following the UN’s declaration of children’s rights, all children have “a right to survival and development” (Article 6), and a “right to enjoy the best possible health and a right to medical care and rehabilitation” (Article 24) (Save the Children, Sweden). Some of the reasons are directed towards children’s future as adults, as people who create better lives for themselves, their communities, and their societies. But, children are not only future adults, they are children just for the sake of being a child. Children’s health, thus, has its own present value and should not only be considered as important in relation to what children can do in the future.

Health promotion

Health efforts have traditionally focused on the prevention of negative outcomes rather than on the promotion of positive outcomes. The rationale behind this is not difficult to understand. Children who are at the greatest risk can be targeted for intervention services with resources directed towards these specific risk groups (Pollard & Rosenberg, 2003). Prevention programs are easier to evaluate because of the large base of multiple problem indicators in both earlier literature and assessment instruments. Outcomes are then often measured in terms of school achievement or adjustment, which are available relatively soon after the program has been implemented, at least for older children and adolescents.

Health promotion is a much more difficult task to evaluate due to the lack of indicators in assessment instruments. It usually takes much longer time to evaluate, and we seldom know the outcome until the children have reached adulthood (Pollard & Rosenberg, 2003). Additionally, to promote health for children it is necessary to know what the aims are. What are the strengths and abilities that are most important for children to be able to function and realize their potentials? It is also essential to know how environments should be facilitated to ensure the best possible health outcomes for children. On the other hand, the focus on health promotion does not imply that health prevention is not necessary. Rather, the difference between health promotion and health prevention is that health promotion could be targeted towards the whole population of children without specifically targeting a certain risk group, while health prevention most often are targeted towards such specific risk groups. Thus, the two approaches are complementary.

Another rationale behind advocating health promotion work is the importance of recognizing the strengths and potentials that hinder problems from occurring. Even if most children who start life under adverse conditions have rather positive outcomes there is little knowledge
of long-term consequences in different areas of development and functioning (Masten, 2001). Whether or not cumulative effects of risk factors are predictable for a negative outcome is an object of interest both among practitioners and researchers in the field of early childhood development (Garbarino & Genzel, 2000; Sameroff & Fiese, 2000; Zhao, Brooks-Gunn, McLanahan, & Singer, 2000). Risk factors tend to co-occur, such as an occurrence of an early problem or risk factor leads to changes in children’s every-day functioning, probably making children more vulnerable to other risk factors (Rutter, 2000; Zhao et al., 2000). Some researchers argue that these early experiences help to add on additional experiences, not only in the specific area, but in a multiple of areas (Zigler, Taussig, & Black, 1992). Early functional problems, such as in self-regulation, not considered before a child starts preschool or school can grow to a greater problem when the child experiences difficulties in peer interaction, extending to other areas of functioning such as development of social competence. It is, however, important to notice that the absence of risk factors probably is not a sufficient predictor of future positive functioning (Klebanov, Brooks-Gunn, McCarton, & McCormick, 1998). In a long-term perspective, strategies that focus on improving children’s general strengths and competencies early in life might have more general effects on children’s health and development than prevention strategies trying to prevent further effects of a certain problem that has already occurred.

Within psychological research the largest emphasis has been on developing methods and strategies to repair what has gone wrong or reduce the impact of adverse circumstances or risk factors. Very little attention has been given to studies about health enabling conditions in normal people’s every-day lives. Two of the contributors to a new movement within psychology, named positive psychology, are Martin Seligman and Mihaly Csikzentmihaly. These researchers and others suggest a shift from a “repair” or risk-based perspective of psychology towards a “nurture” or strengths-based perspective (Seligman & Csikzentmihaly, 2000; Pollard & Lee, 2003). According to Seligman and Csikzentmihaly, (2000) positive psychological features are present on different levels. On the individual level subjective experiences in the past such as well-being and life satisfaction, cognitions about the future such as optimism and hope, and perceptions about the present life situation such as happiness, influence health. On group level positive psychological features involve concepts such as participation in community and society life. Thus, enhancing health and positive functioning among children have implications on many different levels, from the individual child to the
society as a whole. In this thesis positive functioning as a concept is derived from the ideas behind positive psychology, focusing on possibilities of a positive outcome rather than risks for an adverse outcome.

**Positive functioning**

Positive functioning is an umbrella term, capturing several related concepts, such as participation, engagement, and well-being. These concepts are all used in some meaning when describing people’s positive functioning in every-day life. Research and practice emphasising positive functioning by the use of these concepts have in common that the goal is to identify and promote factors that enhance people’s overall health and well-being. Ryan and Deci (2001) discuss two perspectives of positive functioning and well-being. The hedonic perspective is thought to represent subjective well-being and perceptions of pleasure and happiness, or “what makes experiences and life pleasant or unpleasant” (Kahneman, 1999). The eudaimonic perspective, on the other hand, equals well-being and positive functioning with human flourishing and the realization of one’s true potential or as in Aristotle’s words “doing what is worth doing” (cited in Ryan & Deci, 2001, p.145). Ryan and Keyes (1995) introduce the concept of psychological well-being. They theoretically and operationally define aspects linked to psychological well-being, such as autonomy, personal growth, self-acceptance, life purpose, mastery, and positive relatedness, and argue for a relation to both physical and emotional health (Ryff & Singer, 1998). Positive functioning for children is probably not only about pleasure or happiness in the current moment. Development and learning are intrinsic goals in children’s every-day life and thus positive functioning for children must capture aspects of self-realization and striving for competence (Ryan & Deci, 2000). In this thesis, positive functioning is viewed in a eudaimonic rather than a hedonic perspective and is defined as high, rather than low, participation in every-day life.

A complex interplay between personal and environmental characteristics determines people’s functioning in every-day life. Thus, positive functioning is a relative concept, implying that children function differently in different environments and situations. On a continuum the negative end of functioning could be viewed as maladaptive functioning, in the middle adaptation to normative and environmental demands, and in the positive end exceeding those demands and expectations (Kazdin, 1993; Reilly, 1996). Similar to what Wolery, Brashers, and Neitzel (2002) discusses in relation to an ecological congruence model of competence,
maladaptive functioning or non-performance of functional behaviors should not be considered as lack of competence. Children can show maladaptive functioning due to lack of motivation or interest or due to poor matching of environmental demands and constraints. Further, people’s functioning could be dimensional and differ according to system level. Children’s functioning and behavior can be adaptive in the family environment, but be considered maladaptive in the preschool or school environment (Hodges, Bickman, Ring-Kurtz, & Reiter, 1992; Summerfelt & Bickman, 1994). Positive functioning is probably most likely when children’s strengths and competencies match a nurturing and just right challenging environment.

Positive functioning does not represent total absence of illness, disability or other problematic circumstances, rather it is the presence of functional capacities and opportunities in spite of limitations due to illness, disability, or adversity (Ryan & Deci, 2001, Heron, & Goddard, 1999). Factors found in the literature as influencing positive functioning are perceptions of belonging, control, and basic life satisfaction (Cowen, 1991; McLoughlin & Kubick, 2004) as well as factors viewed as resilience promoting, such as autonomy, problem solving skills, social competence, and self-esteem (Cowen, Wyman, Work, & Parker, 1990; Garmezy, 1985; Rutter, 2000). Such general competencies probably promote both current and future functioning of children independent of initial conditions and characteristics, such as disability, developmental delay, or social adversity. Resilience promoting factors are also present in children’s natural environment, represented by family cohesion, warmth, and the absence of discord, as well as availability of external support in meeting challenges in every-day life (Garmezy, 1985). Rutter (2000) argues that such resilience promoting factors are continuous, in that the absence of autonomy or social competence is risk factors while the presence is protective factors. Even though positive functioning is not equal to the total absence of risk factors, the balance between functional limitations and functional capacities and opportunities might be the most important influence on the outcome.

Many concepts representing different aspects of positive functioning have emerged in the literature. Even though the concepts are consistently defined in most studies they are sometimes difficult to distinguish from each other. The multidimensional characteristic of concepts representing health and positive functioning makes them necessary to carefully define, specifically when they are related to outcome expectations (Granlund & Björck-Åkesson, 2005; Magnusson & Stattin, 1998). One means of defining a concept is to interview representatives of the group of people
Participation

Participation is emphasized in many political documents. Although, used in varying contexts it has been given the greatest attention in relation to service provision to children and youth with disabilities. Children’s participation in their natural environment are thought to enhance the development of general life skills and competencies and thus constitutes a basic influence of learning (Brown, Brown, & Bayer, 1994; Brown & Gordon, 1987; Fidler & Fidler, 1978) and quality of life (Felce & Perry, 1992; King et al., 2003; Raphael, Brown, Renwick, & Rootman, 1996; Schalock, 1990). Definitions of participation differ with context and rationale for use, but usually relate to the definition used in ICF, “an individual’s active engagement in his or her life situation” (WHO, 2001).

Similar to other constructs representing health and positive functioning, participation is a multidimensional concept. Based on a survey of 700 students with disabilities Eriksson and Granlund (2004a) distinguished four dimensions of participation, (1) perceptions of engagement and motivation, (2) behavior and activity, (3) information about contingencies and physical availability of niches, and (4) environmental prerequisites. Participation as actions, to be engaged, actively focused and interact with
other people is objectively consistent with the definition of participation provided in ICF, and the other dimensions form prerequisites for action needed to be fully engaged in one’s life situation (Eriksson & Granlund, 2004a; WHO, 2001).

Granlund and Björck-Åkesson (2005) describe concepts, such as participation, as general competence outcomes. General competence requires a range of different skills useful to handle situational demands and challenges in every-day life. What factors that are contained in participation is dependent on the respondent’s age and role (Eriksson & Granlund, 2004a). While young children emphasize activity, engagement, and interaction, such as to play and be with friends, older children emphasize the possibility to take active part, to feel that you belong to a context, and to be able to influence the environment, for example in a peer group. Older students and adults emphasize the ability to make choices and decisions for themselves and to take active part in societal life, such as to be able to decide where to live, and to have responsibilities in the society. Both perceived availability of environments and situations as well as the active engagement of the individual is emphasized (Bronfenbrenner, 1999).

**Engagement**

Whether a person is participating or not is not an entirely observable phenomenon. Although many different definitions of participation exist, common to most are the emphasis on the individual perception of motivation and engagement (Paldanius, 1999). Thus, measures of participation require a subjective statement of how a person feels about a certain situation (Björck-Åkesson & Granlund, 2004; Perenboom & Chorus, 2003). For young children or children with severe disabilities this is of course a problem, since self-reports are difficult or sometimes even impossible to obtain. One way to deal with this problem is to observe children’s engagement behavior in their natural environment. Participation and engagement has shown to be closely associated, specifically for young children (Almqvist, Granlund, & Eriksson, 2004). Engagement is a measure of how children spend their time interacting with their environment and has been emphasized as a facilitator of children’s learning and development in a range of areas. Besides a subjective dimension of motivation and engagement, participation is about being actively engaged in every-day life. For young children, to be active and engaged mostly means to play and interact in a supportive and encouraging environment. By adding measures of environmental prerequisites engagement is valid as a measure of participation of young children. Engagement has frequently been
defined as “the amount of time children spend interacting appropriately with the environment at different levels of competence” and concerns the observation of sustained behavior over time, how children actually use their time in a cumulative fashion in a manner that is expected in relation to their developmental status and the specific situation they are involved in (McWilliam & Bailey, 1992, p. 234). It has been widely used as an outcome measure of intervention programs and child care quality (Krantz & Risley, 1977; McWilliam & Bailey, 1992, 1995; McWilliam, Trivette, & Dunst, 1985). There are several rationales to emphasize young children’s engagement in relation to health and positive functioning. First, engaged children are considered advantageous in development and learning in comparison to non-engaged children (Buysse & Bailey, 1993; Jones & Warren, 1991; McWilliam, Trivette, & Dunst, 1985; McWilliam & Bailey, 1992, 1995). Developmentally appropriate interaction with the environment and the teaching strategies that promotes such interaction constitutes optimal circumstances for numerous response and learning opportunities. Second, a fairly large amount of time spent in high-level engagement behaviors reduces the possible amount of time to spend in low-level and problem behaviors. Finally, the promotion of engagement addresses a humanitarian obligation, similar to the UN’s declaration of children’s rights, to enhance children’s well-being and quality of life through stimulating and moderately challenging environments (Skinner, Fletcher, & Henington, 1996).

Children’s health and positive functioning in a systems perspective

Systems theory directs its attention toward relations. When using systems theory to explain interpersonal relations, a system means a collection of components that interact with each other in a reciprocal manner during a sustained amount of time (Capra, 1997). Systems theory recognizes that health is affected by the individual as well as of external systems, such as the family, school, community, and the society as a whole. The links between the different components of the systems and the quality of the interaction between the systems develop and maintain its functioning over time (von Bertalanffy, 1968; Capra, 1997). Each system must be operating well in order for a person to achieve the best possible outcome. Thus, one of the basic assumptions of systems theory is that phenomena within and across systems interact and are influenced by each other in a dynamic and reciprocal manner.
The understanding of a social system is impossible without knowing how the different parts in the system work. Neither is it possible to understand how the individual parts in the system works without knowledge of the entire system (Wachs, 2000). All the components, their characteristics and interpretations of behavior and actions within the system constitute an entirety. When changes occur in parts of the system, the whole system will be affected in the same way that parts will be affected by changes in the whole system (Bronfenbrenner, 1979; Capra, 1997). What initiates a process and maintains it over time varies. A psychological factor, such as motivation, may start a physical process, such as learning to walk, that is maintained over time by a psychological factor, such as the perception of control. This continuous process of interaction between the developing child and the environment influences current and future functioning (Magnusson & Stattin, 1998). Thus, knowledge of the whole system as well as of its parts is crucial, implying that concepts used in research about health and positive functioning must be consistently defined and operationalized in relation to the system(s) in focus.

Homeostasis is an important aspect of systems theory in relation to health and positive functioning. Homeostasis refers to balance among the various parts of the system, also called equilibrium (Gochman, 1997). This balance is achieved by either increased or decreased activity. To maintain balance and optimal health over- or underactivation of the systems should be avoided. Besides trying to balance the system, all systems strive towards an endpoint (von Bertalanffy, 1968). This endpoint or outcome could be reached from initially different starting points, equifinality. The same process of trying to obtain balance in the system can also affect the end point differently, multifinality. A change in the amount of activity in one part of the person-environment system will probably cause changes in activity in other parts of the system that will either disrupt or re-establish balance in the total system.

In a systems perspective, health and disability appears be a function of opportunities and abilities, activity and function, as well as perceptions and emotions. Health could be viewed in terms of a reserve, as a balance between risk and protective factors, a state of psychological and physiological well-being, and the ability to function and act regardless of challenges in every-day life. Disability, on the other hand, could be viewed as restrictions and limitations within the child-environment system, disrupting or lowering the possibilities for health and positive functioning in every-day life. Many different models and theories have emerged based on systems theory assumptions. These theories and models can be applied
to different parts of child development, health, and positive functioning dependent on what phenomena that is emphasised.

An ecological model of child-environment interaction

Within an ecological model factors of importance to health and positive functioning are present on different levels depending on age and other life circumstances (Bronfenbrenner, 1979; Cowen, 1991; Magnusson & Stattin, 1998). The influence from different system levels is indirectly present from birth, but becomes more apparent with increased age. While the interaction with the family system on a microlevel has the largest impact on an infant, the development of health and positive functioning for a toddler is also affected by the mesosystem relations between the different microsystems, such as between the preschool and the family. With increased age, community life and the opportunities to participate in leisure activities and local decisions on an exolevel become more important and eventually also vital conditions in the society, on a macrolevel, that have important implications for positive life opportunities and independence (Bronfenbrenner, 1979; Rappaport, 1991).

Although environmental influences are emphasized in ecological models children are the main concern in a nested system of proximal and distal environmental influences. A basic assumption within this view is that individuals are active, purposeful agents in an integrated, complex, and dynamic system (Bronfenbrenner, 1999; Magnusson, 1990; Magnusson & Stattin, 1998). Development and functioning, however, are not only a matter of interaction between the child and the environment. Magnusson and Stattin (1998) argue that developmental processes, besides being influenced by the external environment, are also a matter of continuous, reciprocal interaction among different mental, biological, and behavioral factors within the individual. The experiences children receive in specific situations are thus influenced by both external and internal processes. This complexity must be addressed in research and intervention aimed at promoting individual development and functioning.

According to the ecological model what is meaningful to an individual is not only the observable environment, but the subjective perception of how to make use of the environment. Participation and engagement is possible if the characteristics of the environment match the characteristics and experiences of the individual. Strengths, such as reciprocity, understanding, and motivation are developed in interaction with other people, objects, and symbols in what Bronfenbrenner (1999) in his extended bioecological model calls proximal processes. Proximal processes are developmentally promoting interaction marked by continuity, reciprocity,
and duration and are considered one of the most salient processes in children’s psychological and social development (Bronfenbrenner, 1999; Wachs, 2000). Within these proximal processes children with individual differences in personality, temperament, behavior style, and social competence are judged within existing norms and triggers positive or negative reactions from parents, teachers, and peers (Sontag, 1996). These reactions and actions are assimilated into new working models or niches, which form the basis for how children act and react in future situations (Emde & Robinson, 2000; Piaget, 1952).

In this thesis the ecological perspective represents the theoretical base for child-environment interaction and the processes and outcomes involved in children’s health and positive functioning.

**A transactional model of children’s early development and later functioning**

There is a shared consensus among developmental researchers that child development is a reciprocal and dynamic process (Bronfenbrenner, 1979, 1999; Magnusson & Stattin, 1998; Sameroff & Fiese, 2000; Wachs, 2000). According to the transactional model behavioral outcomes are the mutual effect of context on child and child on context (Sameroff & Fiese, 2000; Simeonsson et al., 2003). Equal emphasis is placed on the effects of the child and the environment, where experiences provided by the environment are dependent on the child’s earlier experiences and characteristics. It is important to distinguish transactions from interactions, in which interaction means that different children react differently to similar environments while transaction means a reciprocal interrelationship between the child and the environment, with the child influencing the environment and the environment influencing the child over time (Wachs & Plomin, 1991).

Children’s development and behavior is seen as a product of the transactions between the phenotype (the child with its characteristics), the environtype (the interplay between the child and the environment), and the genotype (the source of biological organization). The environtype operates through environmental and cultural socialization patterns. A central theme in the model is that children’s natural environments change dramatically from infancy to adolescence (Simeonsson et al., 2003). Changes in the transactional process frame the development of increasingly complex skills involving actions and reactions of the physical and social environment. Each of these environmental stages influences children’s development and behavior through stimulation and feedback.
In the transactional process the system tries to regulate and maintain balance through protective and risk factors and the impact of resilience factors. This is illustrated in Figure 1. Protective factors represent possible moderators of risk and adversity that enhance the probability of positive outcomes (Rutter, 2000; Werner, 2000). It has been argued that protective factors do not have a large impact until the child is exposed to one or several risk factors (Rutter, 1987). Resilience factors, on the other hand, are often defined as processes that enable the child to maintain balance under the influence of risk and adversity (Werner, 2000). An example of a transactional process could be if a child is born into a family of loving and caring parents with a large supportive social network (protective factors), in a couple of years the parents divorce (risk factor), although this is a major life situation for the child, he or she is able to cope with it rather well and use parts of the families informal network (grandmother) for support and security (protective factor) that for the moment is not sufficiently given by the parents. The balance between risk and protective factors could then be considered a resilience factor. Although the impact of this risk occurrence early in life is unpredictable the probability is rather high that the developmental outcome for this child will be positive. It has been argued that through a life span transactional process it is the balance between risk and protective factors that determines a possible outcome (Garbarino & Genzel, 2000). The dynamic and reciprocal child-environment transactions influence children’s future pathway of development and functioning, and are thus, particularly important to pay attention to in an early phase of the life span.

In this thesis the transactional perspective is used as a frame for understanding how early transactional processes between children and their natural environment influence health and positive functioning over time.

Figure 1. A transactional model of the influence of protective factors, risk factors, and resilience factors in children’s development and functioning. From Simeonsson & Bairrao, May 2006; Adapted from Sameroff & Fiese (2000).
Health and positive functioning for children with disability or developmental delay

Functioning is a relative concept in that what is positive or adaptive in one situation or context can differ. Children with disabilities, developmental delay, or long term illnesses face greater challenges in everyday life, with increased risks of functional limitations in a variety of situations and contexts in comparison to typically developing children.

The prevalence of children with disability or chronic illness in Sweden, between 2 and 17 years of age, has been estimated to be about 13% (BO, 2004). In the age group between 0 to 6 years the prevalence is more difficult to assess, many children do not obtain a diagnosis until they reach school age. The Child Health Services (CHS) estimate that about 7 to 10% of young children have some kind of long term disease or disability (Hagelin, Magnusson, & Sundelin, 2000).

A child with developmental delay is generally considered a child that shows slower than expected learning in one or more areas of development, in relation to typically developing children (Bernheimer & Keogh, 1982, 1986). In contrast to a disability, a developmental delay is not always diagnosed. The prevalence rate of children with developmental delay is difficult to report and reported figures tend to be more or less adequate. The terminology to name these children also differs. In some reports they are just named children in need of special support, no matter why they need this support and sometimes the word “greyzone” children have been used, because these children are not typically developing, but still do not have an established diagnosis. Gallimore, Keogh, and Bernheimer (1999) argue that the prevalence rate of children termed children with developmental delay probably will increase as the criteria’s for the label is defined.

During the last century there has been a large increase in the number of children with difficulties in certain areas of health and functioning, such as speech and language or reading and writing difficulties, in Sweden and other countries. According to the Swedish Child Ombudsman (BO, 2004) children with severe reading and writing difficulties are now about 5 to 10% of all children in Sweden. If milder reading and writing difficulties are counted as many as 20% of all children are included. The number of children with speech and language difficulties is increasing in Sweden, partly as a consequence of the immigration of people from other countries. Long term diseases such as diabetes, allergy, and asthma are becoming increasingly more common among children, with asthma now being the most common chronic illness (Janson, 2001). The number of
children with neuropsychiatric disabilities, such as ADHD has increased. Researchers in the area of attention, motor activity, and perception problems estimate that at least 5% of all children starting school in Sweden have impaired activity control, motor control, and perception (Gillberg, 1999). The causes for the increased prevalence of children with problems are dependent on multiple genetic, biological, and environmental factors. Although, children presenting early risk factors do need special attention, it is probably the same strengths and competencies found in all children that need to be promoted to facilitate health and positive functioning for children with disabilities, developmental delay, chronic illness, or other problematic circumstances.

The developmental progress of children with disability or developmental delay is commonly viewed as atypical, but whether this atypical development represents a qualitative difference from typical development or only quantitative lags in development is still an ongoing debate. Zigler (1969) argued that the cognitive development of children with mental retardation follows the same structure and sequence of development as that of typically developing children. On the other hand, Inhelder (1968) argued that there is a “false equilibrium”, a fixed level of cognitive development for children with mental retardation and that this level is dependent on the severity of the disability. Up to this level, Inhelder argued, children with mental retardation progress in the same sequence and structure as typically developing children, although this progression is delayed. According to this view, it would not be possible to expect the same outcome of health and positive functioning for children with certain types of disability or developmental delay as for typically developing children.

A functional perspective of functioning, disability, and health

Over time, different models of disability have been influential in explaining the individual consequences of a disability or disease. In a medical model the disability is perceived as a problem within the individual, caused by injury or disease. In a social model the disability is considered a social problem caused by exclusion from the society (Siméonsson, 2006). In the broadened biopsychosocial model attempts have been made to integrate biological, psychological, and social aspects in a coherent model of health and functioning (Engel, 1977). This view is consistent with contemporary theories of development and emphasizes the interplay between the developing person and the environment. The International Classification of Functioning, Disability, and Health (ICF) is based on this biopsychosocial model (WHO, 2001). According to the
model, whether a person is healthy or not is a result of multiple factors possibly leading to multiple effects. The components of Body structure, Body Function, Activities/Participation, and Environmental Factors can be used to identify relevant factors associated with health and functioning for all people, not just people with disabilities. In the development of a children’s version of ICF (ICF-CY) the child-environment interaction is largely emphasized (Simeonsson et al., 2003). The mediating role of developmental and environmental factors in relation to children’s health and disability is considered, in where functional limitations and capacities are viewed as consequences of an interaction between the developing child and his or her environment. The ICF-CY could be of great use to build a multidimensional view of what is needed to promote health and positive functioning independent on diagnosis or disability profile.

As an answer to the question why there is an emphasis on participation as a key component in determining whether a person should be considered disabled or not, Simeonsson (2006) introduces “a functional model” of disability. According to this model disability is a matter of functional limitations mostly in the participation/activity dimension. These limitations are influenced by multiple biological, social, and environmental factors. This is consistent with the arguments made by Patrick, Bush, and Chen (1973) that health is the performance of social and physical activities and the value of preference attached by the society to those activities, in conjunction with physical symptoms and prognoses. With the use of the functional ICF model emphasis is moved from the body level to the interplay between the person and the environment and the limitations resulting from this interplay. Stein (2006) argues that children with asthma, or children living in poverty, as well as children with Down’s syndrome or cerebral palsy, could be considered disabled if they experience large functional limitations in their daily lives. Children with other personal characteristics and experiences but similar conditions might not experience the same functional limitations. A study of black and white non-hispanic children showed differences in functional limitations in participation and activity, with limitations more frequent in the black children (Newacheck, Wong, Galbraith, & Hung, 2003). When controlling for poverty, however, the differences disappeared. Although, there is a rooted tendency to classify people according to race, gender, disability status, and age, reviewed studies show that such classifications do not give sufficient information to predict functional limitations in participation and activity. A functional model of disability is thus applicable to children in many different situations and conditions, and an initial classification or diagnosis is not necessary to
determine what factors that needs to be strengthened to obtain health and positive functioning.

Still, procedures to assess young children’s development make use of standardized tests measuring children’s cognitive, language, and motor skills in comparison to normative values. In Sweden, these assessments are made regularly at the Child Health Services (CHS) beginning with the birth of the child. Deviations from typical development are rated as the number of standard deviations from normative values (Hagelin et al., 2000). The assessments are made by a nurse at the CHS with the participation of one or both parents. This is done to ensure a functional perspective on the assessment, which cannot be fully met in a clinical observation of a child’s development. This is consistent with Simpson, Colpe, and Greenspan (2003) who argue for functional measurement of development. In this perspective, age related functional capacities such as attention, physical development, and purposeful interaction are focused. When viewed in functional perspective, children with developmental delay as other children, develop functional capacities and actions through increased learning, experience, and maturity, although the process of developing these capacities and actions could differ from that of typically developing children (Stein, 2006).

**Measuring health and positive functioning**

**A person-oriented approach**

The development and functioning of a person can be conceptualized as a holistic and multidimensional process, in which each specific aspect of development and functioning has a role in how it contributes to the total functioning of the person (Bergman, Eklund, & Magnusson, 1991; Bergman, Magnusson, & El-Khoury, 2003; Magnusson & Stattin, 1998). This implies that the developmental process is partly specific to individuals, making attempts to predict developmental outcomes difficult. It is impossible to study all specific aspects of development and functioning in all individuals. Therefore, a thorough definition has to be made of what part of individual development that is to be studied and how that part contributes to the total functioning and development. Bergman and Magnusson (1991) have argued that when viewed at a more global level it is possible to find a number of common types sharing similar circumstances and characteristics. Although the developmental process to a large extent is individual it is probably possible to find at least partly homogenous groups or patterns of individuals that could be used to describe a certain aspect of development and functioning.
The main focus in this thesis is on children’s health and positive functioning and what personal- and environmental factors contribute to their participation and engagement. With this focus health and positive functioning can be viewed as a multidimensional pattern of interrelated factors (Bergman, Eklund, & Magnusson, 1991). This pattern of factors, rather than the factors per se, contributes to the outcome.

Two different methodological approaches are distinguished in developmental research, the variable approach and the person approach. Research on individual development has to a large extent been dominated by variable-oriented methods and data treatment (Bergman, Magnusson, & El-Khoury, 2003). This method involves correlational studies of associations between variables and predictions about future functioning in different regression models, many in which the search for causal relations are a basic motive. In a variable oriented approach problems are being formulated in terms of statistical relations among variables, often with an insufficient analysis of the phenomenon of which the associations are assumed to represent. It is assumed that by studying an aspect or a change in one part of development, one can make predictions about development and functioning in the whole person. The person-oriented approach, on the other hand, is more interested in individuals and their total pattern of functioning, than of a summation of variables thought to represent development and functioning. As stated in Bergman, Magnusson, and El-Khoury (2003) “It is individuals, not variables that develop.” According to this approach individuals can be categorised on the basis of different patterns or profiles, each representing a subtype with certain homogenous characteristics thought to represent a certain aspect of development and functioning. These patterns or profiles of children with homogenous characteristics can then be analysed as variables, described, compared, and followed over time by the use of different variable-oriented approaches. It is essential, however, to point out that neither of these approaches excludes the other. The variable oriented approach probably provides stronger predictions of a specific outcome than a person oriented approach, but the latter may contribute to a better understanding of the developmental processes leading to an outcome of interest (Magnusson, 1988). The variable approach and the person approach are, thus, complementary, but yield somewhat different answers to questions about individual development.

**A longitudinal design**

In a person approach it is logical to assume that an understanding of the developmental process requires a longitudinal design. First, different
factors on different levels influence development and functioning of an individual over time (Bergman, Magnusson, & El-Khoury, 2003). These factors play different roles in the process and differ in significance, over time. Second, analyses of stability and change in developmental processes, evaluations of outcome effectiveness in intervention, and causal inferences cannot be made without following individuals over time.

Developmental processes are characterized by two distinct concepts: change and time. Change and time are not interchangeable. A process that over time does not have an impact on the development of the child is not change, even if it occurs over a long time. This has implications for the planning of a longitudinal study and how often the measurements have to be made. Bergman, Magnusson, and El-Khoury (2003) argue that both change and time have to be considered in relation to the focused phenomena. In this thesis a sample of children has been followed between two time points with a one year interval.

In this thesis, positive functioning has been defined as participation and engagement. Participation has been defined in this thesis as a person’s involvement in his or her life situation (WHO, 2001) and engagement as developmentally appropriate interaction with the environment (McWilliam, 1991). Factors such as control, autonomy, interaction, attention, play, activities, and availability have been used to define the process of engagement and participation, together with child-environmental characteristics such as school or preschool environment, and family environment. The studies in this thesis aimed to gain knowledge on how certain patterns of engagement or participation and related constructs contribute to the process of health and positive functioning, both in a current perspective and over time.

**Engagement and engagement related constructs**

As previously stated engagement and participation are multi-dimensional concepts that can be described on a continuum from person to environmental characteristics. Concepts related to engagement and participation can also be described along this continuum. Central themes in all these concepts are activity, learning, and interaction in the natural environment.

**Learning within the natural environment**

Children's natural environments usually consist of settings which are normally available to all children at a certain age, whether having a disability or not. Examples of natural environments for young children
are the home and preschool environments, and for older children additionally the school and peer group environment. Research of children’s learning in natural environments has to a large extent been concerned with the concept of activity settings. An activity setting has been defined as “a situation-specific experience, opportunity, or event that involves a child’s interaction with people, the physical environment, or both, and provides a context for a child to learn about his or her own abilities or capabilities” (Dunst et al., 2001, p.70). According to Dunst et al. (2001) learning is a circular process that builds on four components: interests, engagement, mastery, and competence. In this circular process (Figure 2) each component promotes the other (Chen, Krechevsky, Viens, & Isberg, 1998; Gelman, Massey, & McManus, 1991; Guberman, 1999; Mandler, 2000).

Positive functioning is promoted in this process of natural learning opportunities. The elements provided in the natural environment support the children in the process by giving continuous feedback and reinforcers that help children develop self-regulation abilities over time and decrease their dependency of specific elements in the environment. In a supportive environment, with adults that can help children to regulate or modulate the level of challenge and develop goals that are challenging but still reachable, children’s motivation and interest to be engaged in activities with higher complexity is promoted (Eccles, Wigfield, & Schiefele, 1998; Lubinski & Benbow, 2000). Engagement at lower levels promotes engagement at higher levels, over time resulting in increased positive functioning. Accordingly, engagement can both be considered a part of the ongoing process of development and learning as well as an outcome at a specific point in time.

Figure 2. Activity settings as a source of interest-based and competence enhancing natural learning opportunities (Dunst et al., 2001).
Engagement

Early studies of engagement have mostly focused on engagement as participation in different types of activities (McClannahan & Risley, 1975). Recent research on engagement has broadened the emphasis on quantity of time to also study qualitative differences in complexity of behavior. Similar to modern perspectives of health, engagement is viewed as a continuous construct; most children are engaged a fairly large amount of their time, but there could be large qualitative differences in the type of behavior they display during that time. Both the focus of children’s behavior (engagement with adults, peers, or materials) and the level of the behavior, such as persistence, attention, problem solving, differentiated behavior/play, or nonengagement are of interest (McWilliam, 1995; deKruif & McWilliam, 1999). A varied picture of how children spend their time in their every-day environment could be obtained by studying both the quality and quantity of engagement.

Engagement in meaningful activities provides a base for engagement in more complex behaviors such as problem solving and persistence (McWilliam & Ware, 1995). Problem solving and persistence are behaviors that similarly have been used to define mastery motivation in research about different types of goal-directed behaviors (Messer, Rachford, McCarthy, & Yarrow, 1987). The difference between mastery motivation and engagement is that engagement captures several kinds of behavior, not only specific goal-directed behaviors. During a day, children spend time in a lot of different types of behavior, from non-engagement to problem solving and persistent behavior. As children engage in more complex behaviors the frequency of social engagement with peers also increase (Blasco, Bailey, & Burchinal, 1993; deKruif & McWilliam, 1999; McWilliam & Bailey, 1995). The developmental change lies in how much time is spent in high-level engagement behaviors, such as problem solving, compared to low-level engagement behaviors, such as attention. Even though it is important for children to be engaged in high-level behaviors, a greater amount of total time spent in different kinds of behavior, in combination with increased chronological and developmental age, will promote behaviors with higher complexity.

Several behaviors, such as attention, that in some studies has been considered low-level behaviors, have not been consistently defined in the earlier literature. Some researchers have argued that children who are more competent in processing information about what is going on in a situation do not merely watch and listen, but act instead (Ruff & Saltarelli, 1993). Other researchers have reported a positive relation between children’s attention and competence, both in a current perspective and in
relation to future academic performance (Palisin, 1986; Ruff, 1988). In this view, children’s attentiveness is thought to provide them with new information about the environment and a solid base for further competence (Ruff, 1990). Depending on how it is defined and what role it takes in children’s developmental process, attention could be considered a high-level behavior or at least a behavior that is appropriate if combined with a range of other engagement behaviors.

There are large differences among children in the amount of time and the type and level of their engagement. Children with disabilities spend less time than children without disabilities in high quality engagement behaviors, and more time passively engaged with adults (McWilliam & Bailey, 1995). It is, however, not likely that the disability by itself is the sole influence on level of engagement. Engagement is a multidimensional concept dependent on a pattern of interacting factors in which disability or developmental status is only one of many. McCormick, Noonan, and Heck (1998) found that children with and without disabilities showed similar levels of appropriate engagement and argued that these results occurred because of the high match between the choice of sensitive and responsive activities that built on children’s interests and developmental abilities. To promote children’s engagement it is, thus, necessary not only to know what the risks are for low engagement, but also what sources of influence that make children more engaged, whether they have a disability or not.

**Mastery motivation**

Motivation is one of the influences contributing to children’s continuous experiences of engagement. An emphasis on motivation and engagement is common to most definitions of participation (Paldanius, 1999). Motivation has been defined as the amount of reinforcers that is expected from reaching a goal (Martens & Witt, 2004). These reinforcers could be both intrinsic and extrinsic and stimulates children’s further interests and motivation to learn new skills. Specifically, social rewards have shown to influence the development of further motivation (Jennings & Dietz, 2003).

Interest and motivation in learning spur developmentally appropriate behaviors, such as exploration, problem solving, and creativity, thought to increase the probability of engagement (Dunst et al., 2001; Piaget, 1981). Hunter and Csikzentmihaly (2003) found that children that are motivated and interested in their every-day life situations seem to perceive themselves better able to control what is happening to them, reflecting a strong internal locus of control. Over time, the dependency of extrinsic
reinforcers changes to more intrinsic reinforcers and the circular process of positive functioning (illustrated in Figure 2) become more self-regulating, less dependent on the activity setting. Sheldon and Elliott (1999) have argued that self-concordant goals that fulfil basic every-day needs and that emanate from an intrinsic motivation have much stronger impact on health and positive functioning than goals that are set up by someone else. Thus, children’s intrinsic motivation and interest to be engaged appear to be an initial reinforcer for continuous engagement which in turn is a reinforcer for higher levels of engagement and mastery.

Mastery motivation concerns children’s intrinsic motivation to explore, understand, and control their environment (Hauser-Cram, Warfield, Shonkoff, & Krauss, 2001; MacTurk & Morgan, 1995; Turner & Johnson, 2003; White, 1959) and has been defined as “a psychological force that stimulates an individual to attempt independently, in a focused and persistent manner, to solve a problem or master a skill or task which is at least moderately challenging for him or her” (Morgan, Harmon, & Maslin-Cole, 1990, p.319). Numerous developmental researchers have suggested that the ability to meet challenges and be persistent in trying to reach a goal influence children’s engagement, independent of disability or developmental status (Ruskin, Mundy, Kasari, & Sigman, 1994). Mastery motivation has been related to competent behaviors such as task persistence and self-efficacy and is by definition closely related to high complexity engagement behaviors, such as problem solving and persistence.

As argued by Jennings and Dietz (2003) engagement in goal-directed behaviors might not be sufficient or even necessary to ensure positive functioning, but the probability is higher for children who have developed autonomous ways to control themselves and master their natural environment than for those who have not. Children who are frequently engaged in differentiated behavior have been found to be more developmentally mature and rated by their teachers as more engaged in competent and persistent behavior than children who are less engaged in differentiated behavior (deKruif & McWilliam, 1999). The results of several studies indicate that higher levels of mastery behaviors measured during the infant and toddler period predict higher levels of cognitive competence during the following 1 to 2 years (Messer et al., 1986). In addition, Hauser-Cram et al. (2001) found that mastery motivation predicted growth in developmental age and mastery of daily routine activities, such as dressing or feeding oneself. Thus, the ability to meet challenges and engage in goal-directed high complexity behaviors
promotes children’s autonomy, making it easier for children to function in varied environments.

Autonomy for children has been conceptualized in terms of self-regulation, defined by how children perceive activities and tasks to be self-chosen (Bridges, 2003). The more children perceive tasks to be self-chosen and have a self-perceived value the higher levels of autonomy. Several studies have revealed that children’s opportunities to make choices influence their participation and engagement in activities (Ostrosky & Kaiser, 1991; Whaley & Bennett, 1991). Elementary- and middle-school students self-reports of autonomous forms of self-regulation have been positively associated with self-reported engagement in school. This concerned both ages and intrinsic self-regulation was also positively associated with teacher-reported student engagement (Connell & Wellborn, 1991). Ryan and Connell (1989) examined the association between children’s perceptions of their teachers and classroom environment as being either autonomy enhancing or controlling, and its association to their engagement in school. They found that children who described their classrooms as autonomy enhancing were rated higher in observed and intrinsic self-regulation.

Wehmeyer, Kelchner, & Richards (1996) describe autonomy as being dependent on personal interests or/and abilities and free from external influence or interference. Mastery motivation as task persistence has been related to autonomy in later childhood (Bridges, 2003). Several studies have revealed that the more children rely on their capabilities, the better they are able to handle challenging situations (Dweck & Leggett, 1988; Klein-Hessling, Lohaus, & Ball, 2005) and to seek feedback (Dweck & Leggett, 1988). Young children who show high levels of task persistence because of intrinsic motivation and experiences of positive feedback continues to be explorers of their environment and seek new challenges. While autonomy seems to be important in relation to self-chosen and self-valued activities, the ability to control one’s every-day situations, whether in preschool or school, seems to influence children’s expectations of themselves and their belief that they can make a difference in their life (Skinner, Zimmer-Gembeck, & Connell, 1998). All these concepts, engagement, mastery motivation, persistence, control, and autonomy are interrelated. Perceptions of autonomy arise out of experiences of effectively being able to control the environment (Bridges, 2003). These experiences are difficult to assess or define for young children, thus the predominant approach to examine autonomy for young children is as persistence in exploration and play. Specifically, persistence at tasks that provide moderate, developmentally appropriate challenges are thought to be related to
mastery or intrinsic motivation and the development of autonomy. Engagement not only promotes learning, but is connected with persistence (Brown & Cohen, 1996). Persistence has been linked to mastery motivation in both typically developing children and in young children with moderate and severe developmental delays (Hupp & Abbeduto, 1991).

**Child-environment interaction**

*Child-peer interaction and play*

Children’s health and positive functioning seems to emanate from the every-day experiences they have in their natural environment. If children could choose for themselves they would probably play a lot more than they often have the opportunity to do. Play is mostly associated with friends and positive relationships. In such play situations children learn to take initiatives, try out new strategies, and make decisions (Janson, 2004; Sheridan & Pramling Samuelsson, 2001). During the preschool years children’s social skills increase extensively and become more sophisticated. Children can become more involved in pretense and symbolic play and are no longer as dependent on specific objects in the physical environment, such as toys or a proper play ground, to be able to create stimulating play situations for themselves and their peers (Howes & Matheson, 1992). This implies that the properties of the physical environment need less structure when children move up in ages. In fact, too much structure seems to be associated with low levels of engagement with peers for typically developing children (Cole, Meyer, Vandercook, & McQuarter, 1986). Children’s social relationships as well as their self-regulating abilities seem to over time become more influential for children’s every-day experiences than specific characteristics of the environment.

In earlier literature disability or developmental delay has been considered a risk factor for limitations in children’s social interaction with peers and other play situations. Limitations in play often emerge due to differences in availability of play situations. Indeed, children with disabilities or developmental delay have been found to participate in fewer group play situations with peers than typically developing children (Guralnick & Groom, 1985; Shonkoff & Phillips, 2000) and to interact more with teachers (Buysse, Goldman, & Skinner, 2002; Harper & McClusky, 2003; Hestenes & Carroll, 2000; McCormick et al., 1998). There is no evidence, however, that this difference is due to the disability or delay by itself. Both children with and without disabilities have shown to be more engaged with peers in small group, child-directed activities compared to adult-directed large group activities (McCormick et al.,
The structure of the activities in the natural environment appears to have a large influence in how young children are able to interact with peers, whether they have a disability or not.

The environmental prerequisites for children to be socially engaged with peers include both physical and social availability (Janson, 1999). For children to be able to enter into a play context they have to have access to the activity, interpret the situation, adapt to normative rules of behavior, confirm what the other children are doing and try to contribute to the common activity (Guralnick, 1992). It has been shown that young children who are late speakers do have more problems in play situations (Gertner, Rice, & Hadley, 1994; Guralnick et al., 1996; Hadley & Schuele, 1998). Magnusson and Stattin (1998) argue that children’s interaction with peers is influenced by characteristics of the peer group such as communication system, culture, attitudes, developmental status, and behavior. Similarly, research has shown that children prefer to play with other children who are emotionally and cognitively compatible and who share their play preferences (Odom & Diamond, 1998; Rubin et al., 1994). It is as important to emphasize the social availability as the actual physical availability to promote children’s social engagement.

Often teachers and parents have a much greater control and impact on the learning process of children with disabilities or developmental delay than of children without disabilities or developmental delay (Goodman, 1992). Giving children too much attention and trying to control their every-day activity, influences their ability to take initiatives of interaction with peers, to maintain an interaction, and to handle conflict. Teacher attention has been shown to restrain engagement with peers for children with disabilities (Chandler, 1991). In addition, Hamilton (2005) showed that children with disabilities had fewer opportunities to respond to peer interactions. The effect of the disability on social engagement could be mediated by the attitudes and extent of control of teachers and parents.

**Child-teacher interaction and teacher responsiveness**

What parents and teachers value as vital for children and how they try to create an environment that stimulates their social interaction are sources of influence on children’s engagement. Specifically, teacher sensitivity seems to be an essential feature for children’s engagement or participation in preschool or school (Bronfenbrenner, 1979; Pianta, Steinberg, & Rollins, 1995). Child-teacher relationships play a significant role in the development of a wide range of behaviors in early childhood, such as emotional development, self-regulation, intellectual performance,
and language development (Hofer, 1994). Research has shown that teacher's interactions with children in preschool vary from being responsive and sensitive to being directive and controlling (McWilliam, deKruif, & Zulli, 2002). Responsiveness is characterized by quick responses to children's needs or leads, flexibility, and adaptation to children's personality styles, as well as elaboration of children’s behaviors (Cavallaro, Haney, & Cabello, 1993; Marfo, 1992; McWilliam & Bailey, 1992). Teacher’s responsiveness has been associated with children’s abilities to take initiatives in social interaction with peers.

The sensitivity and responsiveness of the teachers towards children are influenced by the children’s characteristics and behavior (Sameroff & Fiese, 2000). Teachers seem to prefer interaction with children who respond with more positive affect and avoid interaction with children that respond negatively or do not show much response at all (Bugental, 1992; Shonkoff & Phillips, 2000). Positive mood and attention towards adults have been reported to have strong empirical associations with children’s engagement behavior, but that these characteristics are mediated by teacher’s interaction (deKruif, McWilliam, & Ridley, in press). Children have shown better ability to respond to adults when there is a close matching between adult’s requests and children’s current activity (Mahoney & Neville-Smith, 1996). Children were also more responsive towards adults when teachers followed children’s leads aimed at or below their developmental level, and did not put too much pressure on the child.

Children with developmental delay or behavior problems tend to have more vulnerable relationships with teachers and are more frequently met with unresponsiveness from adults (Guralnick, 2005). Much of the behavior, that teachers find difficult to handle and annoying, however, could be related to certain phases in development and actually be normative behaviors. Toddlers that strive for autonomy and self-dependence often appear to show disobedience and discipline problems (Crockenberg & Litman, 1990). In the early literature on autonomy, Spitz (1957) argued that the ability and tendency to say “no” to adults is “one of the most spectacular and semantic achievements during early childhood” (p.99) and is a notion of young children’s increasing awareness of the self and the others. At the same time children at a certain developmental age may have more difficulties in handling transitions and reorganizations that may appear as management difficulties and negative mood (Campbell, 1990). Children who are perceived by their teachers as having behaviors and a personality style that is adaptive according to normative demands probably are met with greater sensitivity and responsiveness by their teachers.
There is an urge among parents, teachers, and other professionals to force learning and development in certain controlled directions to a much higher degree for children with disabilities than for typically developing children. This is based on a concern that if children with disabilities are allowed to spend too much time in spontaneous and uncontrolled activities they will not learn necessary skills needed to promote their development and positive functioning (Mahoney & Wheeden, 1999). The assumption is that children with disabilities have to be guided through experiences that will stimulate their development and participation in a manner that will enhance their competence (Wolery, Strain, & Bailey, 1992). The arguments against this approach is that the skills acquired in highly controlled and structured learning situations seldom become part of children’s repertoire of general competencies (Kaiser, Yoder, & Keets, 1992). Another argument against this approach is that children in general have shown less motivation and engagement when teachers are controlling and directive.

The opportunity to make choices and decisions, respected by caregivers and teachers, has been shown to increase the degree of motivation (Ryan & Deci, 2000; Schwartz, 2000). Similarly, studies have shown that teacher directiveness is negatively associated with children’s initiations of engagement, implying that children are not as motivated to take initiatives if the teacher is the one that controls the situation (deKruif, McWilliam, Ridley, & Wakely, 2000; Mahoney & Wheeden, 1999). Numerous studies have shown that learning within the natural environment and in play situations is most effective in a long-term perspective (Warren, 1992; Warren & Kaiser, 1988; Warren et al., 1993). The tendency of parents and teachers to control and direct the learning and development process for children with disabilities might have the opposite effect by preventing children from acquiring general competencies and motivation that are necessary building blocks for higher level engagement. This does not, however, imply that teachers should not be involved and engaged with children. Research has shown that children are more attentive and participate in more activities when teachers are more affectively involved in the interactions with the children (McWilliam, Scarborough, & Kim, 2003). Additionally, McWilliam et al., (2003) argued from their findings that teacher’s interaction styles can exceed any effects that developmental level and children’s typical engagement style might have on observed behavior. Specifically, providing information that children could use for more differentiated engagement has been found to increase children’s motivation to continue exploration and engagement in activities (McWilliam et al., 2003). One of the key components for optimal learning
opportunities for children with disabilities or developmental delay as well as for all children seems to be the ability of teachers to be involved and affectively responsive towards children without being too directive and controlling.

**Engagement enhancing natural environments**

The interrelations between a person and the environment are both objective and subjective in nature. Magnusson and Stattin (1998) distinguish between the environment “as it is”, the actual environment, and the environment “as it is perceived”, meaning how individuals construct and interpret the environment. This is in line with the distinction between shared and nonshared environments (Magnusson & Stattin, 1998; Shonkoff & Phillips, 2000). Shared environmental influences are perceived in a similar manner by children in the same environment and give them similar experiences. Nonshared environmental influences, on the other hand, are perceived differently by children in the same environment, thus giving them different experiences. Wachs and Plomin (1991) distinguish between organism-environment interaction defined as different individuals reacting differently to similar environmental stimulation and organism-environment covariance defined as different environments are provided to children with different characteristics. For example, even if teachers or parents provide exactly the same sources of stimulation to children, the children will react differently, according to temperament, age, earlier experiences, and other characteristics (organism-environment interaction). At the same time, there is a possibility that teachers and parents actually treat children differently due to temperament, age, earlier experiences, and other characteristics. This implies that child-environment interaction or child-environment covariance and sometimes a combination of both mediate the impact of the environment on development (Wachs & Plomin, 1991) making main effect models insufficient to reveal causal relations between the environment and child development. To be able to determine the impact of the environment on a child outcome it seems necessary to study the range of reactions to the environment within the group or sample of study, not just the overall objective ratings of the environment.

**The family as a context of positive functioning**

For most children the family is the primary influence on positive functioning in the early years. The family functions as a filter that modifies different kinds of information and influences, such as cultural and societal values, norms, and rules (Bronfenbrenner, 1999). The child uses this frame
of reference to interpret daily experiences in their natural environment. The relationship between the child and the parents is transactional, in that children’s behavior influence the attitudes and behavior of the parents and simultaneously the parents are influenced by the child’s behavior (Jose, Huntsinger, Huntsinger, & Liaw, 2000; Magnusson & Stattin, 1998; Melzi, 2000; Winsler et al., 1999). These transactional processes continue to influence the child and the family across the period of childhood and adolescence, although behaviors and attitudes change with age and development of the child.

The findings of numerous studies have shown that parent-child relationships as well as parenting beliefs and expectations strongly influence children’s engagement in high level behaviors and their perceptions of control in their own life situation (Deci & Ryan, 1985; King & Turner, 2001). Children’s early experiences of appropriate challenges, in a context of positive support and feedback from parents, appear to be the base for later engagement or participation.

As children grow older, the frame of reference expands to take in external influences and feedback, from the preschool environment and from peers. According to Bronfenbrenner (1979) the relationships between children’s natural environments is of crucial importance to children’s health and positive functioning. One such relationship that has been found is between the preschool and the family. This specifically concerns children living in families with other cultural and societal values, norms, and rules than what is present in their preschool. Bronfenbrenner (1979) has identified four linkages between the family and preschool or school environment of great concern for children’s positive functioning, (1) children’s participation in extended environments, such as preschool, (2) the contact between the parents and the extended environment, such as the teacher, (3) communication between the parents and the children’s extended environment in the form of an Individual Family Service Plan or a contact book that is supposed to follow the child between the different settings, and (4) shared knowledge about the children’s different settings, including teachers knowledge about family composition, values and culture, as well as parents knowledge about preschool values and activities. The Swedish National Agency of Education (2005), referring to guidelines in the curriculum about quality in the preschool that teachers should emphasize collaboration between the preschool and the family and develop strategies for continuous contact with the parents or caregivers. Further, they should consider the possibilities for parent participation in and influence on the preschool activity. By building linkages with children’s natural environments the socialization process probably
becomes more coherent and children have an easier task transferring information and experiences between the different environments.

The families extended environments do not directly influence children’s engagement or participation. When viewed in a transactional perspective, these extended environments have an indirect but probably rather large effect on children’s engagement or participation (Bronfenbrenner, 1979). Formal and informal networks can provide great support and strengths, specifically for distressed parents (Dunst, Trivette, & Jodry, 1997; King et al., 2003; Patterson & Blum, 1996). This support can be crucial in creating circumstances and conditions for the parents to provide positive early relationships and learning opportunities necessary for children’s future functioning. Duis, Summers, and Summers (1997) found that the support given to a family with children with disabilities was the strongest predictor for reducing family stress. Specifically, a strong informal network has been shown to promote a positive effect (Dunst et al., 1997). When parents have frequent access to positive support the children will indirectly benefit in terms of health and positive functioning.

Laws and regulations affecting children and families have impact both within the family system and for the family as part of a society. Parent’s beliefs in their own capability and their view of their children are related to such factors as economy, time, status, and other important frames of family functioning (Sameroff & Fiese, 2000). The interaction within the family is affected by such factors, and influencing elements important for child functioning could be how these factors are interpreted and judged within the family (Sontag, 1996). Distal and proximal environmental factors influence children indirectly by influencing the conditions for family life.

**The school and preschool environment**

Research and theory in child development and functioning have extended support for the fact that both the amount and diversity of stimulation in the environment is related to intrinsic motivation and increased competence (Piaget, 1952; White, 1959). The structural aspects of children’s physical environment, as well as characteristics of the learning process in the natural environment influence children’s development and learning. Activity settings based on individual children’s interests and existing competence could be described as a niche (Super & Harkness, 1999; Wachs, 2000). A niche has been defined as the nodal point between the child and the environment and constitutes “a pattern of activity roles and interpersonal relations in a face to face setting with particular physical and material features, and containing other persons with
distinctive characteristics” (Bronfenbrenner, 1999, p. 277). Thus, the niche is comprised of the individual child, the physical environment, and interpersonal characteristics. A niche is also part of a larger socio-cultural context (Wachs, 2000). The range of possible niches for children are dependent on how they perceive the availability of interesting and knowledge based activities in their natural environment.

Children’s perceptions of the available sources of stimulation in the environment, and their actual usefulness, are important in the development of niches. How children process information about the environment is dependent on earlier experiences and interpretations about the current situation (Magnusson & Stattin, 1998). These experiences and interpretations are assimilated into an existing working model or cognitive schema and constitute the base for how children will act in relation to environmental stimulation in the future. This means that the same objective situation is perceived differently by different individuals. Several studies have shown that children with disabilities do not perceive the same number of available interesting activities in their natural environments (Garton & Pratt, 1991; Lockwood & Lockwood, 1991) as other children do. Children with disabilities spend a lot more time in solitary play (Eriksson & Granlund, 2004b; Guralnick & Groom, 1985) and more time with adults (Eriksson & Granlund, 2004b) than children without disabilities. In a retrospective study of play memories, adults with disabilities reported that they actively searched for niches that matched their skills and earlier experiences and avoided new niches (Sandberg, Björck-Åkesson, & Granlund, 2004). If children with disabilities perceive restricted availability of activities and learning opportunities they are also likely to perceive restricted possibilities for niches. The long-term implications of this are that children with disabilities will experience fewer opportunities of participation and engagement.

Structural and process characteristics of preschool environments have been discussed extensively in research about preschool quality. Two types of quality dimensions have been distinguished, process and structural quality. Process quality factors are present on a micro level and represent children’s every-day experiences in preschool, such as interactions with teachers and peers, and the activities and materials with which they engage (Phillipsen, Burchinal, Howes, & Cryer, 1997). On a meso level the relationship between preschool and home environments represents a quality factor in the process (Bronfenbrenner, 1999; Phillipsen et al., 1997). Structural quality factors on a micro level are most often determined on an exo level and describe the external conditions of the preschool setting: the organization and available resources, regulations, teacher education/
training, teacher-child ratio, group size, the physical environment, economic and material resources, as well as teacher turnover, enrolment, and profits (Phillipsen et al., 1997). Structural factors are often directly or indirectly influenced by factors on a macro level, such as government regulations, centre policies, cultural characteristics, and/or economic climate. These macro level factors do not directly influence children’s every-day experiences in preschool, but they influence the structural conditions of the preschool setting through the policies and practices that teachers follow.

Research has shown some rather strong associations between process quality factors and desirable outcomes for children. Raspa, McWilliam, and Ridley (2001) for example, found that children in classrooms with fewer teacher-child interactions, lower levels of teacher affect, fewer teacher elaboratives, and more teacher redirectives spent more time in low level engagement behavior, such as unfocused attention or non-engagement. The outcome of quality for children seems to be related to how teachers use available resources and use the experiences of the specific child. This is in turn influenced by structural quality indicators such as teacher-child ratio, as well as teacher’s experience and training (Friedman & Amadeo, 1999).

**Disability or developmental delay in relation to engagement and participation**

**Disability**

Most literature on health and positive functioning of children with disabilities are based on diagnostic classifications or other specific characteristics (Granlund & Björck-Åkesson, 2005). This urge to classify children that share a common risk factor or diagnosis often lead to a circular reasoning in that what is found in a classified group of children is explained by the initial classification (Björck-Åkesson, Granlund, & Simeonsson, 2000; Florian et al., 2006). Typically, the associations between a specific diagnosis or type of disability and general outcomes affecting children’s positive functioning, such as participation and engagement, are moderate to low (Dunst, 1998; Guralnick, 1997; Wachs, 2000).

Although there are large variations in outcomes for children with disabilities there is substantial empirical evidence that children with disabilities perceive restricted opportunities of participation and engagement. A number of studies have found a lower degree of participation in school activities of children with disabilities (Eriksson & Granlund, 2004b; Simeonsson et al, 2001). Children with disabilities tend to participate in less varied activities than children without disabilities and spend more
time in lower level engagement activities than their typically developing peers (McWilliam & Bailey, 1995). Children with disabilities have shown more difficulties in social interaction with peers (Brown & Gordon, 1987; Guralnick & Groom, 1985; Meijer et al., 2000; Sillanpaa, 1987) and to be more passive than children without disabilities in the same situation and environment (Law & Dunn, 1993). Whether the disability in and of itself is a necessary prerequisite is questionable. With a biopsychosocial model of disability in mind the differences between children with disabilities and typically developing children are probably embedded in patterns of factors both within the child, the environment, and the interpersonal relations between the child and the environment. How such patterns should be configured to obtain health and positive functioning for children with disabilities as well as for all children is emphasized in this thesis.

**Developmental delay**

A developmental delay in one or more areas often has an impact on other areas of development. Campbell et al. (2003) showed that children with speech- and language delay frequently have delays in social and cognitive development. Cognitive delay and speech- and language delay are among the most common types of developmental delays of young children (Simeonsson, 2006). In addition, several studies have reported that a delay in cognitive development is more stable than delays in other areas (Bernheimer & Keogh, 1988; Gallimore et al., 1999; Shonkoff, Hauser-Cram, Krauss, & Upshur, 1992). Particularly, stability of cognitive delay has been found for girls (Gallimore et al., 1999). Several researchers have shown that as many as half of the children with speech- and language delay at the age of 2 years will not catch up with their peers at the age of 3 years (Paul, Spangle-Looney, & Dahm, 1991; Rescorla & Schwartz, 1990; Thal, Tobias, & Morrison, 1991) and that these children are at a higher risk of developing behavior problems over time (Baker & Cantwell, 1983; Campbell & Ewing, 1990; Gallagher, 1993).

Several studies have reported that children with developmental delay more frequently show behavior problems or lowered social interaction skills (Baker, Blacher, & Olsson, 2005; Bernheimer, Keogh, & Coots, 1993; Fantuzzo, Bulotsky-Shiare, Fusco, & McWayneb, 2005; Feldman et al., 2000; Cohen et al., 2005; Merrel & Holland, 1997). An increased risk of problems with mental health and social competence has been found for children with intellectual disability (Guralnick, 2005). Feldman et al. (2000) reported that as many as 42% of two-year old children with developmental delay were rated by their parents as also having behavior
problems. Additionally, the prevalence rate of children with behavior problems among the group of children with speech- and language delay has been estimated between 50 and 75% (Cantwell & Baker, 1987; Cantwell, Baker, & Mathieson, 1980). There seems to be a higher risk that behavior problems remain stable and become even more problematic over time for children with developmental delay in comparison to typically developing children (Bernheimer et al., 1993; Frisk, 1999; Shaw, Keenan, & Vondra, 1994).

Children's developmental delay or behavior problems, however, do not occur in isolation. Behavior problems are embedded in the context of family and preschool or school settings, and are affected by and influence these systems (Stattin & Trost, 2000). There is empirical support demonstrating the important role of affective child-family interaction in the social development of these children. Baker, Blacher, and Olsson (2005) reported a direct relationship between behavior problems and parental stress in families of both typically developing children and children with developmental delay. Thus, the delay in itself was not a primary factor contributing to the parents perceptions of stress. Additionally, Guralnick, Hammond, and Connor (2003) reported that families' perceptions of stress and control explained around 40% of the variance in children's social competence. Gallimore et al. (1999) reported from two longitudinal studies that there was a large variation in social competence among children with cognitive delay and that the cognitive delay did not significantly predict the development of social competence over time. The stability of the delay also differed with some children showing great progress in development, while others remained stable or even showed a reversed development. The children with a negative pathway of development were more likely to show behavior problems. In contrast, strengths such as engagement or participation have shown to buffer children from behavior problems (Bland, Sowa, & Callahan, 1994; Cohler, Stott, & Musick, 1995; Werner, 1995). In a study by Pinto, Poppe, and Bairrãö (in press) children's developmental age was not related to either focused attention or other low level engagement behaviors. Rather, children in a varied range of developmental age who were rated as less verbal, less emotionally expressive, or less adaptive spent more time either attentively watching others or in low level engagement behaviors. Similarly, deKruif and McWilliam (1999) found that children that were engaged in persistent behaviors were more likely to engage in high level engagement behaviors, regardless of developmental age. deKruif and McWilliam argued that the teacher's interactions with the children may have equalized typical age and maturity advantages in terms of higher level engagement.
This supports the argument that a developmental delay does not necessarily have long-term consequences for children when no other risk factors are present (Stattin & Trost, 2000). Rather, children with developmental delay in otherwise functional environments will have a higher probability of a positive outcome than typically developing children in dysfunctional environments.

The multidimensional characteristic of health and developmental delay

In this thesis, health and developmental delay has been viewed in a functional perspective, defined as positive functioning in every-day life. Positive functioning is determined by a multitude of factors, each of them with a specified, but dynamic role in the whole child-environment system. The role of each factor is influenced by changes in other parts of the system, as well as of functioning of the whole system. This complexity demands a multidimensional approach considering the interplay between factors on different levels in the child-environment system. What factors that are important depends on the characteristic of the outcome. A number of influential factors could be identified when the outcome is related to positive functioning. This does not mean, however, that all factors identified as related to children’s every-day functioning could, or should, be considered in a research design (Wachs, 2000). An outcome related to positive functioning demands a careful analysis of influential factors, how these factors could be measured or observed, and how they operate to influence positive functioning, in a current perspective and over time. In this thesis the factors thought to influence positive functioning were identified on both a personal and an environmental level. Specifically, child-environment interaction was emphasized.

What constitute positive functioning varies between systems and situations, implying that positive functioning should be viewed as adaptive functioning. Adaptive functioning, however, is by definition, positive. Much of the earlier research, involving children with developmental delay or disabilities, has found that these children do experience restrictions and limitations in every-day life. These restrictions have either been explained as limitations in body function or genetic predispositions, or as restrictions in the environment. Few studies have viewed children with developmental delay or disabilities in a functional perspective, focusing on what children actually can do, rather than what they cannot do. Naturally, a child with speech- or language delay cannot be expected to communicate verbally in the same manner as typically developing child-
ren. If the analysis is restricted to the deviance, surely there is a functional difference between children with speech- and language delay and typically developing children. In a multidimensional perspective, a child with speech- and language delay often find other ways to communicate, making attitudes, norms, and expectations of the environment more salient influences of children’s positive functioning than the delay by itself. If the goal is to communicate, there is no qualitative difference between this child and a typically developing child. Emphasis in this thesis has been on the interplay between the children and their environment and how children deal with the task of learning in their every-day environment.

Positive functioning in this thesis has been measured as children’s engagement or participation in their natural environment. Engagement and participation are closely related to children’s learning. Young children’s learning is commonly defined as a relatively stable change of behavior, often occurring spontaneously by children’s every-day experiences without any specific instruction or learning strategy. Learning and development is overlapping, but not the same. A certain level of development occurs even without external every-day experiences, due to biological maturity. Learning, on the other hand, requires engagement. Children’s engagement are largely determined by the interplay between the child and the environment, in where learning opportunities in combination with the attitudes, expectations, and values of the environment are as salient as personal factors such as children’s motivation and interest. Further, children’s every-day experiences influence their perceptions of themselves as active producers of their own environment (Bronfenbrenner, 1999). The engagement behavior of the child changes the expectations and behavior of the environment and the engagement of the child is in turn changed by the changed environment (Sameroff & MacKenzie, 2003). This transactional process of continuous learning implies that engagement or participation should be considered both as part of the process and as an outcome at a specific point in time. With increased development and learning through continuous experiences, the quantity and quality of engagement or participation is expected to increase. This implies that engagement in the process influence engagement as an outcome, but the construct of engagement do probably not have the same meaning at the two time points. Therefore it is feasible to use different levels of engagement to study the process and a higher level to study the outcome. Lower levels of engagement, such as attention to adults and children’s play with objects, are with increased experiences and maturity thought to influence higher levels of engagement, such as problem solving and persistence. The concept of engagement (McWilliam, 1991), used in this thesis as a
measure of children’s global engagement behavior, implies that engagement is not specific to a certain context or situation. The basic assumption in this thesis is, thus, that children who frequently engage in different types of behavior in their natural environment eventually will be more competent and motivated to learn new skills, thereby engaging in higher level behaviors.

Aims

The general aim of this thesis was to gain understanding of what patterns of child- and environment characteristics promote and sustain health and positive functioning for children with and without disabilities or developmental delay both in a current perspective and over time. This general aim was examined in four related studies.

Study I  The aim of this study was to identify patterns of child- and environmental factors thought to influence participation in school activities for children and youth with disabilities.

Study II  The aim of this study was to examine how young children perceive health and how these perceptions relate to the multidimensional model of health, ICF.

Study III  The aim of this study was to describe how the process variables of availability of activities, involvement in activities, and social interaction were related to engagement, for young children with and without developmental delay.

Study IV  The aim of this study was to investigate pathways of children’s engagement and if pathways of children with developmental delay differ from that of typically developing children.
Summary of Empirical Studies

Material

Outcome material

*Participation in every-day activities*

In this thesis participation was operationalized as frequency of the child’s involvement in every-day activities. The instruments for this assessment were adapted from an instrument developed by Simeonsson et al. (1999) to measure the degree of participation in school activities (Study I) or participation in preschool activities (Study III and IV). The original instrument was adapted for use by teachers, parents and students in a Swedish context. The questionnaire contains a list of items representing common school (25 items), preschool (42 items) or home activities (45 items). The scale consists of both structured and unstructured activities commonly present during a day. Examples of items in the school version are “athletics”, “crafts”, “outdoor play”, and “pupil’s council” and in the preschool version “object play”, “music”, “going to the park”, and “dressing oneself”.

Respondents were asked to check the degree of participation in the activity on a scale from 0-3 (0 = do not participate, 1 = seldom participate/participate to a low degree, 2 = participate sometimes/moderate participation, 3 = always participate/participate to a high degree).

Engagement

In this thesis engagement was used as a measure of the amount of time children spend in developmentally appropriate activities in their natural environment. For this purpose the Child Engagement Questionnaire CEQ was used (McWilliam, 1991). The CEQ originally contained 32 items and was designed to rate children’s global engagement. For this thesis 26 of the original 32 items were used. The CEQ has a four-point rating scale to record whether the child’s engagement behavior (1) almost never happens, (2) happens sometimes, (3) happens often, or (4) happens all the time. Examples of items were “the child tries new ways of playing with toys”, “the child tries to finish things, even if it takes a long time”, and “the child listens to the teacher”.

Process material

*Availability*

Availability of every-day activities was assessed using the same instruments developed by Simeonsson et al. (1999) as the ones measuring
participation in school activities or preschool activities. For examples of the items, see the instrument measuring Participation in every-day activities. Three versions of the questionnaire were used: availability of school activities, availability to preschool activities and availability of home activities.

Respondents were asked to check the degree of availability of the activity on a scale from 0-3 (0 = not available, 1 = minimally available, 2 = partly available, 3 = fully available).

**Interaction**

The questionnaires used in the different studies measuring interaction were originally developed by Granlund and Olsson for the use of parents and professional teams (1998), and adapted for use with students/children, teachers and parents by Granlund and Björck-Åkesson (2000). In the student version a questionnaire with 8 items was used asking the students how they perceived the interaction with their peers (e.g. “me and my friends are together as long as we like”) and 8 items of how they perceived the interaction with their teacher (e.g. “I can talk to my teacher whenever I want to”). Similarly, the teacher version was a questionnaire with 21 items of how the teachers perceived their interaction with the student or child (e.g. “I use a language that is appropriate for our interaction” or “the student/child make comments or shows interest in what I am doing”). Another teacher version of the questionnaire contained 21 items of how the teachers perceived the students or children’s interaction with peers (e.g. “the student/child initiates interaction with other students/children” and “the student/child listens and negotiates to sustain the interaction”). All interaction scales had five response alternatives (1=seldom, 2=fairly seldom, 3=50% of the time, 4=fairly often, and 5=most of the time).

**Autonomy and locus of control**

Autonomy and locus of control were measured with a translated and adapted short version (23 items) of the ARC self-determination scale (Wehmeyer & Kelchner, 1995). The autonomy items of the ARC scale are originally divided into the sections “daily routines” (e.g. “I normally choose by myself what clothes to wear”), “interacting with people” (e.g. “I talk and spend time with people in my age”), “choices” (e.g. “what I do during leisure time is my own choice”), “society and leisure” (e.g. “during leisure time I take part in activities that I like”) and “personal style” (e.g. “I have chosen by myself how to furnish my room”). The
scale consisted of four response alternatives (1=I don’t, even if I have the possibility, 2=I do sometimes when I have the possibility, 3=I do most of the time, if I have the possibility, and 4=I always do, if I have the possibility).

The 12 locus of control items of the ARC-scale contains two sentences with contrasting statements of how the students perceive their control. The respondents were asked to select the one statement of the two that best matched their self-perception (e.g. “I usually tell my friends about my ideas and opinions” vs. “I keep quiet when I come up with something new or different” or “I usually accept it when people tell me that I can’t” vs. “I usually say that I think I can when people tell me that I can’t”).

**School and preschool environment**

Two questionnaires were used in this thesis for measuring school environment (a) general school environment, as judged for all students in school, and (b) the specific school environment for each student with disabilities (Simeonsson et al., 1999). The questionnaire contains items about both the physical environment and the social environment. The general environment part consists of 28 items (e.g. “students at this school can feel secure” and “necessary teaching material is available”). The specific part contain 21 items (e.g. “the student is accepted by peers” and “the outdoor environment has necessary adaptations”). Both parts of the questionnaire have similar response alternatives, 1=I do not agree, 2=partly agree, 3=agree, and 4=completely agree.

A questionnaire measuring adaptations and assistive technology in the school environment was developed by Simeonsson et al. (1999). The questionnaire contains questions about environmental adaptations and assistive technology provided in school for the student. The 13 items had four response alternatives, 1=do not agree, 2=partly agree, 3=agree, and 4=completely agree. Examples of items are: “the teacher has sufficient information on how to use assistive technology” or “the student uses specifically adapted computer software”.

The physical and social environment in preschool was measured by the use of an instrument with 18 items, based on the questionnaire measuring general school environment but adapted to a preschool setting (Simeonsson et al., 1999). The scale have four response alternatives (1=do not agree, 2=partly agree, 3=agree, and 4=completely agree). Examples of items are “the children in the group get along with each other” and “there is good availability of varying material/toys”.

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**Disability profile**

The Abilities Index (Simeonsson & Bailey, 1984) was used for a description of the student’s type, degree, and number of functional impairments. The items concern degree of hearing impairment, motor impairment, general health condition, social skills, behavioral skills, intentional communication, visual impairment, tonus, and cognitive skills. Ratings are made on a scale from 1=normal to 6=severe impairment.

**Developmental status**

One question from the Physical health scale (Cernerud, 2002) concerned the developmental status of the child (“do you consider your child/the child to be slower in development than other children? – yes/no”). This question was validated against data from the Child Health Services (CHS). In Sweden these assessments are carried out regularly when the children are 4-12 weeks old, 6, 12, 18 months, 3 years, 4 years (in some parts of Sweden), and 5.5 years of age (Hagelin et al., 2000). The assessments are made by a nurse at the CHS in the presence of one or both parents. Clinical observations are judged together with earlier assessments and parents perceptions of their children form the basis for the judgment.

**Physical health**

A questionnaire concerning the physical health of the children was constructed for the purpose of this thesis by Cernerud (2002). The parent scale consists of five items about their child’s physical health status, with yes/no alternatives (yes=2, no=1) and possibilities in the first three items to add information: (1) does your child receive any medication or other medical treatment on a regular basis, (2) does your child have any specific disease or disability, (3) do you consider your child delayed in development compared with other children, (4) how many days during the last month has your child stayed at home due to illness? The teachers scale consists of six items with yes/no response alternatives (yes=2, no=1, except for question 6 that had opposite scoring) and possibilities in the first three items to add information. The items are (1) does the child receive any medication or other medical treatment during his/her stay in preschool, (2) do the child have any special disease or disability, (3) is the child delayed in development in comparison to other children, (4) is the child more often ill than other children, (5) is the child absent from preschool more often than other children due to illness, and (6) do the child seem as healthy as children in general?
Mental health and behavior

A shortened version of the Child Behavior Checklist 1,5-5 for parents was used (CBCL; Achenbach & Rescorla, 2000) together with the Caregiver-Teacher Report Form 1,5-5 (C-TRF; Achenbach & Rescorla, 2000). Only 26 of the original 118 items were used in the parent part and 25 items in the teacher part. The aim of using this scale was not to make a clinical psychological judgment of the children’s mental health, but to reveal if any problem behaviors were perceived by parents and teachers. The chosen items were thought to represent a range of common problem behaviors of young children.

Parent’s support and SES

Parent’s perceived availability of support in every-day life and their socio-economic status were measured by a questionnaire developed by Simeonsson et al. (1999). The parents completed a version with items concerning socio-economic status (education and income) and family support (five items about perceptions of support within and outside the family, yes=2, no=1).

Parent’s sense of coherence

Parent’s sense of coherence in every-day life was assessed by the use of Antonovsky’s sense of coherence scale (SOC; 1991). The short version with 13 items was used.

Neighborhood context

A questionnaire developed by Simeonsson et al. (1999) was used in Study III to assess the neighborhood context. The scale consists of seven statements with two response alternatives (yes=1, no=2). Examples of items are: “there are many children living in our neighborhood” and “it is a safe area to grow up in”.

Methods

Study I – Participation in school activities for children and youth with disabilities

Aim. The aim of this study was to identify patterns of child- and environmental factors thought to influence participation in school activities of children and youth with disabilities.

Sample. The first study was carried out with the help of the Swedish Institute of Special Education (SIT). Consultants from SIT (n = 112) helped to collect the data. The consultants are responsible for educational ser-
vice to groups of children classified according to their primary disability. Questionnaires were distributed to the students, their teachers, and parents by the SIT consultant. Additionally, the SIT consultants answered a questionnaire for each child participating in the study. Among other things, the consultants gave information about the children’s type and degree of disability and about adaptations and assistive technology provided to the child in school. Thus, four different sources gave information about each child in the sample. The children all had different types of disability, divided into three major categories according to the support that was given from SIT. These categories were visual disability, motor disability, and multiple disabilities. A total number of 1712 questionnaires were collected representing 472 children. The children were divided in two groups based on chronological age, CA 7-12 (n = 251; M = 10.04, SD = 1.56) and CA 13-17 (n = 197; M = 14.99, SD = 1.51). For 24 of the children information about disability profile and/or age was not given, most often because questionnaires from one or several of the sources were missing. In CA 7-12, a total of 972 questionnaires were collected. Of these, 246 were from the children themselves, 237 from the parents, 238 from teachers, and 251 from consultants. For the CA 13-17, in total 740 questionnaires were collected. Of these, 185 were from the children, 177 from the parents, 181 from the teachers, and 197 from the consultants.

Outcome variables. As an outcome measure, participation in school activities was assessed by students, teachers, and parents by the questionnaire adapted for measuring the degree of participation in school activities (Simeonsson et al., 1999). For the youngest age group (CA 7-12) the degree of interrater agreement between the different sources were significant at the 1%-level with the highest agreement between parents and children (r = 0.32). In further analyses of participation an aggregated index consisting of the mean value of teacher, parent, and student ratings were used. For the older age group (CA 13-17) the interrater agreement was only significant between teachers and parents ratings (r = 0.22, p < .01). Thus, participation in the older age group was analyzed separately for different respondent groups, without aggregation. Student’s perceptions of participation were the only measure used as an outcome of positive functioning. The internal consistency was .77 for both age groups.

Process variables. Both environmental and personal characteristics were used as process variables thought to influence the degree of participation in school activities for children with disabilities. These environmental variables were availability of school activities, general environment, specific environment, and adaptations and assistive technology. The personal characteristics were teacher’s perception of interaction with the stu-
dent, teacher’s perception of the student’s interaction with peers, student’s perception of their interaction with the teacher, student’s perception of their interaction with peers, and student’s perceptions of autonomy and locus of control.

Students, teachers, and parents responded to the questionnaire adapted to measure the degree of availability of school activities (Simeonsson et al., 1999). For the youngest age group (CA 7-12) the degree of interrater agreement between the different sources were significant at the 1%-level with the highest agreement between teachers and children ($r = 0.31$). In further analyses of availability an aggregated index consisting of the mean value of teacher, parent, and student ratings were used. The internal consistency of this index was .75 for CA 7-12 and .80 for CA 13-17. For the older age group (CA 13-17) the interrater agreement was only significant between teachers and parents ratings ($r = 0.21$, $p < .01$). Thus, availability of school activities in the older age group was analyzed separately without aggregation. The school environment was assessed by the teachers using the questionnaires for general school environment and specific school environment (Simeonsson et al., 1999). The questionnaire contained items about the physical environment as well as the social environment. Two indexes were created for each age group, general school environment (CA 7-12, $\alpha = .85$; CA 13-17, $\alpha = .87$) and specific school environment (CA 7-12, $\alpha = .83$; CA 13-17, $\alpha = .84$). Additionally, the SIT consultants answered the questionnaire about environmental adaptations and assistive technology provided in school for the student (Simeonsson et al., 1999). One index was created for each age group, adaptations and assistive technology (CA 7-12, $\alpha = .83$; CA 13-17 $\alpha = .87$). Interaction was assessed by the students themselves in both age groups as how they perceived their interaction with their peers and teacher. Similarly, the teacher assessed how they perceived their interaction with the student (both age groups) and how they perceived the students interaction with other students (CA 7-12). Four indexes were created: teacher’s perception of their interaction with the student (CA 7-12, $\alpha = .87$; CA 13-17, $\alpha = .86$), teacher’s perception of the student’s interaction with peers (CA 7-12, $\alpha = .96$), student’s perception of their interaction with the teacher (CA 7-12, $\alpha = .77$; CA 13-17, $\alpha = .84$), student’s perception of their interaction with peers (CA 7-12, $\alpha = .69$; CA 13-17, $\alpha = .76$). Children in both age groups responded to the autonomy questionnaire (CA 7-12, $\alpha = .82$; CA 13-17, $\alpha = .93$) and the locus of control questionnaire (CA 7-12, $\alpha = .57$; CA 13-17, $\alpha = .69$) (Wehmeyer & Kelchner, 1995).
**Disability profile.** The SIT consultants responded to the Abilities Index (Simeonsson & Bailey, 1984) for a description of the student’s type, degree, and number of functional impairments. An index of disability profile was created by summarizing a total score of functional impairment. The disability profile was not used to categorize children in advance, but to eventually compare the children classified into cluster groups of disability profile.

**Analyses.** Study I was a cross-sectional study with two parallel age groups (CA 7-12 and CA 13-17) of children with disabilities. A cluster analysis was performed on factors thought to be related to degree of participation. A non-hierarchical cluster procedure in SPSS was used, K-means analysis. K-means is a method to explore internal (within-group) homogeneity as compared to external (between-group) heterogeneity toward the goal of identifying underlying patterns in the observed data (Hair, Anderson, Tatham, & Black, 1998). This means that cluster solutions are created by shuffling cases back and forth between the different clusters until a specified clustering criterion is fulfilled (Bergman, Magnusson, & El-Khoury, 2003). The advantage of using this technique is that the homogeneity within the clusters and the dissimilarity between the clusters are optimized. The limitation is that the control of the agglomerative procedure is lost, which means that it is impossible to view each step in the procedure and how clusters are merged. A common procedure is to begin with a hierarchical cluster method in where each step could be thoroughly examined, and continue with a non-hierarchical method to maximize the homogeneity within the clusters. This was not done in this study, due to limitations in handling large data samples in a hierarchical cluster analysis in the SPSS program.

All variables used in the cluster analysis were standardized to provide equal weight in the clustering procedure.

**Study II – “I can play!”: Young children’s perceptions of health**

**Aim.** The aim of this study was to examine how young children perceive health and how these perceptions relate to a multidimensional model of health, ICF.

**Sample.** In this interview study 68 children between 4 and 5 years of age ($m = 4.60$, $SD = 0.51$) in two community-based preschools, each one in a middle-sized community in Sweden participated. A convenience sample was used with the criteria that the children should be at least four but not six years of age at the time of the study. Of a sample of 168 children, informed parental consent was received for 75 children. At the
time of the interviews 4 of the children did not want to participate, and 3 children were not present.

**Material.** A structured interview guide was constructed for the study, based on the questions from a study conducted by Normandeau et al., (1998). A pilot study with 9 children (4-5 years of age) in a small community in Sweden was conducted to test whether the children would understand the questions. All children in the pilot study understood and answered the questions in a verbally varied manner. Therefore no changes were made in the interview guide. To assess each child’s subjective perception of health, the questions focused on children’s every-day experiences. The first question in the interview guide was an introductory question aimed at establishing the children’s concrete experiences of health in their every-day environment: “Tell me of some friends that you think feel well?”. This question was not further analysed. The other questions in the interview guide were: (1) health among others; “why do you think these friends feel well?”, (2) health actions; “tell me what you think one should especially do to feel well”, (3) consequences of health; “what can you do when you feel well?”, (4) threats against health; “tell me what you think can happen so that you don’t feel well”, and (5) consequences of ill health; “what can you do when you don’t feel well?”. To code the answers to the questions, the following definitions were used: (1) health actions were defined as the children’s subjective experience of behaviors that positively affected physical and social factors related to health, (2) consequences were defined as the children’s subjective perception of circumstances that could positively or negatively affect physical, psychological, and social factors related to health, and (3) threats against health were defined as the children’s subjective perception of experiences that reduce the ability to perform desired tasks related to health, physically, psychologically, or socially.

**Procedure.** The interviews with the children were conducted over a period of two weeks. To create a comfortable and safe relationship with the children the interviewers spent some time in their preschool setting before the interviews took place. The interviews were carried out with the interviewer sitting on the floor in front of the child, to get as much of the child’s attention and concentration as possible. No material was used during the interview session to maintain the child’s focus on the interview. The questions were memorized by the researchers and a tape recorder was used to store the children’s answers. The interviews lasted between 5 and 15 minutes. Children that were not present during the first occasion were interviewed at another time. All preschools were visited several times to complete the assessments of all the children.
Analyses. Study II was a qualitative study, and both a manifest and a latent content analysis approach were applied. Thus, the initial analytical focus was on what the children in the interviews actually said and not on an underlying meaning of what they talked about (Graneheim & Lundman, 2003). The categorization of the interviews was done within the framework of the ICF to reveal if the children’s perceptions matched this multidimensional model of health. The answers from the children were divided into sub-categories and in turn categorized into one of the ICF dimensions body, activity, participation, and environment. A latent content analysis was applied to the interview data to identify underlying themes in the manifest categories. To increase reliability of categorization the entire material was coded by two researchers separately with the ICF definitions of each dimension. There was a high agreement between the different judges. In any case of disagreement, a discussion was conducted to reach an agreeable solution.

Study III – Patterns of engagement for children with and without developmental delay

Aim. The aim of this study was to describe how the process variables of availability of activities, involvement in activities, and social interaction were related to engagement, of young children with and without developmental delay.

Sample. Of an original population sample of 1,477 children, questionnaires were received for 1,035 children in community-based preschool or family day-care in a middle-sized community in Sweden. The children ranged in age from 14 to 47 months ($m = 32.75$, $SD = 8.84$). A total of 1,448 questionnaires were collected, 990 from preschool teachers and 458 from parents. Thus, not all children were represented by both parents and teachers, but 413 children had complete data from both sources. Data about children’s developmental status were collected from the Child Health Services (CHS) for the children whose parents and CHS practitioners consented ($n = 223$). In this sample 13% of the children were assessed as developmentally delayed. The most common type of delay was speech- and language delay (81%).

Outcome variable. In this study children’s engagement was used as a measure of the amount of time children spent in developmentally appropriate activities in their natural environment. For this purpose parents and teachers responded to the Child Engagement Questionnaire CEQ for each child in the sample (McWilliam, 1991). There was a significant interrater agreement between parent’s ratings of their children’s
engagement behavior at home and the preschool teachers ratings of the children’s engagement behavior in preschool, \( r = .30, p < .01 \).

**Process variables.** The process variables in Study III were participation, availability and interaction. These variables were divided into several indexes used to define the cluster groups. The participation variables were: participation in collaborative play, outdoor play, free play, and solitary play in preschool, participation in routine activities, organized activities, visits to playground or park, and reading/storytelling at home. The availability variables were: availability of role play, creative activities, stories/art, and solitary play in preschool, the availability of routine activities, excursions, organized activities, and home play and family life at home. The interaction variables were: the teacher’s perceptions of child behavior within their interaction, teacher’s perception of the child’s communication within their interaction, teacher’s perception of his or her ability to maintain the interaction with the child, teacher’s perception of his or her engagement in the interaction, teacher’s perception of the child’s initiation and interest of interaction with peers and peers initiation and interest of interaction with the child, teacher’s perception of the child’s ability to maintain and end interaction with peers and peers ability to maintain and end interaction with the child, parent’s perception of the child’s behavior within their interaction, and parent’s perception of their own behavior within the interaction with the child. Teachers responded to the participation questionnaire (Simeonsson et al., 1999) containing preschool activities and the parents responded to the questionnaire measuring participation in home activities. Interaction was measured by the questionnaire developed by Granlund and Olsson (1998). This version was adapted by Granlund and Björck-Åkesson (2000) for use with preschool children.

**Background variables:** The background variables, used to compare the children in the cluster groups were children’s physical health, children’s developmental status, children’s mental health and behavior, parent’s perception of availability of support in every-day life, parent’s sense of coherence, parent’s socio-economic status, neighborhood environment, and preschool environment. Parents and teachers responded to the questionnaire concerning physical health of the children (Cernerud, 2002). There was high agreement between teachers and parents ratings in physical health, and thus an index of physical health was created by summarizing scores from the parents and the teacher scale. Parents and teachers responded to the one question concerning the child’s development from the physical health scale (Cernerud, 2002). The ratings of the preschool teachers were used as an indicator of the developmental status of the
child. This indicator was validated against parents ratings and the reports from CHS, for those children in the sample that we could receive such a report for \((n = 223)\). The view of the children’s developmental status differed across sources, with 13% of the children being assessed as developmentally delayed by the preschool teachers, 24% as assessed by the CHS, and only 7% when assessed by the parents. These differences could be due to situational circumstances mentioned earlier. In home settings the skills and competencies necessary for the child to function socially are not as demanding as they are in a preschool setting. Similarly, the large variability in rate of development in different areas is not considered in a clinical assessment based on standardized tests of cognitive, motor, and language development in comparison to norm values. Parents completed the version of the Child Behavior Checklist 1,5-5 (CBCL; Achenbach & Rescorla, 2000), and teachers completed the Caregiver-Teacher Report Form 1,5-5 (C-TRF; Achenbach & Rescorla, 2000). There was significant parent and teacher agreement, \(r = .24\), and the two scales were aggregated into one index of mental health and behavior.

The information about how the parents perceived availability of support in everyday life and their socio-economic status was measured by the questionnaire by Simeonsson et al. (1999). Indexes were created of: education (education of primary caregiver), income (family income), and parent support. Parent’s sense of coherence was measured by the use of the SOC scale (Antonovsky, 1991). For measuring neighborhood context the questionnaire by Simeonsson et al. (1999) was used. Finally, the physical and social environments in preschool were assessed using the questionnaire by Simeonsson et al., 1999.

**Analyses.** Study III was a quantitative descriptive study with a person-oriented approach. A K-means cluster technique was conducted resulting in a five cluster solution. The advantages, limitations, and rationale of this procedure presented above are the same as for Study I. The five cluster solution was chosen based on interpretability, amount of explained variance, homogeneity within the clusters, and a meaningful distribution of children across the clusters (Hair et al., 1998). To evaluate this solution, however, the total sample was split into two sub samples. An exactly similar cluster analysis was conducted for one of the sub samples. The total matching of the centroids ranged from .32 to .54, with a median of .43 which is considered satisfactory. Thus, the external validity of the five cluster solution obtained in the total sample was acceptable (Bergman, Magnusson, & El-Khoury, 2003). All variables used in the cluster analysis were standardized to provide equal weight in the clustering procedure.
Study IV – Pathways of engagement of children with and without developmental delay

Aim. The aim of this study was to investigate pathways of children’s engagement and if pathways of children with developmental delay differ from that of typically developing children.

Sample. The fourth study was based on the previous one, using the same sample in a longitudinal approach. This time data were only collected from preschool teachers. The teachers completed the same questionnaire as for the first data collection for each child in the sample. The total number of children participating in the follow-up study was 813. Of these children 595 had complete data from both waves. The age span of the children were at the second wave between 27 and 61 months ($m = 45.84$, $SD = 8.86$). In this sample 14% of the children were delayed in development. Most of these children (82%) were delayed in speech- and language.

Engagement. In this study the CEQ (McWilliam, 1991) was divided into different dimensions of engagement. For this purpose an explorative factor analysis with Varimax rotation was used. The result indicated evidence for a three dimension solution of engagement: attention to adults (e.g. “the child watches the teacher”), differentiated behavior/play (e.g. “the child plays with toys”), and problem solving/persistence (e.g. “the child tries many different strategies before giving up”). This solution explained 51% of the variance at wave 1 and 52% at wave 2. In the cluster analyses the dimensions of attention to adults and differentiated behavior/play were used process variables, while problem solving/persistence was used as an outcome variable. This choice was based on the hypothesis that attention to adults and differentiated behavior/play are skills that influence the learning process leading to more advanced skills represented by problem solving and persistence. The sample mean in problem solving/persistence was lower than ratings in attention and differentiated behavior/play at both time points, $t(594) = 7.29, p < .001$. The effect size in change between the two measurement points was .36, which is considered a low to moderate change.

Process variables: The engagement variables of differentiated behavior/play and attention to adults were used to define the cluster groups at both waves, together with participation in every-day activities in preschool and child-peer interaction. Teachers responded to the questionnaire about participation in preschool activities (Simeonsson et al., 1999) and the questionnaire measuring child-peer interaction by Granlund and Ols-
son (1998). To validate the appropriateness of using both interaction with peers and differentiated behavior/play, two variables that were highly correlated, a confirmatory factor analysis with Oblimin rotation was performed. The factor solution revealed that peer interaction and differentiated behavior/play loaded on different factors, and thus could be considered not to measure the same construct. The two-dimension solution explained 52% of the variance.

*Environmental variables:* Teacher’s responsiveness, availability of every-day activities in preschool or preschool environment were used as environmental variables to validate the cluster groups. A part of the questionnaire measuring the teacher’s interaction with the child representing teacher responsiveness towards the child was used (Granlund & Olsson, 1998). Teachers responded to the questionnaire about availability of every-day activities in preschool (Simeonsson et al., 1999). The physical and social environments in preschool were assessed by the questionnaire by Simeonsson et al. (1999).

*Demographic variables.* Three measures were used as demographic variables: mental health and behavior, physical health, and developmental status. The teachers completed the C-TRF measuring children’s mental health and behavior (Achenbach & Rescorla, 2000). One question about children’s development from Cernerud (2002) was used. Additionally, physical health was assessed by the use of Cernerud (2002). An index of physical health was created as a sum score of the items.

*Analyses.* Study IV was a longitudinal study with a person-oriented approach. The study was conducted in two waves with the duration of one year. A hierarchical cluster analysis with Ward’s method was used at both waves, using SLEIPNER (Bergman & El-Khour, 2002). By the use of a hierarchical procedure the structure of the data at different levels could be investigated (Bergman, Magnusson, & El-Khour, 2003).

The process of a cluster analysis is based on several steps in which different decisions and interpretations have to be made to be able to continue to the next step. One of these steps is how to handle missing data. In this study, as in many large scale studies using questionnaire data, a substantial proportion of the participants did not provide answers to all items, resulting in missing data in one or several variables for many cases. Excluding participants due to missing data creates the possibility of a large drop-out of cases. In this study a procedure called imputation was used to replace missing data with twin data, which means that data is estimated by the use of a case with very similar values in the non-missing data (Bergman, Magnusson, & El-Khour, 2003). This procedure resulted in 20 imputed cases at wave 1 and 6 imputed cases at wave 2.
that could be kept for further analyses. A second step in the procedure is how to handle data that do not fit in into any cluster, in which individuals are not similar enough to other individuals. Bergman (2000) has argued from both a theoretical and technical standpoint that it is not reasonable to expect that all individuals can be classified into a homogenous cluster. Additionally, the presence of outliers in a sample significantly decreases the homogeneity of the cluster to which the outlier is forced. Thus, it is important to identify these outliers, remove them from the sample used for further analyses and possibly analyze outliers separately. It has been argued that a maximum of 3% of outliers is acceptable in a sample (Bergman, Magnusson, & El-Khouri, 2003).

Another issue in longitudinal studies concerns how to statistically handle change. When applying a longitudinal design, the same variables are measured at two time points, implying a change in this variable over time. When standardizing variables for use in cluster analysis, this is done separately at both waves, resulting in a change score made up by both true change and error. Because the same variable is measured twice, the correlations are usually rather high with a small variance. The variance of the error change scores at the two time points are, however, independent and thus the variance of the error change scores will be much larger than the error score at one time point. In the case of a change score, more of the total variance is usually error variance than for a score that refers to only one time point (Bergman, Magnusson, & El-Khouri, 2003). To use change scores to measure change in variables over time significantly lower the reliability in a longitudinal study. Bergman and colleagues argue for using scores related to the different time points in the analysis instead of measuring change scores. In Study IV, this is done by studying children’s movements between clusters over time with the use of an exact analysis of single cells in a contingency table. For this purpose the EXACON module in SLEIPNER (Bergman & El-Khouri, 2002) was used. Individual change in background variables over time was measured by analyzing the difference between the mean values from the two time points. Additionally, effect sizes were calculated to determine the real effect of the change. This was done by dividing the mean difference between the two time points with the standard deviation of the first time point. An effect size of .20 was considered a small effect, .50 a medium effect, and .80 a large effect.
Results

Study I

The aim of this study was to identify patterns of factors of child- and environmental factors thought to influence participation in school activities of children and youth with disabilities.

The research questions were: (a) Are specific patterns of subject and environmental factors related to participation in school activities?, (b) Is the type and/or degree of disability related to participation in school activities?, and (c) Do subject and environmental factors vary as a function of chronological age.

Missing cases

Forty-five students (18%) in CA 7-12 and forty-seven in CA 13-17 (24%) were “outliers”, which means that they were not homogeneous enough with other students in the sample or had too much missing data to be able to classify. Students with missing data from either themselves, their teacher or their parents were excluded from the remaining analyses. An analysis of missing cases was not possible due to ethical reasons. The consultants from SIT chose the subjects and the researchers only received information about the students that finally participated in the study.

Results

A cluster analysis of the youngest age group, CA 7-12 \((n=251)\), resulted in five distinctly different profile groups with a range of subjects from 5 to 75. The results from the cluster analysis showed that two of the profile groups were distinct representatives of either negative or positive patterns. One profile group (cluster group 1, \(n=75\)) had a distinct pattern of positive ratings and another profile group (cluster group 2, \(n=5\)) had a distinct pattern of negative ratings in participation related factors, defined by interaction with teachers and peers, characteristics in the general and specific physical environment, adaptations and assistive technology in the school environment, availability of school activities, autonomy, and locus of control. In the profile group with the highest mean scores, students rated their perception of autonomy positively and perceived themselves having an internal locus of control, while the students in all the other profile groups gave negative ratings of autonomy and locus of control. The cluster group with the overall lowest mean values rated their own perception of autonomy positively and perceived themselves having an internal locus of control, while the students in all the other profile groups gave negative ratings of autonomy and locus of control. The largest difference, however, between the profile groups was in the students perceptions of their interaction...
with peers. While cluster group 1 perceived positive interaction with peers, cluster group 2 perceived very negative interaction with peers (< 2 SD below sample mean). In addition, for both cluster 1 and cluster 2 the association between students own perceptions of interaction with peers and teachers perceptions of interaction with peers were high, with very similar ratings. The teacher’s ratings in physical environment showed that cluster 1, although having positive ratings in all other variables, received negative ratings concerning environment. This concerns both the general and the specific environment, as well as adaptations and assistive technology in the school environment. Aggregated ratings of availability of school activities by students, teachers, and parents were, however, positive. The profile group receiving the highest ratings concerning general and physical environment (cluster 5, n=45) perceived negative interaction with peers and were also rated negatively in their interaction with peers by their teachers. Their interaction with teachers was, however, rated positively by both teachers and the students themselves.

When comparing the profile groups in participation in school activities the children in cluster 1 were rated highest in participation by both teachers, parents, and the students themselves. Although, the students in cluster 2 were rated lowest in participation, the difference was not significant due to the small number of students in the profile group. The students in cluster 5 were rated significantly lower in participation in school activities than cluster 1, and so were the students in cluster 3. Cluster group 3 was characterized by students that received the lowest ratings concerning general and specific environment (< 1 SD below sample mean), low ratings by teachers in social interaction, but own perceptions of an average level of social interaction, autonomy, and locus of control, compared to other students.

When comparing the children in background characteristics such as sex, type and degree of disability, and number of disabilities the results revealed no significant difference between cluster membership and any of the background variables.

A second cluster analysis was performed for the age group 13-17 (n=197). This cluster analysis also resulted in five cluster groups with a range of subjects between 11 and 63. One of the profile groups (cluster 1, n=63) had high ratings in all variables, except of general and specific environment and adaptations and assistive technology that were rated low or near to average. The student’s perceptions of autonomy and locus of control were high, even though they were lower than for the students in the younger age group, CA 7-12. The profile group with the overall lowest ratings (cluster 4, n=11) had low or very low ratings in all variables,
except of adaptations and assistive technology in the school environment. These students rated their interaction with peers very low (< 1 SD below sample mean) and their interaction with the teacher even lower (< 2 SD below sample mean). Similar to the younger age group the largest difference between the profile groups were in how the students perceived their social interaction with peers. But in this age group there was also a large difference between the groups in how they perceived their ability to control their every-day life in school. The students in the profile group that received the highest ratings in environmental conditions (cluster 5, n=36) had the lowest perceptions of themselves. This concerned both interaction with teachers and peers, autonomy and locus of control, as well as availability of school activities.

When comparing the profile groups of the children in the 13-17 age group the results revealed that the children in cluster group 1 perceived themselves significantly higher in participation in school activities than the children in cluster group 2. Cluster group 2 (n=21) were characterized by negative ratings of the environment and interaction with teacher (according to the teacher), but positive ratings by the student concerning interaction with peers and teacher, autonomy, and locus of control. The students in cluster 3 also perceived low participation in school activities, but due to the small number of subjects in the group no significant differences were found between this group and any of the other groups.

When comparing the children in background characteristics such as sex, type and degree of disability, and number of disabilities no significant difference was found across groups.

There were few differences in participation related variables between the two age groups, but the degree of participation was somewhat lower for the older students, even if studying only the perceptions of participation of the younger students, not using the aggregated measure from teachers, parents, and students. The environmental ratings also decreased with age group, except for availability of school activities. Further, the comparison showed that the within-group variation in the student perceived variables of participation, interaction with peers and teacher, autonomy, and availability were higher for the older age group.

**Conclusion**

The results of this study showed that the students in groups with overall positive ratings from themselves, parents, and teachers, also were the students who rated their autonomy and locus of control most positively. Autonomy and locus of control are person characteristics that are likely to demand a positive pattern of many person- and environmental char-
acteristics for children with disabilities. Difficulties in interaction seemed to be most problematic for students that already had a lot of problems. The properties of the environment did not seem to have similar importance for high participation. Students with a mostly positive pattern had the highest ratings in participation in school activities even though their ratings on environmental variables were low, implying that personal characteristics, such as autonomy and locus of control, make children with disabilities less dependent on specific properties in the environment. The only environmental variable that to a high extent seemed to influence participation was availability of activities.

There were no difference in type and degree of disability across groups. The conclusion from this is that general competencies such as autonomy, the ability to take control over one’s life situation, and social interaction skills probably influence the student’s perception of availability of school activities, which in turn influence the student’s perception of participation. For students with positive perceptions of their general competence, the type and degree of disability seem to be less of a factor for participation in the school environment while students with negative perceptions of their competence seem to be more dependent of environmental prerequisites and teacher support for high participation.

Study II

The aim of this study was to examine of how young children perceive health and how these perceptions relate to the multidimensional model of health, ICF.

The research questions were: (1) What variations are there in young children’s (4-5 years) perceptions, attitudes, and self-reported behaviors concerning health?, (2) Are these perceptions, attitudes, and self-reported behaviors related to the health dimensions in ICF (body, activity, participation, and environment) ?, and (3) To what extent do the children’s perceptions, attitudes, and self-reported behaviors concerning health mirror child engagement as an expression of health?

Results

Most of the children’s answers to the initial question: “Why do you think these friends feel well?” (children’s perceptions of the health of others) were related to the category body, as in the absence of a disease, age and development, eating habits, or statements of well-being, e.g. “He was sick yesterday, but he’s actually well now”. Many answers, however, were related to participation as in play with others and friendship, e.g. “because she want’s to play with me!”.
Answers to the question: “Tell me what you should especially do to be healthy” (children’s perceptions of health actions) were also mostly related to the body dimension of ICF as in taking medication, eating habits, and disease prevention, e.g. “you shouldn’t drink Fanta or Coke, you should only drink water”. Nearly as many answers were related to activity as in play, pottering, outside play, rest, and computer/TV games, e.g. “you could go out and go to the big park and play with all the stuff”.

In response to the third question “What can you do when you are feeling well?” (children’s perceptions of consequences of health) most of the answers were related to activity as in play, pottering, outside play, rest, athletics, and computer/TV games, e.g. “then I can draw and do puzzles”. A lot of answers were also related to participation as in play with others, role play, and friendship, e.g. “then we play wrestling, it’s everyone against everyone!”.

Answers to the question “Tell me what you think can happen so that you don’t feel well” (children’s perceived threats to health) were mostly related to the body dimension, as in disease or infection, pain, emotions, and even death, e.g. “you can have a sore throat”, or “you don’t laugh a lot”. A moderate number of answers were also related to activity, as in rest, computer/TV games, play, or running, e.g. “you can play too much, run too much, and then you can be ill, but if you run and feel your heart you have to stop”. Answers related to the environment were also present, e.g. “do you know that the teacher says that they will come, but then they don’t. They call!”.

The last question was “what do you do when you don’t feel well?” (perceived consequences of health). Most answers to this question were related to activity, as in rest, computer/TV games, play, or running, e.g. “then you play, but you play more slowly”. Answers related to the body dimension were also present, e.g. “when I was really sick, I was more sick than my big brother, he was more sick at first, then I got more sick than he was”, or the environment dimension, e.g. “I’m usually at home and watch TV under the cover”.

When examining the individual answers from each child the results revealed that 50% of the children related health to at least three of the health dimensions of ICF. Only 12% of the children related health to only one of the dimensions, either body or activity. 18% of the children related health to all four of the health dimensions. The distribution of the children’s answers from each question and how they related to the ICF dimensions is presented in Table 1.
The answers from the five main questions were then related to engagement. Of the answers to the question about consequences of health 86% were related to engagement, and 50% of the answers to the question about consequences of ill health. In total, 50% of the answers were related to engagement.

**Conclusion**

The results from this study showed that young children largely view health as a multidimensional construct, largely related to being engaged, and being able to perform wanted activities and to participate in an everyday context. Although young, the children in this study were able to distinguish between several different aspects of health, in an experience-based perspective. All four ICF dimensions were included in each of the main questions and half of the children included at least three of the dimensions. Thus, it could be concluded that the children demonstrated a complex understanding of health organized around multiple dimensions of body, activity, participation, and environment. The children also demonstrated an understanding of how their own behavior as well as the behavior of others can influence health. Finally, the children seemed aware of the environmental influence on health.

**Study III**

The aim of this study was to describe how the process variables of availability of activities, involvement in activities, and social interaction were related to engagement of young children with and without developmental delay.
The research questions were: (1) Are patterns of health and engagement evident among subgroups of children aged 1-4 years?, (2) Do children with developmental delay or disability share membership in a group with a specific pattern of engagement?, (3) Does the level of engagement of children differ by cluster group membership?, and (4) Are there differences in demographics and biopsychosocial indicators by cluster group membership?

**Missing cases**

Ten of the participating children (1%) were defined as “outliers”, which means that they were not similar enough to be clustered into any of the profile groups. These children were excluded from the remaining analyses.

**Results**

The cluster analysis in this study revealed five distinctly separated profile groups, defined by the process variables thought to influence engagement. Significant differences in engagement as rated by teachers, $F(4,776) = 181.52, p<.001$, were found. Engagement ratings from parents were also significantly different between the groups, although not as high as between teachers ratings, $F(4,421)=30.08, p<.001$.

The number of children in each profile group ranged from 117 to 363, with the largest group showing the most positive pattern of process variables related to engagement (cluster 1). The children in this group were significantly more engaged than the children in all the other profile groups. About 9% of the children in this group were considered developmentally delayed. Two of the profile groups were rated average in engagement, although their pattern of process variables related to engagement looked different. In one of these profile groups (cluster 2) the children were rated high in interaction, both with teachers and peers, and average in child-parent interaction. In contrast, the children were rated negatively concerning availability of activities in preschool and at home and concurrently in participation in activities both at home and in preschool. About 6% of the children in cluster 2 were delayed in development according to their preschool teachers. The other profile group showing average levels of engagement (cluster 4) was characterised by mostly negative interaction, both with peers and teachers, but positive interaction with parents. In contrast, the availability of activities was mostly high and, accordingly, children participated more in activities both at home and in preschool. About 15% of the children were
developmentally delayed. The parents of these children had a significantly higher sense of coherence and perceived higher degrees of support than parents in cluster 3. The children were rated average in mental health and behavior.

One of the profile groups had mostly negative ratings in the process variables (cluster 3). Specifically, the children were rated low in child-peer interaction. The teachers perceived that they were engaged in the interaction with the children and that they were able to maintain their interaction, but that the children’s behavior and communication with the teacher were negative. In addition, even though availability of activities in preschool was rated mostly positive the children did not participate to any high extent. In addition, availability of activities at home was negatively rated, but the children participated to a high extent in routine activities, organized activities, and going to the playground or park. The children’s engagement was significantly lower for the children in this cluster than for the children in cluster 1 and 2. About 17% of the children were considered developmentally delayed and also rated more negatively in mental health and behavior than the children in the other profile groups. The parents of these children had the lowest income, low sense of coherence, and perceived less access to support within and outside the family compared to the parents of children in the other profile groups.

The last profile group (cluster 5) was characterised by ratings that were different between parents and teachers. While the teachers rated the children in overall negative terms, parents gave opposite ratings. Even availability of activities was rated negative in preschool and positive at home. Similarly, the children were rated negatively in participation in activities in preschool, but positive in participation in activities at home, specifically concerning organized activities. According to teachers, the children in this profile group showed a significantly lower engagement level, while the parents rated their children’s engagement level above sample mean. About 24% of the children were assessed as developmentally delayed by the teachers and 7% by the parents. When validating this number with data from the CHS about 13% of the children scored lower than 1 SD below normative values in development. Data from the CHS, however, were not available for all children in the profile group. None of the parents of these children scored in the low-education category and the parent’s sense of coherence was high. Finally, according to teacher ratings these children had significantly more behavior problems than the children in all other profile groups, but parents assessed the mental health and behavior of the children in the average range.
Conclusion

This study showed that children with different patterns of engagement related variables could show similar levels of engagement, in spite of their developmental status. The contribution of child and environmental variables related to engagement varied, with some of the profile groups showing higher levels in child variables and some of the profile groups showing higher levels in environmental variables. Although, the profile groups in a current perspective showed similar levels of engagement the children could still differ in their engagement over time. The impact of developmental delay on engagement varied across clusters.

Study IV

The aim of this study was to investigate pathways of children’s engagement and if pathways of children with developmental delay differ from that of typically developing children.

The research questions were: (1) What are the pathways of engagement?, (2) Do these pathways differ for children with and without developmental delay?, and (3) What are the characteristics of children with developmental delay who show stability or change in engagement over time?

Residue analysis

At the first wave in Study IV only 1 child was found that could not be classified into one of the profile groups. The associated proximities to the five most similar cases ranged from .58 to 1.03. Separate analyses of this case revealed that it was a boy, 48 months of age, with developmental delay in speech- and language and possibly other areas. At the first wave, this boy had ratings in social interaction with peers that was more than 2 SD below sample mean, ratings in attention to adults that was just below sample mean, ratings in differentiated behavior/play that was more than 2 SD below sample mean and missing data concerning participation in every-day activities in preschool. At the second wave 2 children were found that could not be classified. The associated proximities of the five most similar cases ranged from .53 to 1.56 for one of the cases and from .50 to .86 for the other case. The first child was a girl, 59 months of age, with typical development. The other child was a boy, 59 months of age, with typical development. The mean values of these children in the process variables were below 2 SD from sample mean in social interaction with peers, below 1 SD in attention to adults, below 1 SD in differentiated behavior/play, and 3 SD below sample mean in participation in every-day activities in preschool.


Results

A cluster analysis on the process variables peer interaction, participation in every-day activities, differentiated behavior/play, and attention was performed at both waves. An eight cluster solution was chosen at the first wave and a nine cluster solution at the second wave. The two cluster solutions explained 67% and 69% of the variance respectively. The cluster solutions were then linked between the time points to study structural changes in the patterns and individual change in cluster membership over time. The children in the profile groups were compared at both waves in environmental and demographic variables, and at the second wave in problem solving and persistent behavior as an outcome measure of high level engagement.

The two cluster solutions showed high structural stability between the measurement occasions, with an average squared Euclidean distance ranging from .027 to .304. This means that patterns similar to those in the first wave emerged again at the second wave. The best matching appeared between the largest cluster groups at the two time points (cluster A1, n=171; cluster B1, n=163). Similarly, many children showed individual stability over time in pattern configuration, either negative or positive. Five typical pathways were found. For children overall it was a 2.6 times higher probability than expected by chance alone that children who were social, active, and playing at wave 1 still would be social, active, and playing at wave 2. For children with developmental delay, there was a 3.2 times higher probability to still be social, active, and playing at wave 2. There was a 2.8 times higher probability that children who were attentive towards adults at wave 1, but showed negative ratings in the other process variables were still attentive and also had more positive ratings in differentiated behavior and play at wave 2. None of the children with developmental delay were present in this pathway. There was also a 4.4 times higher probability that children with very low engagement would show increased levels of attention towards adults at wave 2. For children with developmental delay this probability was 3.6 times higher. The probability that the children with a multi-problem pattern still would show a multi-problem pattern at wave 2 was 2.8 times higher, and for children with developmental delay 1.5 times higher. Children that were low in engagement at wave 1 were 3.3 times more likely to show the same pattern at wave 2. All of the above probabilities were significant at the 1%-level. One atypical pathway was found between children with low engagement at wave 1 and high engagement at wave 2. The 12 children in this pathway, thus, changed positively over time even though the probability was 1.5 times less likely that they should. Of the
children in the atypical pathway, 6 were assessed as developmentally delayed.

When comparing the children with typical and atypical pathways of engagement in environmental factors, the result revealed that for children in the very low engagement pathway availability of activities decreased, \( t(10) = -2.55, p < .05 \) (effect size \(-.81\)), and their preschool environment was rated more negatively by the teachers \( t(10) = -2.97, p < .05 \) (effect size \(-1.57\)). For the children with low level engagement patterns at both waves there was a negative change in preschool environment, \( t(10) = -5.03, p < .01 \) (effect size \(-1.96\)). For the 12 children with an atypical pathway from low engagement to high engagement, teachers rated themselves more responsive over time, \( t(11) = 3.01, p < .05 \) (effect size \(1.00\)).

The children’s engagement was hypothesized to lead to higher levels of engagement, represented in this study by problem solving and persistent behavior over time. This was true for all children with a typical pathway, with the largest significant increase found for the children with a low engagement pattern at wave 1 and a very low engagement pattern at wave 2, \( t(10) = 3.00 \) (effect size \(1.22\)). The levels of problem solving and persistent behavior for these children were, however, very low initially. There was also a significant increase in problem solving and persistence for the children who at wave 1 were attentive, and at wave 2 were both attentive and playing, \( t(13) = 2.56, p < .05 \) (effect size \(0.98\)). For the children with an atypical pathway the increase in problem solving and persistence were very high, \( t(11) = 7.81, p < .001 \) (effect size \(4.05\)). Overall, children with positive change in engagement over time showed increased levels of problem solving and persistent behavior and became more similar to children that were stable in engagement over time.

A logistic regression analysis was conducted to find out how environmental factors contributed to children’s pathways of engagement over time. The results revealed that children who experienced positive teacher responsiveness had a 19 times higher than chance probability to change positively in engagement over time, odds ratio=19.23, \( p < .01 \). The final model explained 27% of the variance.

When examining the typical and atypical pathways for children with developmental delay the results revealed that these children showed similar development in engagement over time as the typically developing children. There was a larger number of children with developmental delay (51%) who showed negative stability in engagement over time, \( \chi^2(3,465) = 22.93, p < .001 \).

A logistic regression analysis was conducted to examine the contribution of developmental delay, gender, age, or behavior problems
on children’s engagement over time. The only variable that was significant in the final model was behavior problems. The probability was more than three times higher that children with and without developmental delay would be characterized by positive change in engagement over time if they did not show any behavior problems, odds ratio=3.64, \( p < .01 \). The logistic regression model also revealed that it was a 2.6 times higher probability that boys would show stability in low level engagement over time, compared to girls, \( p < .01 \).

Further, in comparing the children in the different pathways regarding environmental variables the results revealed that both the absence of developmental delay and behavior problems were significant contributors to positive teacher responsiveness, odds ratio=1.1 and .84, respectively \( (p < .01) \). When validating the pathways on environmental variables the paired samples t-test showed that children characterized by change to higher level engagement over time showed the largest increase in teacher responsiveness and preschool environment, indicating that teachers perceived the preschool environment more positively and were more responsive towards children with high level engagement patterns, whether or not the children had a developmental delay.

Children with developmental delay who showed stability in high level engagement had teachers who rated their own responsiveness higher than children with developmental delay who showed stability in low level engagement over time, \( F(3,77) = 3.85, p < .05 \). There was also a significant difference between children in that children who showed stability in high level engagement also showed less behavior problems than their peers with stability in low level engagement over time, \( X^2(3,1)=17.59, p < .01 \) (observed/expected count).

**Conclusions**

The results of study IV demonstrated both stable and changing pathways of engagement. These patterns were either positively stable, changed in a positive direction, negatively stable, or changed in a negative direction of engagement. The most common pathway was between the high engagement groups at the two waves. The children in this pathway were very stable and over a year did not develop any higher levels in engagement. Children with low or very low engagement were stable in low level engagement over time. Thus, a certain level of engagement seems to be a prerequisite for development of higher levels in engagement.

In this study the pathways for children with developmental delay did not differ from those of typically developing children. The low level engagement pathways at wave 1 were more stable in low level engagement
over time, whether or not a developmental delay was present. The strongest predictor of stability of low level engagement was behavior problems; developmental delay was not a significant predictor.

For the children with stable patterns of low level engagement the environment was less positive over time, with lower availability of activities and teachers that perceived the preschool environment as more negative. In the atypical pathway 50% of the children were developmentally delayed, but only 8% had behavior problems. These children were met with significantly more responsiveness from their teachers and their problem solving and persistent behavior increased largely over time. Teacher responsiveness was the only environmental variable that significantly predicted stability in or change to high level engagement over time for all children. At the same time, children without behavior problems or developmental delay were met with more positive responsiveness from their teachers. Children with developmental delay or behavior problems that are met with responsiveness from teachers have more positive outcomes in engagement over time, but the risk is higher that these children experience more negative responsiveness from their teachers.

**Ethical considerations**

The participants in Study I was recruited by consultants from the Institute of Special Education in Sweden (SIT). The consultants received a package of coded questionnaires, one each for the student, the parents, the teacher, and the consultant. The consultant then distributed the questionnaires to teachers, parents, and students and eventually collected them and returned them to the researchers. The questionnaires were placed in envelopes sealed by parents, teachers, and children before they were returned to the consultant. This procedure guaranteed that no one other than the consultant working with the children in school knew the names of the children, but still made it possible to keep track of questionnaires from different sources. All participants were informed of the ethical principles formulated by the Humanistic-Social sciences research council. All participants were informed about the rules that the participation in the study was voluntary and that they could withdraw from the study at any time without giving any reason for their decision.

In Study II informed consent was received from the parents for all children considered for the study. Further, the children were all informed that their participation was totally voluntary and that the questions did not demand any particular answers. We also informed the children that
we were going to tape the interview and that they could listen to parts of the interview afterwards if they wanted to.

For Study III and IV ethical approval was obtained from the medical-ethics committee, Dnr Ups 02-410. Similarly, the participants were informed of the ethical principles formulated by the Humanistic- Social sciences research council.

General Discussion

Introduction

Positive functioning

The overall aim of this dissertation was to empirically investigate the relations between different factors, previously found to be related to different outcomes of positive functioning, for children with and without disabilities or developmental delay. The overall finding in this thesis is that positive functioning of children of different ages with and without disabilities is a multidimensional phenomenon. A specific diagnosis or disability is only one of several factors influencing the outcome. In fact, relations between isolated variables measured on group level can often be misinterpreted as an indication that the constructs are conceptually related. An alternative explanation might be that several problems tend to occur within the same individuals (Bergman & Magnusson, 1997). Person-oriented analyses that take this complexity into consideration offer better possibilities to describe and predict causal mechanisms related to favorable or unfavorable outcomes (Sameroff & Fiese, 2000; Magnusson & Stattin, 1998; Wachs, 2000). This thesis is one of the few that has studied children’s positive functioning in a person-oriented, longitudinal perspective, taking into consideration both qualitative and quantitative differences in patterns of factors related to positive functioning over time. The first and the third study consistently showed that in a cross-sectional perspective, child-related factors such as child-peer interaction and autonomy were more strongly related to positive functioning than environmental factors. By adding the longitudinal perspective in the fourth study, pathways of engagement patterns could be studied which showed that social interaction continued to be the most influential mechanism of engagement over time. One environmental variable, teacher responsiveness turned out to promote children’s engagement over time. The longitudinal study supported the premise of non-linearity and within-group variability of developmental processes, independent of initial conditions such as disability or developmental delay.
Positive functioning could be considered both a short-term outcome, such as a high level of engagement or participation, and a mediator of long-term developmental process towards optimal health and functioning. In this thesis, health for children has been defined in a functional perspective in that an optimal state of health for children is engagement in a life situation and interaction with the environment in a developmentally appropriate manner. Positive functioning is thus operationalized by different patterns of process variables defined in earlier literature as related to engagement or participation. The interviews with the children in Study II were used to explore how children perceive health. The results from these interviews showed that children perceive health as a multidimensional concept, consistent with the health dimensions of ICF: body, activity, participation, and environment. Children answered the questions about health actions and health consequences, as well as threats to health and illness by incorporating all the dimensions of ICF. The children mostly related health consequences to the dimensions of activity and participation, which is not so surprising. When the children felt that they were healthy they could play, go to preschool, and be together with peers. What is more surprising is that the children also linked illness consequences mostly to activity. With regard to not feeling well, the children stated that they played, more slowly like playing computer or TV games. The children’s perceptions are consistent with a functional perspective where disability, developmental delay, or long-term disease is defined by functional limitations determined by multiple person and environmental factors (Simeonsson, 2006). Still, factors such as disability or developmental delay will often be considered as risk factors and factors such as engagement or participation or related concepts as protective factors. The transactional process involving these risk and protective factors will impact children’s health and positive functioning over time (Garbarino & Genzell; Sameroff & Fiese, 2000).

Since multidimensional outcomes such as participation and engagement could both be part of the developmental process and considered an outcome at a specific point in time changes that occur from one stage to another affect the whole person-environment system. Just as risk factors tend to co-occur within the same child, protective or positive factors probably have the same effect (Rutter, 2000; Zhao et al., 2000). Health promotion during the early years focusing on children’s strengths and competencies, such as engagement, has implications for later outcomes in health and positive functioning. In Study II in this thesis, children as young as 4-5 years of age showed a great understanding of how their own behavior and the behavior of others influence health and that the
optimal outcome of health was closely related to engagement. In the children’s answers to the question of health consequences 86% were associated with engagement. Engagement is likely to be a strong influence over time on health and positive functioning and should be one of the main targets in health promotion.

This thesis has focused on patterns of positive characteristics and behaviors thought to influence health and functioning in terms of engagement and participation over time. A positive approach that builds on enhancing existing strengths and capabilities does not mean that children’s weaknesses and current risk factors should be ignored. Building on strengths and capabilities can influence the process leading to better health and functioning over time, across different initial circumstances. How the findings in the different studies in this thesis contribute to the overall aim of health and positive functioning are summarized in Table 2.
Table 2. Synthesis of studies related to overall research aims

<table>
<thead>
<tr>
<th>Study</th>
<th>Focus</th>
<th>Findings</th>
<th>Implications/contributions to main research aims</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Do specific patterns of child and environment factors influence participation of school aged children with disabilities?</td>
<td>Autonomy, control, interaction with peers, and availability of activities influential factors of participation. No difference according to type or degree of disability.</td>
<td>Positive functioning capture aspects of self-realization and striving for competence. Children who perceive opportunities to take part in and influence the environment, and act on this opportunities, probably experience positive functioning across environments and situations, independent of type and degree of disability.</td>
</tr>
<tr>
<td>II</td>
<td>Are young children’s perceptions of health consistent with ICF dimensions?</td>
<td>Children’s perceptions of health related to the health dimensions of ICF. Consequences of health to related to engagement.</td>
<td>Factors related to health of young children could be found by the use of a multidimensional model, such as the ICF. Engagement could be used as an outcome of health and positive functioning.</td>
</tr>
<tr>
<td>III</td>
<td>Are specific patterns of child-environment factors related to engagement of children with and without developmental delay?</td>
<td>Groups of children with different patterns showed similar outcomes of engagement. Children with developmental delay represented across groups.</td>
<td>Using a functional perspective of health and developmental delay implies that children with different patterns or circumstances could experience similar outcomes of health and positive functioning, by the use of different environmental opportunities and personal abilities.</td>
</tr>
<tr>
<td>IV</td>
<td>What are the pathways of engagement of children with and without developmental delay?</td>
<td>Child-peer interaction related to high level engagement. Developmental delay only related to low level engagement over time if combined with behavior problems. Developmental delay and behavior problems related to low teacher responsiveness.</td>
<td>A large amount of possibilities exist in the process of health and positive functioning. An isolated factor, such as developmental delay is not sufficient to determine the outcome. Developmental delay in combination with positive factors, such as teacher responsiveness, availability of activities, and the absence of behavior problems, significantly increase the probably of health and positive functioning.</td>
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</table>
Patterns of engagement and participation

The findings of this thesis have identified factors that appear to influence engagement and participation. In Study I, autonomy and locus of control were two prominent factors in relation to participation in school activities for children with disabilities. The children in the age group 7-12 years who perceived themselves autonomous and able to control their every-day situation in school also participated more in school activities. This is consistent with Connell and Wellborn (1991) who reported that children in elementary- and middle-school who perceived higher degrees of self-regulated autonomy also reported that they were more engaged in school activities. The children in Study I who were autonomous also had better availability of school activities as rated by themselves, teachers, and parents. The role that availability of activities plays in relation to participation in activities seems logical. To be able to participate in school activities the activities have to be available. The relation between autonomy and locus of control and participation in school activities are, however, not as direct. In the older age group, 13-17 years, children in two of the profile groups perceived themselves as autonomous and able to control their every-day situation in school. Only one of these groups did perceive that they also participated to a high degree in school activities. In addition, the children in this group perceived better availability of school activities than the children in the other groups. There are at least two possible explanations for this finding. The first explanation is environmental, in that the relation between autonomy and control are mediated by perceived availability. Children that are provided a favourable match between their competence level, earlier experiences, and interests and the physical and social availability of activities in school also participate in more school activities. This notion is consistent with niche theory describing a niche as a nodal point between the child and the environment that is built on the perception of how the environment could be used in relation to existing interests and competencies (Bronfenbrenner, 1999; Super & Harkness, 1999; Wachs, 2000). New experiences become part of children’s niche potential by assimilating them into the existing working model, thus, expanding the available sources of stimulation in the environment (Magnusson & Stattin, 1998). One of the profile groups in the age group 7-12 years in Study I had low ratings on all factors, except for general and specific environment and availability of activities. This implies that these children, although not very autonomous or able to control their every-day life situation perceived a match between their existing competence and environmental support making them participate to a high extent in school activities. Sandberg et al. (2004) reported that
adults with disabilities remembered from their childhood that they actively searched for niches that did not challenge their existing competence and avoided new niches. This implies that for some children with disabilities the access to environmental stimulation influences their participation in available activities, but the children do not actively search for new activities or niches.

On the other hand, one of the profile groups in Study I with low perceptions of autonomy and control in the older age group, 13-17 years, did not perceive high availability, but still rated their participation in activities high. The children in this group, however, did have a more positive general and specific environment, with more adaptations and assistive technology, than all other profile groups. Possibly, these children with a supportive and adaptive environment did have a lot of possibilities to participate in school activities, although perhaps not in activities in which they were interested or motivated to participate. Thus, they did not perceive the environment useful for achieving personal goals. Goals that are not self-chosen or self-valued do not give the same reinforcement needed to stimulate children’s self-regulating ability to actively search for new niches that matches their interests and abilities. This is consistent with earlier studies that have shown that children with disabilities do not perceive the same amount of available interesting activities in their natural environments (Garton & Pratt, 1991; Lockwood & Lockwood, 1991) as typically developing children do. Autonomy is self-regulating in that the more children perceive activities to be self-chosen and have a self-perceived value the higher the level of autonomy (Bridges, 2003). Autonomy, on the other hand, is largely dependent on personal interests and abilities and the absence of external influence or interference (Wehmeyer, Kelchner, & Richards, 1996). Several researchers have argued that children with disabilities tend to be more controlled by adults than typically developing children (Carta et al., 1991; Mahoney & Wheeden, 1999; Wolery et al., 1992). If activities and experiences thought to stimulate development and participation are simply provided to the children, they are not given the opportunity to set personal goals, to be challenged in trying to reach them, or learn by their own mistakes. In contrast, children that perceive the ability to make their own choices and decisions, as well as mistakes perceive more intrinsic motivation (Ryan & Deci, 2000; Schwartz, 2000). How children perceive external forces to interfere or influence their personal choices and activities probably affects their perceptions of the availability of interesting and self-valued activities.
The other explanation to the relation between autonomy and control and participation is interpersonal. Children, who are more autonomous and able to control their every-day situation in school, also make use of the environment in a manner that builds on existing competence, experience, and interests and thus, perceive better availability to activities that they are interested in and motivated to participate in. As discussed by Magnusson and Stattin (1998) there is a distinction between the environment “as it is” and the environment “as it is perceived”, implying that there is a difference between the actual environment and how children construct and interpret the environment. Thus, a part of the environment is not shared with other children (Magnusson & Stattin, 1998; Shonkoff & Phillips, 2000), meaning that although provided the same objective environmental stimulation children will react differently to that stimulation depending on personal characteristics, earlier experiences, and existing interests and competencies. The only profile group in the age 7-12 years in which the children perceived themselves as autonomous and able to control their situation was also the only group in which the children, their teachers, and parents perceived a high availability of school activities (Study I). These children were higher in participation in school activities than the children in all the other profile groups. The interactive process between the child and the environment contribute to differences in how children are received by their teachers and adults, depending on child characteristics and behavior. Research has shown that adults actually do treat children differently depending on the children’s characteristics and behavior (Bugenthal, 1992; deKruif, McWilliam, & Ridley, in press; Shonkoff & Phillips, 2000). Children that respond in a positive manner to adults are met with more positive response from the adults. In addition, it has been reported that the teacher’s ability to support children’s initiatives and follow children’s focus of attention is influenced by the children’s ability to control their every-day situation (Skinner, Zimmer-Gembeck, & Connell, 1998). Environmental feedback and reinforcement from adults, peers or the actual activity on a child’s behavior promotes children’s intrinsic motivation and interest to seek new challenges (Eccles et al., 1998; Lubinski & Benbow, 2000). Thus, children that perceive that they can choose valued activities and expect to have the ability to perform them will also perceive higher degrees of participation.

Another factor identified in this thesis as related to participation and engagement was social interaction. Specifically, children in Study I who perceived themselves as engaged in social interaction with peers also typically perceived high participation in school activities. Difference among
children in each of the Studies I, III, and IV were highest for the dimension of social interaction with peers. In Study III this concerned specifically the children’s initiation and interest for social interaction with peers. Additionally, a large variation among children was found in Study III in participation in collaborative play. The children in Study III were young, however, between 1 and 3 years of age.

Though many of the children showing high levels of social interaction in Study I, III, and IV also showed high levels of participation or engagement, the relation did not seem to be linear. Children in one of the profile groups in the age 13-17 years in Study I that rated their interaction with peers positively still perceived a lower degree of participation than all the other groups. The children in this group perceived that they were autonomous and able to control their every-day situations, but their teachers perceived that their interaction with the children was very negative and that the general and specific environment for the children, as well as adaptations and assistive technology, were negative. Possibly, the environmental support and adaptations that had been provided did not motivate the children to participate in school activities, which led the children to be perceived in more negative terms by their teachers. The teachers did rate their interaction with the children in this profile group lower than average. The absence of extrinsic reinforcement from teachers could have led the children to become even less motivated. Thus, these children might have been more interested to engage in social interaction with peers than to participate in school activities they were not interested or motivated to participate in. On the other hand, this could be explained by the fact that these children with disabilities were like any other teenager, tired of school and of teachers, and more involved in social interaction with peers.

In Study III, two of the profile groups showed similar levels of engagement, although their patterns of person and environmental factors thought to influence engagement were different. In one of the profile groups the children showed high ratings in social interaction, specifically social interaction with peers and teachers in preschool, but low levels of participation in all the activities provided in preschool and at home, with the exception of reading/storytelling at home. Similarly, they had low availability to activities in preschool and at home. The children in the other profile group showed primarily high ratings in participation in activities and availability to activities. This specifically concerned availability to role play and creative activities in preschool and availability to routine activities, such as helping in the kitchen, excursions, and homeplay and family life, such as going to the grocery store or playing
with a neighbour child. The children participated primarily in collaborative play, free play, and outdoor play in preschool and in routine activities, and going to the playground or park and listen to stories at home. Concerning environmental and other background factors the children in the two profile groups differed in some areas. There were more children with developmental delay in the profile group based on participation and availability than in the profile group based on interaction (observed/expected count; 6 vs. 15%), and significantly fewer boys (observed/expected count; 41 vs. 59%). The children in the interaction based group were significantly younger (29 vs. 36 months) and the parents had significantly higher income. Although these children had different patterns of person and environmental factors influencing their engagement level, there was no significant difference in the outcome of engagement. This implies that several different developmental profiles could lead to the same outcome (von Bertallanfy, 1968). Over time, however, these children will probably be provided with different environmental experiences and also perceive environmental experiences differently due to their initial patterns of person and environmental factors (Magnusson & Stattin, 1998; Sameroff & Fiese, 2000; Wachs & Plomin, 1991). How much this covariance effect will affect children’s positive functioning over time probably depends on their overall pattern of person and environmental characteristics. Children that develop better social interaction skills with other children have been found to function well in more varied environments over time and to be more autonomous in creating and controlling their own every-day situations (Howes & Matheson, 1992; Ryan & Deci, 2001; Shonkoff & Phillips, 2000) than children with lower social interaction skills. Additionally, children’s motivation and interest to engage in more complex behaviors are specifically stimulated by social rewards, such as positive social interaction with other children (Jennings & Dietz, 2003). On the other hand, availability to and engagement in meaningful activities does provide children with a base of experiences that stimulates further exploration and engagement in more complex behaviors (McWilliam & Ware, 1995). By feeling competent and capable to perform interesting activities, children develop positive feelings about themselves and a better ability to handle challenging situations (Dweck & Leggett, 1988; Klein-Hessling et al., 2005), thus increasing their engagement in many areas. Both of the profile groups in Study III showing similar levels of engagement, but different patterns of characteristics influencing engagement have the possibility to increase their niche potential, but by different processes.
Stability and change in engagement and participation over time

This thesis assumed that the development and positive functioning of children would involve stable and changing processes. Stability in the process is defined by children who show positive patterns of health and functioning over time, even though in most cases the behaviors have developed and matured. Development does imply change, but change is not enough to lead to development. The change has to incorporate multiple positive and developmentally instigating factors that lead children towards a more optimal level of health and positive functioning. In this thesis, change has been defined as a pathway from an initially negative pattern of engagement behaviors to a positive pattern of behaviors thought to influence health and positive functioning. It was hypothesised that development and age would influence engagement for all children, but that the overall pattern of person and environmental characteristics would determine the outcome.

Consistent with the earlier studies, the children in Study IV showed variable patterns of engagement. The measures used as process variables influencing positive functioning in this study were chosen to represent the different engagement dimensions of social interaction with peers, attention to adults, differentiated behavior/play, and participation in activities. Young children have been found to prefer different types of engagement, with some children preferring to participate in many activities, while other children seem to prefer involvement in social interaction. Some children are more attentive towards adults, and listen and look carefully at what they say or do, while other children are occupied playing without paying attention to the surrounding context. Although, these behaviors are interrelated, they represent distinct constructs. The amount of time that children spend in appropriate interaction with their environment, the quality of these interactions, and the focus of the interaction (with peers, adults, or materials) are relevant for positive functioning over time (McWilliam, 1995; deKruif & McWilliam, 1999). Most children developed a dynamic pattern in all the four types of behaviors. Improvement in one type of behavior was thought to influence improvement of engagement in more complex behaviors, such as problem solving and persistence (McWilliam & Ware, 1995). Problem solving and persistence is perceived as goal-directed behaviors linked to mastery motivation (Brockman, Morgan, & Harmon, 1988; Messer et al., 1987). These types of behavior are thought to represent an engagement level that promotes children’s intrinsic motivation to learn and engage in their own life situation (Turner & Johnson, 2003). This is consistent with how health has been operationalized in this thesis. In order to study
stability and change in children’s engagement over time the children in
the different profile groups in Study IV were aggregated into two
categories: positive functioning clusters or negative functioning clusters
at each time point. The criterion for aggregation was that at least three
out of four process variables were below or above sample mean and/or
that one process variable was more than one standard deviation below
or above sample mean. Several studies have shown that the complexity
of children’s engagement behavior as well as the frequency of engage-
ment with peers do increase with chronological and developmental age
(Blasco et al., 1993; deKruif & McWilliam, 1999; McWilliam & Bailey,
1995). Thus, the assumption was that well-developed patterns of these
behaviors represent health and positive functioning and promote higher-
level behaviors, of problem solving and persistent behavior over time
independent of developmental status.

The largest percentage of children (39%) in Study IV were stable in
high level engagement, which means that the positive pattern of engage-
ment they had developed a at the first wave was stable over time. The
ratings for these children decreased somewhat in attention and
differentiated behavior/play over time, but increased in interaction with
peers and participation in activities. This is consistent with the arguments
of Ruff and Saltarelli (1993) that children who have competence to act in
the ongoing situations in their natural environment seem to be less attentive
and more likely to act. The stability in engagement does not imply that
the children have reached their optimal level of engagement. Since these
children already had developed high ratings in all the dimensions of en-
gagement defining the profile groups, the children did not change in
frequency of engagement behavior, but likely in quality of their engage-
ment behavior. For children who did not show high ratings in all
dimensions at the first wave the qualitative differences were easier to
capture. In Study IV, problem solving and persistent behavior was used
as an outcome measure representing a more complex engagement
behaviour. The profile groups were compared in problem solving and
persistent behavior at the second wave, implying that children that reached
higher levels of engagement over time would also have high levels in
these behaviors. The children in the high engagement group in Study IV
over time reached ratings well above sample mean in problem solving
and persistent behavior.

Interaction with peers, participation in activities, and differentiated
behavior/play were behaviors that children who were characterised by
stability in or change to high level engagement in most cases became
better in over time (Study IV). Attentiveness towards adults, however,
did not always increase over time. There has been a lot of discussion about the role of attentiveness in engagement and if it should be considered a high- or low-level behavior. Most children in the first wave who were social, active, and playing remained stable in social interaction with peers, participation in activities, and differentiated behavior/play, as well as in their inattentiveness towards adults. These children perceived better availability of activities and more positive teacher responsiveness over time. As discussed earlier the teacher-child relationship might be mediated by children’s characteristics and behavior (Bugenthal, 1992; Sameroff & Fiese, 2000; Shonkoff & Phillips, 2000). Normally, as children become older and more mature, they engage in more complex behaviors. For young children a certain amount of attentiveness is probably required to provide them with important information about what is going on in the environment as a base for continuous engagement (Ruff, 1990). When children have already reached a certain level of engagement they are not as dependent on being attentive anymore. Teachers tend to be less controlling and directive with children who are more autonomous and perceive that they are able to control their own activities and behaviors. Children that are able to regulate their behavior and be autonomous are often met with greater responsiveness from both teachers and peers (Shonkoff & Phillips, 2000). How attentiveness influence the teacher-child relationship might be mediated through children’s engagement behavior. Another pathway in study IV consisted of children who were attentive at the first wave, but over time a little less attentive and more playing. These children also received higher ratings from their teachers in availability to activities over time and above all showed a significant increase in problem solving and persistent behavior. The fact that these children also received higher ratings in availability of activities over time support the notion that teachers perceive these children more capable of using available activities in the natural environment with increased levels of competence. Thus, how attention towards adults influence engagement over time is probably influenced by the role it has in the whole pattern of behaviors.

Social interaction seems to be a salient factor influencing engagement directly and as a part of a pattern related to engagement. In Study III the children had similar ratings in the process variables, but different patterns of engagement. Children who were higher in social interaction skills had similar ratings of engagement as the children that were more active and had better availability to activities. Social interaction, specifically with peers, is a general competence that is useful in many situations and contexts. Over time, these children can use their social competence without
being as dependent on the surrounding environment. Research has shown that social rewards from social interaction with peers specifically influence children’s autonomy and perception of control (Jennings & Dietz, 2003). Children that perceive that they can make their own choices and control their environment can make use of the environment in a way that suits their interests, providing them with experiences that match their interests and competencies. Children in the profile groups in Study IV that remained positive over time all had high ratings in social interaction with peers and differentiated behavior play, although for some of the children attention towards adults or participation in activities were below sample mean. In contrast, children who were rated high in participation in activities and had good availability of activities, but were less socially skilled, were initially more dependent on the environment. If availability of activities has a direct relation to participation these children could have a harder time if activities were less available, in new or changed settings. If however, the relation between availability of activities and participation is not as direct and simple, these children could develop a high sense of autonomy and control through exploration and engagement in a variety of activities. Children that are autonomous and able to control their own life situation are more motivated to seek new challenges which expand their niche potential and leads to engagement behaviors with higher complexity. This exemplifies the notion that patterns that initially are different could lead to the same outcome, but the processes leading to the outcome might look totally different. In an interactional perspective, one small change in the process could change the whole pattern leading to a totally different outcome. If children in the profile group with positive participation and availability of activities, but negative social interaction skills, move to an environment that does not provide the stimulation needed to develop a sufficient level of autonomy and control, the result could be lower engagement over time.

An important environmental influence on children’s stability and change in engagement was how responsive the teachers were. Even though both availability of activities and overall preschool environment were related to children’s positive change in engagement, the way teachers responded to the children was the only factor that by itself could predict such a significant relation. In addition, it was a higher than chance probability that children without developmental delay or behavior problems would be met by responsiveness from their teachers. At the same time there was a higher probability that children without behavior problems would change positively over time. The children in the pathway of positive change showed the largest increase in teacher responsiveness,
indicating that preschool teachers do perceive that they are more responsive towards children with positive engagement patterns, independent of developmental status. In line with a transactional model of child development, teachers have been found to be less responsive towards children with certain characteristics and behavior (Sameroff & Fiese, 2000), including developmental delay or behavior problems (Guralnick, 2005). This means that teachers tend to withdraw from children that show problematic behavior and become less responsive. As shown by Kerr & Stattin (2006) parents tend to ask less about the activities of their teenagers the more the children engage in defiant and secretive behavior. At the same time they tend to be less controlling. A question for future research is if the preschool teachers become more directive and controlling, in contrast to responsive to children with behavior problems in preschool or if they become overall more passive in their relationship with these children.

Disability and developmental delay in relation to patterns of engagement and participation

The children in Study I all had different types and degree of disability, classified by the consultant service group into either visual disability, motor disability, or multiple disabilities. These children could also have additional impairments of audition, extremities, general health, intentional communication, or tonus. In the cluster analysis these children were not classified based on their type or degree of disability, but based on their other personal and environmental characteristics, such as social interaction, autonomy, and environmental prerequisites. When comparing the profile groups regarding type and degree of disability there were no significant difference between the groups. This implies that type and degree of disability do not directly influence degree of participation in school activities. Other person and environmental factors such as autonomy and social interaction skills seem to influence participation in school activities more directly. In Study III about 13% of the children were identified as developmentally delayed in comparison to their typically developing peers. The children were initially classified based on interaction, participation, and availability and then compared regarding developmental status. Although there was a significant difference between the two profile groups with the largest number of children with developmental delay, all profile groups contained children with developmental delay (6 to 24%). In the profile group with the highest frequency of children with developmental delay a range of different risk factors were present. According to teacher ratings these children had negative interaction with both teachers and
peers, negative availability of activities in preschool and low participation in activities in preschool. Additionally, the teachers perceived the children’s mental health and behavior to be more negative than that of the other groups. The teachers perceived the children’s engagement level lower than for all other children in the sample. According to the parents of these children, the interaction between parents and children was positive, the availability of activities at home and the children’s participation in activities was also positive. This specifically concerned activities that were organized, such as swimming classes or dance classes.

The children in one of the profile groups in Study IV with the most negative ratings at the first wave were significantly stable in their negative pattern of engagement over time. In this profile group there were significantly more boys than girls, and the children had a significantly more negative preschool environment, as rated by their teachers. Also the availability of activities and the teacher’s responsiveness became more negative over time. Many children in this pathway did have a developmental delay, and the prevalence of behavior problems increased over time, a risk that has been shown by many researchers before (Feldman et al., 2000; Paul et al., 1991; Spangle-Looney & Dahm, 1991; Rescorla & Schwartz, 1990; Thal et al., 1991). Guralnick (2005) reported that teachers have more difficult relationships with children with developmental delay and/or behavior problems and that the children are more often met with unresponsiveness from the teachers. It is possible that the way teachers perceive the children also affects how they perceive the total environment. If children do not have enough social competence to interact with peers or do not have enough competence to participate in activities, and are not attentive towards adults, the teachers might not perceive activities in preschool as available for the child.

The expectations parents and teachers have on children’s capabilities in specific areas influence how they explain children’s behavior. A child with a disability or developmental delay will probably experience lower expectations from parents and teachers in areas related to the diagnosis or delay. Parents or teachers may not expect children with speech- and language delay to communicate their wishes and will therefore be more directive and take too much responsibility in the interaction process. Similarly, the expectations for children with behavior problems are probably lower and more negative than the expectations of children without behavior problems, which influence how teachers and parents explain difficulties in functioning and development. Children with socio-emotional problems are not expected by teachers and parents to have the same ability to take initiatives to play situations with peers as children
without socio-emotional problems, and the teacher or parent might support the children by introducing them in the play situation. The children are thus provided with fewer opportunities to learn how to take initiatives in a social situation. Over time this will influence the children’s view of themselves as producers or products of their life situation and eventually their locus of control, explaining poor outcomes according to disability or problem. Children with disabilities have shown a more external locus of control than typically developing children, and this could probably partly be explained by early expectations on the child from parents and teachers. In Study I many of the children with higher degrees of autonomy and an internal locus of control perceived higher degrees of participation, independent of type and degree of disability. If this is partly due to early environmental expectations and attitudes is not known. Children with disabilities are more affected by the attitudes and expectations of teachers than typically developing children. Study IV in this thesis showed that teachers over time became more responsive towards children that showed positive change in engagement. If this means that children with disabilities or developmental delay are met by more directive and controlling teachers this has implications for their development of engagement over time. As engagement has been shown to buffer children from behavior problems (Bland et al., 1994; Cohler et al., 1995; Werner, 1995) it seems likely that teachers and other adults are sensitive in how they respond to children with disabilities or developmental delay and how their expectations and beliefs influence children’s motivation to be engaged. Children with and without disabilities or developmental delay might benefit from less adult controlled activities and directive instruction, and instead be encouraged to engage in explorative play, persistence, and problem-solving.

Children with developmental delay are exposed to a larger risk than typically developing children to develop behavior problems over time (Baker et al., 2005; Bernheimer et al., 1993; Fantuzzo et al., 2005). Although the prevalence of behavior problems decreased for the whole sample over time, problems were more prevalent in groups with children with developmental delay (Study IV). In the profile groups that contained most children with developmental delay the prevalence of behavior problems was around 50%. Additionally, other risk factors tended to cluster into these profile groups. They all contained a significantly larger number of boys than girls, their preschool environment was rated by the teachers as more negative, the availability of activities was low, and the teachers rated their own responsiveness towards the children negative. These environmental factors became even worse over time. Most of the children (51%) with developmental delay remained stable in low level
engagement over time. When controlling for behavior problems, the impact of development, gender, age, and behavior on stability of engagement decreased, with behavior remaining the only significant predictor in the final model. This implies that the developmental delay by itself is not a significant predictor of negative functioning. Rather an effect of problem gravitation might be present, in which children with developmental delay often show a range of other risk factors that in combination can contribute to a negative outcome. When removing such a risk group from a sample there might not be any significant effect.

Children with disabilities or developmental delay have been reported to be less engaged and specifically this concerns engagement in social activities. The largest differences between the profile groups in Study I, III, and IV were in social interaction with peers. Over time the children in Study IV showed increased levels of social interaction skills and the differences between the groups decreased, but still remained the largest of all the factors thought to influence engagement. In Study I the opposite effect in social interaction with peers was present. There was a larger difference between the children with disabilities in the older age group concerning interaction with peers than in the younger age group. The possible explanation to this is that peers become more important in the age of 13-17 years and thus, children with disabilities might perceive more difficulties, although the same difficulties might have been present earlier. Research has shown that children with disabilities have more difficulties in social interaction with peers, and that these difficulties specifically concern the ability to initiate social interaction (Guralnick, 1992). This is not surprising as children with disabilities have been found to participate in fewer group play situations and interact more with teachers. The tendency of teachers to control the every-day situation in school or preschool for a child with disability may lead to fewer natural learning opportunities usually provided for children in such settings. For teenaged children, peer interaction is an important part of their life. If they have not learnt the proper skills to interact with peers before reaching this age it becomes a problem. This is by no means different for children with disabilities than for typically developing children.

**Methods and designs**

In earlier research positive functioning has mostly been studied by the use of one or a few items from measures of symptomatic behaviors, assuming that reductions of symptoms automatically will lead to positive functioning. In the studies in this thesis several instruments were used
that measure different developmentally appropriate activities and competencies present in children’s every-day life. Indexes were created from these variables and applied in cluster analyses in order to find patterns representing different levels of positive functioning. This was important in that children with different initial circumstances, such as age, developmental status, environmental prerequisites etc, may still show a similar outcome of engagement. In addition, with a longitudinal design such as the one applied in this research, children with different patterns of positive functioning are followed over time, and thus it is possible to study progression of skills and competencies in different areas of positive functioning.

The study of phenomena related to individual development and functioning is more fruitful in terms of continuous processes than as a current state. In this thesis this could be illustrated in that earlier research findings are rather consistent in that children with disabilities or developmental delay are less engaged in higher level behaviors, participate in fewer and less varied activities, and overall have more vulnerable relationships with both teachers and peers, than typically developing children (Eriksson & Granlund, 2004b; Guralnick, 2005; Simeonsson et al., 2001). These findings, although providing an important notion that children with disabilities or developmental delay need special attention in many areas, are not sufficient to make firm conclusions about how differences between children arise. In this thesis, several different alternatives have been given to explain the differences. One of the alternatives is that children with disabilities or developmental delay are more controlled by adults and not expected as other children to be able to handle their own development and learning process in the same manner. Teachers and other adults seem to be more directive and less responsive to the children’s initiatives and interests. This provides children with disabilities with fewer possibilities to act based on their own choices and interests, fewer possibilities to be challenged, and eventually fewer possibilities to be rewarded for obtaining a self-valued goal. In other words, children with disabilities are provided fewer opportunities to develop self-regulating skills and autonomy, skills that are emphasized in the child development literature as salient predictors of future functioning in both general and specific situations. In this thesis this is illustrated in Study IV, in which teachers were more responsive to children if the children were not developmentally delayed or had any behavior problems. Similarly, teacher responsiveness was the only factor that by itself could predict positive change in engagement over time. As earlier research has shown, children’s abilities to take initiatives to engagement and interaction are associated
with teacher responsiveness (McWilliam et al., 2002). At the same time teachers have shown tendencies to be more responsive towards children who are engaged and take initiatives. This self-reinforcing process of learning opportunities is probably a better predictor of future health and positive functioning than the fact of a disability, developmental delay, or chronic disease in early childhood.

Another possibility related to the difference between children with disabilities and developmental delay and children without disabilities is due to measurement issues. Most studies on individual development are conducted in a variable-oriented approach with methods that rely on group statistics, not paying attention to individual variation. In addition, most variable-oriented methods assume a linear relation between the effect of a disability or developmental delay and outcomes in the area of functioning and development. Prominent researchers within the field of individual development have argued that such linear relations do not hold for phenomenon related to individual development (Magnusson & Stattin, 1998). Although a significant relation was present between disability or developmental delay and engagement or participation in Study I, III, and IV in this thesis, the use of a person-oriented approach clarified the understanding of how several interacting factors act simultaneously to influence participation and engagement. The studies show large variation in the role of how disability and developmental delay, together with other person and environmental factors, lead to a certain outcome. In Study IV, children with developmental delay were significantly overrepresented in a couple of the profile groups. When examining the effect of developmental status, behavior, gender, and age, all considered in earlier literature to be risk factors of poorer engagement, only behavior could by itself predict lower engagement over time. This suggests that children with developmental delay are not at larger risk for lower engagement over time than typically developing children, if they do not show additional behavior problems.

Person or environmental factors influencing people’s health and well-being or related areas have often been discussed in terms of prevention of disease or illness prognosis. In terms of disease prevention these factors are often treated as more or less isolated indicators of a later outcome. This implies that a factor showing a significant relation with a certain phenomena on a group level also predict the outcome for each individual in the sample. One of the problems with this approach is that risk factors tend to cluster within small groups of individuals (Bergman, Magnusson, & El-Khoury, 2003; Magnusson & Stattin, 1998). When a group of individuals with many risk factors are removed from a sample there may
not be any significant relation between a specific risk factor and a later outcome. In study IV in this thesis two of the profile groups have significantly more children with combined risk factors. Although children with developmental delay were largely present in these profiles, the logistic regression model showed that the absence of behavior problems was the only significant predictor of positive development of engagement for these children over time. The implications of this phenomenon are both practical and methodological (Bergman, Magnusson, & El-Khoury, 2003). Practically, a certain problem might not be a problem over time if not present in a pattern of other problems or risk factors. Methodologically, this implies that results obtained at a group level most often are not valid for making inferences about results at an individual level. The work in this thesis was more focused an understanding how different processes influence outcomes on an individual level. All process variables thought to influence engagement and participation in this thesis were moderately correlated with participation. Using a variable-oriented approach would have suggested direct relations between autonomy and participation in school activities, and social interaction with peers and engagement on a group level. A person-oriented approach showed that on an individual level there was sustained variability among children and that relations seldom were direct and simple. Variable-oriented approaches often aim to reveal causal relations or find significant predictors that can explain how a certain factor influences a specific outcome, whereas person-oriented approaches often aim to gain an understanding of the processes underlying individual development and functioning. The work in this thesis has sought to advance this understanding by examining processes contributing to health and positive functioning for children with and without developmental delay.

**Limitations**

Individual development is a continuous, dynamic, and nonlinear process. Adding a longitudinal perspective in Study IV to the person-oriented perspective allowed an understanding of the process mechanisms over time. Studies I and III, however, were conducted by a cross-sectional design. In Study I, this was advantageous, in that two age groups were used to illustrate how different patterns of person and environmental factors influenced participation in different ages. A limitation is that the conclusions drawn about variations in patterns between ages may have been biased by cohort effects, rather than actual age effects. With a person-oriented approach, however, different individual processes could be
viewed that provide some clarification of how children of one age, compare to children of another age, participate in school activities.

Cluster analysis was applied in studies I, III, and IV in this thesis for the purpose of studying groups defined by patterns of factors and variation of these patterns over time. It can be argued that the level of information resulting from a cluster analysis is too simplified with the whole description of a child presented as just one categorical variable, the cluster membership. But, as argued by Bergman & Magnusson (1990), to describe such a complex issue as children's development, health or positive functioning demands simplification where non-essential aspects of information must be set aside, and eventually treated by an appropriate variable-oriented method (Bergman & Magnusson, 1990; Magnusson & Bergman, 1988). In the person-oriented approach of this thesis, complimentary variable oriented methods have been used to compare children with different patterns involving variables regarded as less significant in the process of positive functioning. Thus, person-oriented and variable-oriented methods should be seen as complementary in studies of individual development and functioning.

Another limitation of this thesis was how engagement was assessed with the youngest children. It has been argued that concepts such as engagement must be assessed by the use of subjective ratings that can capture the range of participation and how the child perceives his or her abilities to participate in their own life situations. With the young children in this study, subjective assessment was not obtainable. Parents and teachers served as respondents for the children by giving information in questionnaire form. The validity of measurement has been questioned in such second-hand reports (Wachs & Plomin, 1991). Problems of validity are associated with difficulties of retrospective reports in that they can be biased by parents and teachers attitudes about proper behavior of children. The problem with retrospective information was partly handled by informing teachers and parents that they should use the questionnaires as observation forms. The instruments measuring engagement for young children were chosen based on their objective and observable features, rather than instruments that measure subjective perceptions and internal processes. The teachers and parents were instructed to observe the children in their every-day situation during a two-week period and fill out the form during that period. The problem with attitudes about how a child should behave was partly handled by a pilot study in which teachers were asked about what they valued as positive characteristics of children. The answers revealed that social competence and engagement were considered foremost positive characteristics of children in preschool. The
study also revealed that the teacher’s expectations of children’s social competence and engagement increased with children’s age.

Further, Study II in this thesis served as a base for studying patterns of person and environment factors related to engagement and participation. In that study, interviews were conducted with somewhat older children (4-5 years) to secure reliable answers. Earlier research has shown that children are reliable informers and can express a thorough understanding of health and related concepts, although they do vary in this ability (Bird & Podmore, 1990). It can be argued that the children who were interviewed about their health beliefs were influenced by their parents and teachers health beliefs. When stating answers to the question about what one should do to stay healthy, the children sometimes said things such as “you should only drink water, not Fanta or Coca Cola” or “you should spend a lot of time outdoors”. These kinds of answers are probably influenced by adult’s perceptions about health and health promotion. This is logical, bearing in mind the role of observational learning and reinforcement in early childhood socialization defined by social learning theory (Bandura, 1989). In this regard, modelling of health behavior has been most effective for socializing children’s health behavior (Lau, Quadrel, & Hartman, 1990). Although, children’s perceptions may be influenced by adults they should be considered as valid sources of information. Wachs and Plomin (1991) argue that the question of validity of children’s reports is unimportant as long as the measurement meets psychometric standards of reliability. The interviews in Study II were used as a basis for the studies of health and positive functioning for young children where parents and teachers were used as observers and raters of children’s engagement.

Difficulties in capturing qualitative differences in children’s engagement over time were another limitation. The Child Engagement Questionnaire (McWilliam, 1991) consists of items representing different dimensions of engagement, but when used as a global measure each child receives an average score of engagement. Some children may engage to a high extent in high level behaviors, but to a lower extent in low level behaviors. Other children might engage to a high extent in low level behaviors, but to a lower extent in high level behaviors. When using the global measure of CEQ as an index of engagement, these children could receive similar ratings of engagement. This was partly handled in Study IV by dividing the CEQ into different dimensions of engagement. In the cluster analyses the dimensions of attention to adults and differentiated behavior/play were used process variables, while problem solving/persistence was used as an outcome variable. This choice was based on the hypothesis that attention to adults and differentiated behavior/play
are skills that influence the learning process leading to more advanced skills represented by problem solving and persistence. The sample mean in problem solving/persistence was lower than ratings in attention and differentiated behavior/play at both time points, but it was the only dimension of engagement that increased significantly between the time points, \( t(594) = 7.29, p < .001 \). The effect size in change between the two measurement points was .36, which is considered a low to moderate change.

The attrition of parent data in Study III was another limitation. The attrition was foremost represented in areas of the community where overrepresented by parents from other cultural and ethnic backgrounds. Initially, it was planned that the questionnaire should be translated to at least the largest second languages present in Sweden, but due to restrained economic resources in the project this was not possible. Further, even if such translations had been made, there could be cultural differences in interpretation of the questions and what kind of information parents were willing to share about their family and their children.

In the longitudinal study IV, there was also attrition of child data represented in both waves. Even though between 700 and 800 children were represented by their teachers separately in each wave, only 595 of the children had data from both waves. This attrition was caused by lack of time for the preschool teachers to answer the questionnaires about each child. There was, however, no significant difference in engagement of the children that were left out of the longitudinal study and those that participated. This indicates that the sample of 595 children used in Study IV was representative of the initial population for the study.

A final limitation was the attrition of data from the Child Health Services in Study III. Additionally, for one of the profile groups in Study III there was a large difference between the parent and teacher assessment of children’s developmental status. This could be due to situational circumstances mentioned earlier. In home settings, the demands on children to develop skills and competencies necessary to function in a social setting are not the same as they are in a preschool setting. Similarly, in clinical assessments of children’s development, the total functioning of the child in a social setting is not considered. Viewing development in a functional perspective it was assumed that teacher’s ratings would give a more representative picture of how children’s development was related to engagement in a social setting. The attrition of data from the Child Health Services did, however, not provide a thorough validation of ratings for all children, as was planned. The optimal measurement of children’s
development would have been obtained by the use of all three sources of information. However, this was the case for 223 of the children.

Summary and conclusions

In summary, the findings of this thesis demonstrate that different patterns and processes are involved in the development of health and positive functioning. The interactive nature of developmental processes is best studied by a longitudinal person-oriented approach to research. This allows for a thorough understanding of how different factors influence outcomes such as engagement and participation over time. Further, such an approach shows that factors defined as risk or protective factors as directly associated with engagement or participation in main effects studies seldom do have such a direct relation to the outcome on an individual level. A child’s developmental delay or disability was found to be just one out of many factors influencing engagement or participation. If risk factors such as behavior problems were present the probability that children would develop negative functioning over time was larger, but if only developmental delay was present there was no significant probability. Similarly, children with developmental delay or behavior problems were over time met with less responsiveness from their teachers. This combination of factors constitutes a risk, not the developmental delay or disability in itself. Factors such as autonomy, internal locus of control, and social interaction were found to be salient influences of engagement and participation, even though the relation was not always direct and simple. The interaction between personal factors and the immediate environment led to different processes for the children in the profile groups, both in a cross-sectional and a longitudinal perspective. For a thorough understanding of these processes a person-oriented approach capturing these interactive patterns and processes over time is necessary to understand health and positive functioning of young children.

Directions for future research

To expand on these person-oriented studies it would be interesting to apply a variable-oriented approach in which structural pathways could be explored. In such a model it would be possible to identify mechanisms central for engagement and participation. This could be done by the application of a causal field model (Lagerberg & Sundelin, 2000). The model is based on knowledge about what combinations of factors influence a certain outcome. The assumption is that one or a few risk factors are not sufficient to determine an outcome and that multiple components
influence a causal field. By the use of a causal field model, knowledge of what risk factors would predict a certain outcome could be obtained, with knowledge about the individual’s total pattern of risk and protective factors. This type of approach expands the person-oriented method used to gain understanding of what patterns of factors influence a certain outcome on an individual level to also be able to actually present a good prognosis for outcomes on an individual level.
References


