Peer Interaction in Preschool: Necessary, but not Sufficient

The Influence of Social Interaction on the link between Behavior Difficulties and Engagement among Children with and without Need of Special Support

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Abstract

The overall aim of this thesis is to enhance knowledge regarding engagement among children with and without need of special support due to behavior difficulties. The influence of social interaction as well as the provision of special support in Swedish preschool were investigated. Specifically, the aim was to explore children’s engagement at the nodal point between environmental factors, children’s behavior and characteristics, peer-to-child-interaction and teacher responsiveness, both in a cross-sectional perspective and over time. In addition, predictive factors for special support were explored.

A prospective longitudinal survey design with three data points was used, with both quantitative and qualitative data. The sample consisted of 829 children, 425 boys and 394 girls (10 missing) from 92 preschool units in six municipalities in Sweden. The children participated in at least one wave of data collection. The preschool staff rated the children’s engagement, behavior difficulties, and the provision of special support. Both cross-sectional and longitudinal analyses were conducted. For the cross-sectional analyses 663 children participated, and for the longitudinal analyses, 203 children participated. For the cross-sectional analyses logistics regression and content analyses as well as mediation analyses were used, meanwhile, structural equation models were used for longitudinal analyses, that is, growth curve model with multivariate analyses as well as autoregressive, cross-lagged panel analyses.

Overall, children with high levels of hyperactive behavior were less engaged in everyday activities in preschool. In addition, the peer-to-child-interaction and teacher responsiveness were rated lower for these children, both in current time and longitudinally. Children’s hyperactive behavior had more negative influence on their core engagement (e.g. attentional behavior and persistence behavior), compared to their developmental engagement, (e.g. problem solving, involvement in complex rule-based play, more common for older preschoolers). The levels of social interaction explained a large percent of the negative effect between hyperactive behavior and engagement. Peer-to-child interaction explained between 56-78 percent, whereas teacher responsiveness explained between 33-34 percent.

Over time, the level of hyperactive behavior decreased more dramatically for girls than for boys. However, boys who became more
engaged, showed less hyperactive behavior over time. The majority (63%) of the children displaying behavior difficulties (BD) did not receive special support on top of what was provided to all children in the classroom. No support was related to children being a second language learner in Swedish (EL2) or BDs that did not disturb the peer group or the teachers. Children more often received special support if the staff perceived the child’s behavior difficulties as disruptive in preschool activities or among peers. The most common type of support, mentioned by the staff, was paying attention to the child’s negative behavior, achieved by at least one member of the staff staying close to the child. Other examples of attention to the child’s negative behavior involved the preschool staff providing special support by paying attention to critical situations, by teacher’s proximity to the children, or by distracting the child from situations that could trigger negative behavior. Distractions were used more often for children with high engagement and BD.

Concerning directional and transactional paths, children’s core engagement was a significant predictor for both peer-to-child interaction and teacher responsiveness. That is, high levels of core engagement at T1 predicted both types of social interaction at T2, which in turn predicted children’s levels of core engagement at T3. Children’s hyperactive behavior did not predict lower ratings in social interactions in preschool over time, whereas, high ratings in peer-to-child interactions and teacher responsiveness were significant predictors for decreased hyperactive behavior over time. Once again, social interactions were important factors for promoting a decrease in children’s hyperactive behavior. Children with high levels of core engagement were more likely to be met by teacher responsiveness and positive peer-to-child interactions over time.

Several statistical relations exist between children’s engagement, BD, social interactions and special support in preschool settings. This thesis shows that perceived negative behaviors such as BD can co-exist with more positively perceived behaviors or characteristics, such as engagement. However, this research shows that well-functioning peer-to-child interaction and teacher interactions improve child engagement for children with hyperactive behavior, special support is not always provided and seldom focused on improving children’s engagement. In order to improve engagement among children in need of special support due to BD, it is necessary to consider both hyperactive behavior and engagement as well as the influence of social interactions. Teacher responsiveness and peer-to-child
interaction may work as supportive factors for children with hyperactive behavior to help sustain attention and stay actively engaged in the activities. Preschool teachers need to self-reflect on their organization, planning of everyday activities and how to design special support that consider individual children’s needs for improving their engagement.

*Keywords:* preschool, engagement, hyperactive behavior, teacher responsiveness, peer-to-child interaction, Bioecological Systems Theory, niches, proximal processes, environmental factors, cross-sectional, transactional processes, longitudinal design.
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<td>BD</td>
<td>Behavior difficulties related to the hyperactivity scale, conduct problems scale, emotional scale, and peer problems scale. Children’s documented behavior difficulties are based on preschool staff’s ratings using the Strength and Difficulties Questionnaire (SDQ; Goodman, 1997).</td>
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<tr>
<td>Conduct problems</td>
<td>Behavior difficulties such as aggressive behavior and temper tantrums.</td>
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<td>Hyperactive behavior</td>
<td>Behavior difficulties such as being easily distracted, having concentration difficulties, and wandering around.</td>
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<td>Engagement</td>
<td>Child behavior displaying focused and sustained attention and active participation in interaction with peers, teachers, activities, or materials.</td>
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<td>Core engagement</td>
<td>Engagement aspects with low correlations to the child’s chronological age, such as children’s attention towards other children or activities, and persistence behavior.</td>
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<td>Developmental engagement</td>
<td>More complex engagement behavior such as pretend play or use of language in a new way. Developmental engagement has high correlations with the child’s chronological age.</td>
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<td>Peer interaction</td>
<td>Other children’s interaction with the target child (i.e. other children adapt their pace in the interaction to the child).</td>
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<tr>
<td>Teacher responsiveness</td>
<td>Teacher’s interaction with the target child (e.g. the teacher comments or shows interest in what the child is doing, the teacher knows how to support and improve the child’s concentration on shared activities or material).</td>
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<tr>
<td>Children in need of special Support</td>
<td>Special support provided to children due to behavior difficulties affecting their everyday functioning in preschool.</td>
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<td>EL2</td>
<td>Children entitled as second-language learners of Swedish.</td>
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<td>SiS</td>
<td>Staff-initiated special support without supervision from external experts.</td>
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<tr>
<td>SuS</td>
<td>Special support under supervision in which staff receive supervision from external support service teams (e.g., from child and adolescent psychiatry)</td>
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Preface

Working as a special educator is a balancing act of handling several perspectives at the same time: the perspective of the child, the perspective of the parents and those of the preschool staff. All actors have their own explanations of why, when and how special support is needed beyond that which is provided to all children in the preschool classroom. During my time as a special educator, I have met children who have low self-confidence and doubt their ability to learn and develop new skills. These doubts may be expressed through the child acting out, becoming withdrawn or exhibiting other challenging behaviors. In addition, the parents often express feeling hopelessness in the fight for their child’s right to receive special support, and they constantly try to point out problems in the preschool classroom that might explain their child’s difficulties. At the same time, the preschool staff express how difficult it is to handle children with challenging behavior while also running the classroom for all the children. As a special educator, one must consider environmental factors that might be challenging for the child as well as the child’s ability to meet these demands. My experiences as a special educator form the basis of this thesis. These experiences led me to understand that children in need of special support can be viewed from several different perspectives, as the support format must be tailored to the demands of different activities in preschool environment.

The topic of this doctoral dissertation is children in need of special support and the ways in which the conditions created by everyday activities contribute to or hinder the child’s active involvement, with peers and teachers, in these activities. For example, interaction between preschool staff and the child, such as lack of responsiveness from the staff or teachers’ expressions of disapproval, might limit the child’s ability to be actively engaged. Meanwhile, other factors, such as how the staff create conditions that improve child-child interaction, might promote the child’s curiosity and increased engagement. Therefore, there are essential skills needed by both the special educator and the preschool staff working with children, who, due to their cognitive, social, and/or emotional difficulties, are in need of special support. Furthermore, the staff must have knowledge of how to design special support in the classroom and they also have to be aware of the child’s interests, abilities, and possible
lack of skills, and how these relate both to their expectations of the child and to the demands on the child's functioning in various activities. Special support should be based on knowledge of: characteristics and behaviors of the child, diversity of the preschool group, environmental factors, and expectations of the child’s functioning in the everyday activities. In addition, preschool staff need to know how to organize activities and necessary materials in order to improve engagement among all the children, both those with and without need of special support.

My hope is that this dissertation will contribute to the early identification of preschool children in need of special support and to an increased understanding of how early support might help these children gain confidence in their ability to learn and develop according to their own strengths and challenges.
Introduction

Preschool is one important environments for enhancing children’s learning, development and school readiness skills (Belsky et al., 2007; Heckman, Pinto, & Savelyev, 2013; Howes et al., 2008; Slot, Leseman, Verhagen, & Mulder, 2015). Engagement in everyday activities in preschool has been found to facilitate children’s learning and development, as well as being a long-term predictor for mental health and academic achievement (Almqvist, 2006; Gustafsson et al., 2010; Renblad & Brodin, 2014; Shonkoff et al., 2010; Williford, Whittaker, Vitiello, & Downer, 2013). However, children in need of special support due to behavior difficulties (BD) are less engaged in preschool activities compared to other children, which in turn may predict later academic underachievement (Almqvist, 2006; Metcalfe, Harvey, & Laws, 2013).

Several studies show that children displaying BD experience limitations in peer interaction in preschool and are met with less responsiveness from teachers (Almqvist & Granlund, 2005; Bulotsky-Shear, Fernandez, Dominguez, & Rouse, 2011; Coplan, Bullock, Archbell, & Bosacki, 2015; Odom et al., 2006). Engagement has been defined as a multidimensional construct, and concerns children’s active involvement and interaction with peers, teachers, and activities. It refers to children’s behaviors, cognition, and emotional expressions in interacting with the classroom environment (Fredricks, Blumenfeld, & Paris, 2004b; Skinner, Furrer, Marchand, & Kindermann, 2008). Being engaged in the classroom environment is partly dependent on child characteristics and capacity (e.g. self-regulation, preferences, activity competence), and partly on environmental factors (e.g. structure of the activity, teacher-child ratio, special support) and niches jointly constructed between the child and the environment. For instance, positive and cooperative peer interactions have been found to be related to the child’s time spent as highly engaged. Levels of engagement in turn promotes essential cognitive and social skills for better adaptation to the learning environment, which in turn improve the development of early literacy and mathematics skills (Goble et al., 2016; Vygotskij & Cole, 1978). Teacher responsiveness, such as a close and positive teacher-child relationship and low levels of teacher-child conflict, has been shown to be a predictive factor for children’s
engagement, and to improve children’s self-regulation skills and school readiness skills, especially for children in need of special support (Cadima, Doumen, Verschueren, & Buyse, 2015; Cadima, Verschueren, Leal, & Guedes, 2016; Williford, Maier, Downer, Pianta, & Howes, 2013). To conclude, several factors in the preschool may work as risk - or protective and/or promotive factors for engagement among children at risk for later learning difficulties and maladjustment in school. It is not known how social interaction factors interact over time to promote or hinder children’s engagement in preschool activities. More knowledge is needed about the reciprocal processes between social interactions with peers and teachers in preschool and engagement among children displaying BD, and how these processes change over time.

It has long been known that children’s access to high quality preschool environment largely impacts their learning and development (OECD, 2006; Sheridan, 2001; Sylva et al., 2006). There is an assumption that preschool attendance for children in need of special support may function as early intervention. The argument is that attending a high-quality preschool can counteract negative trends in child development due to psychosocial risk and can reduce the probability of later learning difficulties and maladjustments (Dominguez, Vitiello, Maier, & Greenfield, 2010). According to Swedish law, municipalities are obliged to offer placement in preschool for all children aged one to five years (SFS, 2010:800) Children with and without need of special support are usually within same the preschool units, and special groups for children in need of special support are rare. The Salamanca Declaration (1994) proclaimed that children in need of special support must have access to ordinary schools, and that schools should accommodate all children regardless of their physical, intellectual, social, emotional, linguistic or other conditions. The implications of the Declaration are further reinforced in several national and international policy documents (OECD; 2006; United Nations, 1989; United Nations, 2007, United Nations, 2015), proclaiming that inclusive learning environments in preschool and school are necessary conditions for promote children’s right to an equal education and for combatting discrimination. However, simply attending may not be enough.

High-quality and inclusive learning environments are value-based concepts and need to be linked to the researchers’ and/or practitioners’ perspectives
concerning both theory and practice. Inclusive learning environment refers to preschool classrooms where the staff consider the diversity of the children in the peer group in their planning of preschool activities and organization of the day (Lillvist & Granlund, 2010; Odom & Diamond, 1998; Skolinspektionen, 2017). However, concerns are raised that mainstream preschool may fall short in promoting children’s development and learning, especially concerning children in need of special support (Barton & Smith, 2015). Access to preschool is likely a necessary but insufficient requirement for children’s engagement, especially for children in need of special support.

One of the most important factors for quality in preschool is the educational level and experiences of the teachers (Wang, Elicker, McMullen, & Mao, 2008). It is also related to the quality of teacher-child interactions and peer interactions, which are promotive factors for children’s engagement in activities. Engagement enhances children’s learning, development, and health (Hughes, 2010; Rimm-Kaufman, La Paro, Downer, & Pianta, 2005). Positive social interactions with peers and teachers within preschool units directly influence the engagement among children in need of special support, can thus be seen as an indicator of high quality. It is likely that preschool in general cannot be regarded as an inclusive learning environment without considering the reciprocal influences between the social processes in preschool activities and the engagement among children in need of special support.

Engagement among children with and without need of special support occurs through mutual influences between available niches, the children’s capacities and the characteristics of the environment. For this thesis, niches refer to everyday activities jointly created by child-child interaction and teacher-child interaction occurs in the nodal point between characteristics of the child and the environment. Thus, engagement needs to be explored as a transactional process (Sameroff, 2009), between child characteristics, niches on the one hand and environmental factors on the other, of which the preschool is one of the microsystems (Bronfenbrenner & Ceci, 1994). The processes are mutually influenced by children’s behavior, preferences, activity competences, and social interactions in niches (e.g. peer interactions and teacher responsiveness) and characteristics of the preschool environment (i.e. child-initiated activities, teacher-initiated activities, group composition). With time, the promotive quality of these processes may determine whether the preschool unit can be regarded as an inclusive learning environment where all children, both with
and without need of special support, have the same opportunities to develop and learn.

The aim for this thesis is to enhance knowledge regarding engagement among children with and without need of special support due to behavior difficulties. The influence of social interaction as well as the provision of special support in Swedish preschool were investigated. Specifically, the aim was to explore children’s engagement at the nodal point between environmental factors, child’s behavior and characteristics, peer-to-child interaction and teacher responsiveness, in a current perspective and over time. In addition, predictive factors for special support were explored.
A preschool for all children

In this section, the following concepts are defined: the Swedish preschool system, children in need of special support, type of special support, inclusive learning practices, engagement, behavior difficulties, and social interaction processes. Thereafter, the theoretical framework of the thesis is presented.

Children in need of special support in Swedish preschools

The Swedish preschool system

In Sweden, preschool is provided to all children, with and without need of special support. Together with the family, the preschool constitutes a starting point for lifelong learning. Preschool is a part of the educational system in Sweden, and the municipality is obligated to provide all children from one year of age a place in preschool (SFS 2010:800). Almost 77 percent of all children between one and three years of age, and 95 percent of all children between four and five years of age, regularly attend preschool. Children spend an average of four to eight hours a day in preschool. Swedish preschools have a common curriculum, and 39 percent of the staff of municipal preschools have a higher education on bachelor level. These facts underpin that the educational content of preschool is important. In fall 2016, there were on average 5.2 children per preschool staff \(^1\) and 15.9 children in each preschool group. In groups with children between one and three years of age, there were on average 12.8 children per group on average (National Agency of Education, 2017).

The responsibility of the preschool is to create a safe and stimulating environment, where all children participate based on their own prerequisites.

In 2011 preschool became a separate school form, with clearer goals to strive for, including topics such as mathematics, science, technology and language.

\(^1\)Staff refers to preschool teacher with higher education on bachelor level as well as nurses/preschool assistant with education on upper secondary level
Teaching refers to goal-oriented processes as directed by the preschool teacher’s aim to facilitate children’s development and learning through the acquisition and development of knowledge and values. The preschool has a dual mission: to stimulate development and learning while also promoting caring. Children’s right to special support is stressed in the Swedish Education Act (SFS 2010:800) as follows:

Children needing special support for their development of physical, psychological or other reasons should be given the support their special needs require. If, through information from preschool staff, a child or the child’s guardians, or in another way, it is discovered that a child is in need of special support, the preschool manager shall ensure that the child is given such support. The child’s guardians shall be given the opportunity to participate in designing the special support. (SFS 2010:800, Ch. 8, § 9)

Children in need of special support are entitled to placement in ordinary preschool, and have the right to special support if needed. This support should be given primarily within the child’s preschool group, and be adapted to the needs and all children (National Agency of Education, 2016).

Preschool attendance is viewed as a form of generic support for all children. In accordance with the Swedish preschool curriculum (Swedish National Agency for Education, 2016), the activities must be adapted to the needs of each child. As there is no universal support that works for all children, special support needs to be tailored to each child’s specific needs. The curriculum does not provide information on how to design special support to improve children’s development and learning. In the individual preschool environment, the design of special support depends on the preschool staff’s didactic skills, knowledge of the preschool curriculum, and beliefs and views concerning children (Sheridan, Williams, Sandberg, & Vuorinen, 2011).

**Who needs special support, and why?**

In Sweden different theories and perspectives have been used for decades to explain children’s need of special support and to understand the complex interrelationships between children’s characteristics, expectations of functioning within the preschool context, and policy documents for preschool. Within special education research, explanatory models of why special support
are needed for some children have a tendency to be presented as a dichotomy (Nilholm, Almqvist, Göransson, & Lindqvist, 2013). On the one hand, based on a categorical perspective, children’s needs are explained as solely related to their characteristics and shortcomings in developing new skills. On the other hand, based on the relational perspective, children’s needs of special support are mainly related to environmental shortcomings (Rosenqvist, 2013). However, neither the categorical nor the relational perspective provides a full explanation of children’s need of special support and how to plan appropriate special support to improve their learning and development. Accordingly, the field of special education needs to visualize the interrelationship between environmental characteristics, interaction processes, and the children’s characteristics. This interrelationship pattern has to be interpreted using different perspectives: environmental risk factors (both within and outside the preschool environmental context) and personal risk factors that might have a negative influence on the children’s development and learning; group processes and leadership in the classroom that might lead to inclusion or exclusion; and exclusion processes in society (Fischbein & Österberg, 2003). In other words, in order to design appropriate special support, the preschool staff need to consider children’s need of special support as a multidimensional construct involving the children’s abilities and preferences, as well as environmental factors, which are influenced by norms and values and lead to the inclusion or exclusion of the children in need of special support.

Traditionally, children in need of special support have been classified into different categories, e.g. intellectual disabilities, motor disability, hearing and visual impairments, or language delay (SOU 2006:100, p. 202). About 4-5 percent of the children in Swedish preschools have been formally identified as being need of special support due to a disability or a diagnosis. In addition, based on preschool staff’s judgement of children’s special needs due to behavior difficulties, an additional 11-17 percent of the children are considered to need special support in order to function in the everyday activities of the preschool (Lillvist & Granlund, 2010; Lutz, 2009). Furthermore, similar percentages are found in other countries. For example, in the US about 8-22 percent of preschool children exhibit moderate to clinically significant emotional and behavioral problems (Brauner & Stephens, 2006; Thompson & Raikes, 2007). The assessment that identifies disability in children is based primarily on norm-referenced measures and/or diagnoses, rather than on everyday functioning in preschool. A relatively high
proportion of children formally identified as being in need of special support display BD (Lebeer et al., 2010).

Diagnoses or disability categories are not sufficient for explaining children’s engagement in preschool (Simeonsson, 2006). Researchers have stressed the importance of using a more functional approach in assessing the special needs of children. In such an approach, children’s difficulties should be defined in relation to their everyday context (Lillvist, 2010; Lillvist & Granlund, 2010; Simeonsson, 2006). Several Swedish studies show that preschool teachers identify children in need of special support based on their perceptions of how to handle the BD in everyday activities, or peer problems (Lillvist & Granlund, 2010; Sandberg, Lillvist, Eriksson, Björck-Åkesson, & Granlund, 2010). In addition, a Swedish study by Sandberg et al. (2010) revealed that staff identified children in need of special support in relation to environmental resources, as well as based on the child’s individual characteristics and everyday functioning in preschool activities and routines. The most common problems exhibited by children occurred in peer interaction.

**Type of special support provided in preschool**

Children who are at risk of developing learning difficulties or having developmental delay require additional support beyond what is provided to all children during the preschool day. The type of special support provided in Swedish preschools depends on whether the child is formally identified as being in need of special support (i.e. disability) or is identified primarily in relation to everyday functioning in the natural environment with no formal identification (e.g. preschool, home, leisure activities).

A Swedish interview study by Sandberg, Norling, and Lillvist (2009) shows that preschool staff can provide indirect or direct special support. Indirect support refers to general activities provided to all children with and without need of special support, and constitutes the overall quality, norms, values, and practices based on the central concepts of the preschool curriculum: “The activities should be fun, safe and instructive to improve participation among all children […] the preschool activities should be adapted to all children in preschool” (Skolverket, 2016, p. 5). Direct support refers to specific interventions tailored to meet the specific needs of the child, often based on the child’s right to receive additional support beyond what is provided to all
children. The decision of whether the child has the right to additional resources is generally based on traditional disability categories, although these offer little information on how the child functions in the preschool (Simeonsson, 2006). Thus, general support, i.e. preschool attendance in activities together with other children in the preschool group is necessary but not sufficient for providing all children with the support they need. It might not provide the individual child with support needed in everyday activities in the preschool environment (Björck-Åkesson & Granlund, 2005). The way the preschool staff provide support has been shown to be related to the number of children in need of special support within the preschool units. Preschool units with high numbers of children in need of special support include these children in the main preschool activities, and do not tend to provide specific support designed for the individual child. Units with low number of children in need of special support tend to provide special support outside ordinary routines (Sandberg et al., 2009). Interventions are often designed with the aim to facilitate group functioning, and mainly focus on decreasing the effect of children’s BD on the group and may not primarily emphasize the individual child’s everyday functioning (Drugli & Hjemdal, 2013; Lahdenperä, 1999).

Inclusive learning practices in Swedish preschools

The Swedish Education Act (SFS, 2010:800) states that preschool education should promote all children’s development and learning. Based on a democratic climate, the curriculum for Swedish preschool (The National Agency for Education., 2016) states that pedagogical activities should be related to the needs of all children in the preschool, and that the preschool’s goal is to strive for each child to develop his/her identity, curiosity, enjoyment, self-autonomy, and participation. All preschool staff have the responsibility to pay special attention to children who are in need of additional support due to physical, psychological, health-related, socioeconomic, or other factors (SFS, 2010:800). Children’s right to support is further reinforced in the revised version of the preschool curriculum (The National Agency for Education, 2016), which stresses that “Children who occasionally, or on a more permanent basis, need more support and stimulation than others should receive such support in relation to their needs and circumstances so that they are able to develop as well as possible” (p. 5). From this point of view, Swedish preschool can be regarded as an inclusive learning practice where children with and without need of special support attend equal environments.
However, in their critical analysis of inclusion in practice, Göransson, Nilholm, and Karlsson (2011) stress that the policy documents leave a great deal of room for interpretation at the municipal and school levels, and this results in an extensive variation.

Inclusion might only be a vision of the direction in which the political level wants to develop the institutions of the welfare state, and create a preschool for all (Hansen, 2012). Hence, the vision of inclusion needs to be related to the specific preschool context in order to more carefully explore inclusion and exclusion processes to gain a deeper understanding of preschool as involving inclusive practices. The definition of inclusive learning practices refers to preschool settings where the staff consider the diversity of the children in the peer group. Based on this knowledge, the preschool environment is planned to promote children’s engagement and learning (Ahlberg, 2009; Odom & Diamond, 1998). That is, engagement can be seen as an outcome of inclusive practices. This engagement outcome is this also dependent on the support provided to children in need of special support to enhance their engagement.

Engagement among children with behavior difficulties

Engagement
Children’s engagement has been widely studied in recent decades, and researchers have pointed out engagement as a necessary component of children’s learning and development (Cadima et al., 2015; Chien et al., 2010; Ladd & Dinella, 2009) McGarity and Butts (1984) summarize the importance of engagement in learning: “A student can be engaged and not achieve, but it is hard for a student to learn a task who was not engaged while that task was being taught” (p. 60). This statement implies that engagement in classroom activities may not be sufficient for learning, but may be a necessary component (Ladd & Dinella, 2009; McCormick, Noonan, & Heck, 1998; McCormick, Wong, & Yogi, 2003; McWilliam, Trivette, & Dunst, 1985). Although there are many conceptualizations of engagement, there is agreement that it is a multidimensional construct involving behavioral, emotional, and cognitive aspects. Behavioral engagement refers to children’s attendance, participation, and involvement in activities. Emotional engagement denotes the child’s emotions towards teachers, peers, or the school/preschool as an institution. Finally, cognitive engagement refers to the child’s investment in learning, is related to self-regulation, and includes the
child’s persistence behavior, comprehension of cognitively complex ideas, and acquisition of difficult skills (Fredricks, Blumenfeld, & Paris, 2004a; Skinner, Kindermann, & Furrer, 2008).

Research conducted in preschool settings, like this thesis, tend to be focused on behavioral and/or emotional engagement (Raspa, McWilliam, & Maher Ridley, 2001; Vitiello, Booren, Downer, & Williford, 2012). In general, children’s engagement in preschool has been referred to as the amount of time a child interacts with other children or adults in activities or play materials, in a developmentally and contextually appropriate manner (McWilliam & Bailey, 1992). Developmentally and contextually manner refers to behaviors expected according to the child’s chronological age and how the children’s ability to adapting their behavior in accordance to expectation of the specific activity. Mature children usually show increased complexity in their engagement behavior, e.g. involvement in complex role-play, tries to handle complex problem solving. In addition, older children are expected to a higher extent, manage or modulate their positive and negative emotions, to inhibit or control their behavior, and to shift and focus their attention in accordance during teacher-directed activities, such as circle time (Aguiar & McWilliam, 2013; Blasco, Bailey, & Burchinal, 1993). Accordingly, engagement might be viewed as a continuum from engagement in less complex activities to sophisticated engagement, an indicator of engagement behavior related to development. On the other hand, engagement might also be viewed as the intensity of engagement behavior, regardless of complexity, from low to high levels of engagement behavior. High levels of engagement could be observed in the child’s body language, e.g. the child concentrate highly persistence and attention towards a person or material. Meanwhile, low levels of engagement might be observed when the child briefly looking around, without paying attention or interest towards something specific (Farran, unpublished manuscript). An observational study by Casey, McWilliam, and Sims (2012), shows that children in need of special support were observed spending less time in complex engagement compared to children without need of special support, and spending more time in less complex engagement, such as shared attention. Levels of the intensity of children’s engagement behavior, e.g. attentional behavior or persistence, have been shown to be a significant predictor for achievements, mastery motivation and learning, regardless of the complexity of the activity or task (Casey et al., 2012; McClelland, Acock, Piccinin, Rhea, & Stallings, 2013). Children in need of special support due to
behavior difficulties or disability might be highly engaged if the activity is less complex, which in turn improve their learning and development.

In accordance with the Bioecological Systems Theory by Bronfenbrenner and Evans (2000), children’s development takes place through “processes of progressively more complex reciprocal interaction between an active, evolving biopsychological human organism and the persons, objects, and symbols in its immediate environment” (p. 38). Proximal processes involving the child, such as social interaction, is the driving force for children’s development and learning. To be effective, proximal processes need to occur on a relatively frequent basis over an extended period of time. An observable indicator of ongoing proximal processes is children’s engagement. However, the impact of increasing complexity of interaction on the effect of proximal processes is questionable. Since evidence is lacking concerning the issue of complexity, it requires more research.

**Significance of behavior difficulties**

It has been shown that child-initiated activities require children to have good skills in initiating, maintaining and completing the activities in a socially accepted way (Granlund et al., 2015). Studies show that children displaying BD tend to spend more time unoccupied, at lower levels of engagement, or involved in solitary active play during child-initiated activities. Thus, these types of low engagement behavior may be a risk indicator for learning difficulties, or might influence the development of cognition and school-readiness skills (Coplan, Wichmann, & Lagacé-Séguin, 2001; Fantuzzo, Bulotsky-Shearer, Fusco, & McWayne, 2005).

Behavior difficulties (BD) are typically divided into two general categories: externalizing and internalizing difficulties. Externalizing difficulties are outward-directed and involve acting-out, defiant and noncompliant behaviors, whereas, internalizing problems involve more introvert behavior and including withdrawal, depression and anxiety (Bagner, Rodriguez, Blake, Linares, & Carter, 2012). Other indicators of BD among preschoolers are loneliness, which has been found to be a marker variable for both early internalizing and externalizing BD (Cassidy, Werner, Rourke, Zubernis, & Balaraman, 2003). Another observation study shows that solitary-active play might be an indicator of BD that might have a negative influence on the children’s learning and development. Solitary-active play consists of play
behavior related to sensorimotor and/or dramatic activity acted out by oneself, despite being in the company of others. It was found to be related to parent’s ratings of their children’s negative experiences of preschool (Coplan et al., 2001).

Studies have shown that especially externalizing BD among children in need of special support is identified as challenging behavior, and has a negative influence on the surroundings (i.e. preschool staff, parents, peers). Challenging behavior has been defined as “any repeated pattern of behavior or perception of behavior that interferes with or is at risk of interfering with optimal learning or engagement in prosocial interactions with peers and adults” (p. 83) (Powell, Fixsen, Dunlap, Smith, & Fox, 2007). A meta-analysis by Allan, Allan, Lerner, Farrington, and Lonigan (2015) showed that children with externalizing behavior difficulties have problems regulating their attention and excluding non-relevant stimuli. Other studies indicate that children displaying externalizing BD show lower levels of self-regulation, which in turn result in the child not maintaining engagement long enough to be active participants in preschool play activities (Searle, Miller-Lewis, Sawyer, & Baghurst, 2013). The term self-regulation refers to “children’s ability to manage or modulate positive and negative emotions, to inhibit or control their behavior, and to shift and focus their attention”, (Raver et al., 2012, p. 247). In order to handle externalizing BD in the classroom and improve learning and development for all children, teachers must have high levels of didactic skills and knowledge, be able to transform the preschool curriculum into everyday activities, and have positive beliefs and views concerning children (Sheridan et al., 2011; Williams, Sheridan, & Sandberg, 2014).

Another aspect of the daily work of preschool staff is related to environmental factors (i.e. type of activities, grouping of the peer group), that might influence children’s opportunity to be engaged in preschool. Important aspects seem to be how activities are organized, staff communication skills, and how both teachers and peers are perceived and are influenced by BD among children of preschool age (McComas, Johnson, & Symons, 2005; Skalicka, Belsky, Stenseng, & Wichstrom, 2015).
Environmental factors, niches, and social interactions

Environmental factors and children’s niches

Children’s experiences in the natural environment play a major role in their learning and development. Natural environment refers to the microsystems, i.e. the proximal environments in which the children are participants (e.g. preschool, school, home). The preschool classroom is one of the microsystems where most Swedish children between one and five years of age spend a great deal of time. Experiences in preschool give children regular opportunities to be engaged in tasks and social interaction with peers and teachers (Dunst, Bruder, Trivette, & Hamby, 2006).

Although children with and without need of special support attend the same preschool environment, their niches may vary depending on the interrelationships between preschool environmental factors, proximal processes, the child characteristics and interest. Because of this individuality, available niches may vary for children in the same environment. For instance, the interrelationship between type of activity for the whole group (environmental factors) and the children’s opportunity to be engaged in the learning activities has been shown to be associated with academic outcome among children (early reading and mathematics ability). Children with BD were more likely to show low academic outcome, compared to children without BD. Probably children with BD partly creating other niches in certain whole group activities because of having difficulties with meeting the activity requirements. In addition, early BD in peer interaction situations predicted negative attitudes toward learning and appropriately engaging in social classroom learning activities (Bulotsky-Shearer et al., 2011). Thus, even though teachers provide all children learning opportunities through the same structured activities, the opportunity to learn for the individual child might be different depending on the child’s perception of the activity and the niches constructed (see the Theoretical framework section).

For this thesis, environmental factors refer to structural aspects such as number of children in the classroom, teacher-child ratio, number of children in need of special support, or number of early second-language learners of Swedish (EL2). These factors are determined at system levels more distal from the children (e.g. exo- and macro-system levels). Another example of an
environmental factor is teachers’ decision regarding how to organize the preschool day in terms of grouping and activities. The patterns of their organization of common activities and grouping include mealtime, small group activity, circle time, child-initiated activities, and transitions between activities (Early et al., 2010). A longitudinal project using the same data as in this theses by Granlund et al. (2015) showed that the environmental factors (i.e. type of activities) in the microsystem were related to the proportion of children defined as EL2 and the number of children with behavior difficulties. For instance, high frequencies of teacher-initiated activities such as small group or circle time were more common in preschool units where many children displayed hyperactive behavior. Meanwhile, the frequencies of free-choice play activities were more common in preschool units where many children displayed conduct problems. This implies an interrelationship between the characteristics of the child, different types of BD (e.g. conduct problems and hyperactive behavior), and environmental factors in the microsystem.

To conclude, children’s opportunities to learn and develop are situated at the nodal point between individual children’s preferences, sense of self and activity competence on the one hand and the environmental factors on the other; that is, in the niches (Imms et al., 2016; Super & Harkness, 1986; Wachs, 2000). A niche has been defined as “a pattern of activity roles and interpersonal relations in face to face setting with particular physical, material features, and containing other persons with distinctive characteristics” (Bronfenbrenner, 1999, p. 277). The range of possible niches for children with and without need of special support might be different. This is related to how the child perceives the activities, people and objects. In interplay with children’s characteristics, accessibility of the activities, attitudes and social interaction pattern in the specific preschool can either enhance or restrict the child’s exposure to varying niches, and also the child’s capacity to discover and enter existing niches, which in turn leads to differences in opportunities for them to “become engaged” (Wachs, 1996)

**Peer interaction and teacher responsiveness**

Children’s engagement and social interactions in preschool plays a crucial role for in their cognitive, emotional, and academic development (Hughes, Bullock, & Coplan, 2014). Cross-sectional and longitudinal studies have shown that positive interaction with peers is positively associated with
prosocial behavior, cooperation and engagement in learning activities, and negatively associated with hyperactive behavior, exclusion by peers, and disruption (Coolahan, Fantuzzo, Mendez, & McDermott, 2000; Sallquist, DiDonato, Hanish, Martin, & Fabes, 2012). Preschool staff perceptions of children’s learning and development in preschool have been shown to be related to several system levels, from society to the microsystem in which the preschool environment is shared by teacher and child. Learning and development seem to be improved when preschool teachers use an interactive style, and engage in goal-directed communication with the children (Doverborg & Pramling Samuelsson, 2012; Sheridan, Williams, & Sandberg, 2013). It is also important that teachers possess knowledge about the content they are communicating about (Samuelsson, Carlsson, Olsson, Pramling, & Wallerstedt, 2009).

Children’s social interaction with peers in early childhood can be divided into different categories or types of participation, including unoccupied behavior, solitary play, onlooker behavior, parallel play, associative play, and cooperative play (Parten, 1932). These categories occur frequently in everyday activities in preschool when children’s play behaviors during free-choice play activities are observed (Farran & Son-Yarbrough, 2001). Free-choice play activities usually entail spontaneous activities initiated by the children with little involvement by the preschool staff. It places high demands on children’s skills in initiating, maintaining and finishing the activity in a socially accepted manner. For instance, a cross-sectional study shows that solitary active play in free-choice play activities were observed more frequently among children who displayed externalizing BD. These children tended to act out in the preschool classroom and were rated by their parents as having a shorter attention span, being more difficult to soothe when upset, and being shy. In addition, the children expressed that they felt less satisfied with their preschool experiences (Coplan et al., 2001). However, studies have shown a decreasing level of children’s BD when they are met with teacher responsiveness and are involved in positive interactions with peers (Buyse, Verschueren, Doumen, Van Damme, & Maes, 2008; Graves & Howes, 2011). The association between children with BD and the quality of teacher-child as well as child-child interactions has been found to be a transactional process (Roorda, Verschueren, Vancraeyveldt, Van Craeyveldt, & Colpin, 2014).
In the longitudinal project by Granlund et al. (2015) using the same data as in this thesis, children were in free-choice play activities during 74 percent of the observations. The proportion of observations of free-choice play activities differed between preschool units. Preschool units with high numbers of BD among the children had lower percentages of free play and higher percentages of structured activities (small group activities, circle time), initiated by the preschool staff. The results indicate that there is an interdependency between children’s BD behavior and staff decisions regarding how to organize structured everyday activities in the units. Another longitudinal study by Fuhs, Farran, and Nesbitt (2013) shows that children’s engagement in learning teacher-initiated activities and a combination of teachers’ positive emotional tone and approving behavior predict children’s gain in cognitive self-regulation skills. Other researchers suggest that preschool teachers’ belief in their competence, and in addition to their level of experience, influences their interaction with the children and how they organize activities to promote the children’s learning and development (Sylva et al., 2006). Further, a longitudinal study by Spivak and Farran (2016) indicates that preschool settings where teachers display more approval responses to children’s behavior were associated with children’s gains in social interactions with peers and lower frequencies of behavior difficulties in the first grade. Similar results were found in another study conducted in Sweden and Germany, with the purpose of exploring different quality dimensions in preschools (Sheridan, 2007). The results revealed four different teaching strategies in which teachers interacted with and approached children: abdication, dominance, the democratic strategy, and democratic/learning-oriented strategy. Preschools where teachers used abdication or dominance were characterized by more conflicts between children and little space for their own initiatives, which in turn showed to have a negative influence on their participation. When teachers used democratic/learning strategies this promoted interplay, participation, communication and cooperation between the teachers and children, and among children in the peer group.

Accordingly, children not only influence but also are influenced by their social environment; their development is likely based on both child characteristics and the social and psychical environment in which they are engaged (Sommer, Pramling Samuelsson, & Hundeide, 2013). In order to create a preschool for all children, it is necessary to be aware both of how children affect staff, the abilities and skills of the individual child and how the staff affects the children.
This transactional perspective is important to recognize in the provision of support that promotes development and learning for all children (Björck-Åkesson, 2009). In order to plan additional support to promote engagement among children displaying BD, it is not useful to merely identify the shortcomings in their engagement in activities or with peers (Almqvist, 2014); it is also necessary to understand the mutual influences between the child and the immediate setting (i.e. preschool) in which different activities can take place (Bronfenbrenner & Ceci, 1994). The Family of Participation Related Constructs framework by Imms et al. (2016) implies that even if children with and without special support are within the same preschool environment, the experiences of and how to act within the same activity may vary among children as well as among preschool staff. The field of special education research is based on the premise that early interventions in natural settings can improve learning and development for children in need of special support, and also counteract a negative trend. Traditionally, the starting point has been that children who are identified as doing poorly early in life will do poorly later in life. In contrast studies have shown that there is no linear relationship between children’s functioning in early childhood and their later functioning. Rather, it is a mutual interaction between risk factors and protective factors that might predict future outcomes (Sameroff & Rosenblum, 2006).
Theoretical framework

In this section, the theoretical framework for the thesis is presented. The point of the departure is the *Bioecological Systems Theory, proximal processes and niches*, and the *transactional model*.

Bioecological Systems Theory

The theoretical framework this thesis is based on the Bioecological Systems Theory (Bronfenbrenner & Ceci, 1994). It is used to explain the complex associations between the preschool environmental factors and engagement among children displaying behavior difficulties (BD).

Systems theory is a useful theoretical framework for understanding changes and the interdependency between various factors at different system levels associated with trajectories of children’s engagement and behavior difficulties (Bornman & Granlund, 2007). Changes in a system are related to two important concepts: equifinality and self-stabilization (Bornman & Granlund, 2007). Equifinality refers to a process of mutual influences between individuals and the environment, and the same final state (i.e. engagement) can be reached from different initial states and in different ways (Cicchetti & Rogosch, 1996). Self-stabilization refers to the system’s ability to respond to internal or external influences (i.e. open systems) (Bornman & Granlund, 2007). In other words, a system makes internal modifications to the relationship between component parts in response to the changes in environment to keep the system stable (Wachs, 2000).

Child development and the preschool microsystem

The bioecological model by Bronfenbrenner (1999a), contains two propositions that specify its defining properties. First, children’s development takes place through processes of reciprocal interactions between an active child, the child’s evolving behavior, and the environment. These interactions need to occur fairly regularly over an extended period of time to be effective in a child’s development. Secondly, the form, power, content, and direction of the proximal processes affecting development vary systematically as a joint function of the characteristics of the child and of the environment – both proximal and distal–in which these processes take place (Rutter, 2012). To
understand and explore child development the process-person-context-time (Bronfenbrenner, 1999b) need to be considered. The theory involves a conceptualization of the ecological environment as a set of nested systems ranging from macro to microsystems changing over time.

A system consists of several components that influence each other and change over time. The microsystems (e.g. family, preschool, leisure activities) directly influence children’s engagement and development. The mesosystem could be viewed as a communication between two microsystems (e.g. home and preschool). Exosystems involve one system having an indirect influence on another system that has a direct influence on the child (e.g. decision-making at community level: additional resources among preschools with children in need of special support, group size). The macrosystem (e.g. laws, curriculum for preschool, norms) have indirect influences on children’s engagement in preschool. Laws established by a government can highly influence children’s development and learning, for example legislation concerning special support for children who are in need because of physical, psychological, or other reasons. Bronfenbrenner (1999) also defines the chronosystem, which refers to the aspect of time in which all individual development exists.

For this thesis, social interaction processes, engagement and behavior difficulties are explored in preschool, that is one of the microsystems that has a direct impact on the development and learning of children with and without need of special support. In this microsystem, the children are directly influenced by the interactions and activities in the system. In addition, the children have a direct influence on their surroundings through their choice of materials and how they initiate or respond in interaction with peers and teachers. For instance, children’s hyperactive behavior might influence child-child interaction negatively which in turn lead to that other children avoid the child. However, children’s engagement and need of special support do not exist in a vacuum but rather in the specific context where conditions at different levels contribute to the understanding of the processes within the microsystem (Bronfenbrenner & Evans, 2000). Such indirect linkages studied in this thesis concern, for group size, the geographical area where the unit is situated, rules and regulations for when and how external experts can act as supervisors, etc.
The influences on the child from child characteristics and environment can be divided into risk and protective factors. Environmental risk factors that negatively affect children’s development can involve a lack of responsive and warm relationships with teachers or peers (Commodari, 2013). Examples of protective environmental factors are having access to at least one primary attachment person (parent or teacher) and growing up in a safe community (Tetzchner & Lindelöf, 2005). Individual characteristics can be protective factors for development; e.g., persistence and social competence are dimensions that have a positive influence on children’s development. Individual risk factors might entail externalizing behavior difficulties, which in turn can have a negative influence on the quality of the interaction with parents, teachers, and peers (Bulotsky-Shearer, Bell, & Dominguez, 2012). However, no specific risk or protective factor in isolation strongly influences children’s development. Rather, it is the total accumulated product of risk and protective factors to which an individual is exposed over time that determines the trajectories of child development (Corapci, 2010; Sameroff, 2010).

To enhance the knowledge about children’s engagement in preschool, not only child characteristics and environmental factors in the microsystem but also proximal processes and niches must be clearly conceptualized.

**Proximal processes and niches**

A child’s early experiences influence how he or she handles new situations, such as starting preschool. Children with a secure attachment style are more likely to cope with environmental challenges than are those who are insecurely attached (Sroufe, Carlson, Levy, & Egeland, 1999; Vaughn, 2008; Wolff & Ijzendoorn, 1997). Attachment style has been found to be related to aspects of individual characteristics such as dependency/independency and self-esteem (which are predictors of later social relationships) and engagement with peers in preschool (Sroufe, Egeland, Carlson, & Collins, 2005a). The sum of experiences might work as a causal chain, with cumulative influences built into developmental processes. The occurrence of insecure attachment early in life may increase the probability of the occurrence of later types of influence, which act to maintain the impact of the earlier influences (Wachs, 2000). In other words, a child’s positive experiences might influence his or her interest in new environment settings and activities, whereas negative experiences might encourage an avoidance of new situations and solitary activities.
Children’s engagement is therefore the nodal point between their characteristics and the environment. In addition, the niches are constructed by the interplay between child, peers, and teachers within these environments (e.g. preschool). The niches created are jointly framed by the children’s earlier experiences, preferences, activity competences and other characteristics, as well as environmental factors such as staff organization of the physical environment and planning of the activities within the group. The niche concept expands Bronfenbrenner’s bioecological model (1994) by going beyond the physical environment in the microsystem and including the influences of child characteristics: “cognitive abilities and skills, interpersonal characteristics and attitudes, that are potentially available to a given individual” (Wachs, 2000, p. 301). There are bidirectional influences between children’s lived experiences and characteristics on the one hand and the niches on the other (Ibid). For instance, children’s externalizing behavior difficulties might influence their niches due to their low attention span and their difficulty sustaining attention in problem-solving and excluding non-relevant stimuli (Allan et al., 2015). The range of possible niches for children depends on how they perceive the availability of interesting and knowledge-based activities as well as norms and values in their natural environment, such as preschool. In addition, children’s perception of the environment and how they process information are dependent on earlier experiences, and influence their interpretations of the current situation (Wachs, 1996).

The bidirectional influences in this thesis are defined as child-child and teacher-child interaction within the preschool activities and routines. Within the microsystem of influences presented in the bioecological model, the child’s development occurs through proximal processes in which these social interactions are included. Proximal processes are reciprocal in nature, and must, according to Bronfenbrenner, contain gradually more complex interactions over time to be effective for the child’s development; “the characteristics of the person are both a producer and a product of development” (Bronfenbrenner, 1999, p.5). Proximal processes are distinguished in terms of the two major kinds of developmental outcomes they produce: competence and dysfunction. Competence refers to the development of knowledge, skills, or the ability to conduct and direct one’s own behavior across different situations and environments. The outcomes can occur in all or one of the intellectual, physical, motivational, or socioemotional domains. Dysfunction refers to difficulties in maintaining control over and integrating
behavior across situations and different domains of development (Bronfenbrenner & Evans, 2000).

The assumption that proximal processes are the engines of development of the child, and the different processes that produce competence vs. dysfunction, is related to the duration, frequency, timing, and intensity of the processes. Duration refers to the length of the periods of time a person has been exposed to negative or positive experiences. Frequency refers to how often the exposures occur, e.g. if a child is constantly rejected from interactions this may lead to lower self-esteem and self-confidence (Odom et al., 2006). The timing of interaction is critical; this refers to how frequently the parent or teacher response occurs soon enough for the toddler to connect it to his or her own psychological state. As the child grows older, the timing of the response can be delayed. Finally, intensity refers to the strength of the exposure. When exposure to proximal processes is brief, happens infrequently, and does not take place on a predictable basis, developmentally disruptive outcomes are more likely to occur (Bronfenbrenner & Evans, 2000).

For the present thesis, these notions are important in order to understand the proximal processes involving the behavior and characteristics of the child, and the environmental factors influencing the niches. The processes and niches are jointly created by the child, peer and teachers and effect functioning. Several studies show that children displaying BD are more likely to be met with a lower level of positive peer interactions and responsive behavior from teachers thus creating less optimal proximal processes and limits available niches (Almqvist & Granlund, 2005; Ladd & Troop-Gordon, 2003; Mejia & Hoglund, 2016). However, if a child shows both prosocial behavior (such as being helpful if someone is sad, or playing fun games) and externalizing behavior difficulties, the exhibited prosocial behavior may lead to the child being perceived likeable by peers despite the behavior difficulties (McComas et al., 2005). Over time the proximal processes between child, and environment in the niches might lead to inclusion or exclusion of children. This is especially important to recognize for in need of special support in preschool.

The transactional model
The influence of responsive relationships in early years are important factor for children’s everyday functioning and development of cognitive self-
regulation as well as resilience, i.e. protective and coping skills in order to
handled demanding situation and experiences (Rutter, 2012; Sameroff, 2009;
Shonkoff et al., 2015). These relationships are built up by reciprocal
influences between child, teacher and peers; i.e. proximal process. Similarities
have been found between Vygotsky’s theory of zone of proximal development
(ZPD) and the important role of social interactions for children’s cognitive
development (Vygotskij & Cole, 1978) and the transactional model exploring
reciprocal processes between child and teacher. More specifically, when
children and teachers are tuned in to each other, and when teachers can read
the children’s emotional cues and respond appropriately to his or her needs in
timely fashion, their interactions tend to be successful and the relationship is
likely to support everyday functioning in preschool activities, i.e. engagement
in a developmentally and contextually appropriate manner (Shonkoff &
Phillips, 2000; Test & Cornelius-White, 2013). In contrast, in a short-term
longitudinal study by Roorda et al. (2014) investigated the transactional links
between teacher-child relationships and behavior adjustment among preschool
boys at risk for developing externalizing behavior difficulties. The study
showed that if there were more teacher-child conflicts at T1 it predicted lower
levels of prosocial behavior among the boys at T2. Meanwhile, teacher-child
closeness was reciprocally and positively related to children’s prosocial
behavior over time. However, whether these patterns might be similar if child-
child interaction is analyzed, is not well known and need to be further
investigated.

In research with the purpose of exploring children’s everyday functioning and
development, it is necessary to identify transactional processes between the
child and the environment (Sameroff, 2009). Kuczynski and Parkin (2009)
propose that the relationship, rather than the individuals, is the appropriate
unit of analysis for identifying transactional processes. The transactions are
not only an ongoing and simultaneous process between the behavior of the
child and others, but also involve how different individuals change their
behavior over time. Longitudinal design with at least three-time points of
observation are needed to identify the direction between acting and interacting
in order to investigate the reciprocal processes between child, peers and
teachers (Ployhart & Vandenberg, 2010). This thesis provides an opportunity
for such analyses.
Rationale

The preschool setting is one of the proximal microsystems that have a significant influence on children’s development, learning, and lifelong desire to learn, especially for those in need of special support due to BD. Children’s play and enjoyment in all their various forms stimulate their imagination, insight, communication, and skills for symbolic thinking and their ability to collaborate and solve problems. Children who are actively engaged in interactions with peers, teachers, and activities show higher levels of well-being and have more opportunity to learn and develop new skills (e.g. early math and language skills). The negative trajectories of a child’s BD and engagement might be counteracted in preschools with responsive preschool staff and positive interactions between children.

Attendance at everyday preschool activities among children with and without need of special support is necessary, but not sufficient, for their trajectories of well-being, development and learning. For an improvement of the children’s learning and development to occur, both attendance and active engagement in the activities are required, involving materials as well as interaction with peers and teachers. Engagement among children with and without need of special support is partly dependent on their characteristics and capacity (e.g. self-regulation, preferences, activity competence), and partly on environmental factors (e.g. structure of the activity, teacher-child ratio) and niches jointly constructed by teacher, peers, and child in the preschool environment. Thus, in order to explore engagement among children with and without need of special support, it is necessary to analyze the association between the characteristics of the child, engagement, proximal processes, niches, and the environmental factors in the preschool.

Children with externalizing behavior difficulties (BD) (i.e. conduct problems, hyperactive behavior) tend to show lower levels of active engagement in learning activities and lower frequencies and duration of attending proximal processes (i.e. child-child interaction, teacher-child interaction). Over time, these negative paths might have a negative influence on children’s well-being, development and learning. Children with externalizing behavior are usually highly active and have problems regulating their attention and excluding non-
relevant stimuli, which in turn has a negative influence on their engagement. They tend to spend more time in solitary active play, and parents state that their children express negative attitudes and emotions regarding preschool. However, externalizing BD, such as conduct problems and hyperactive behavior, seems to have different relations to environmental factors and proximal processes. For instance, preschool units with a high number of conduct problems were associated with higher frequencies of free-choice play activities whereas those with a high number of children with hyperactive behavior were associated with higher frequencies of teacher-initiated activities (e.g. circle time, small group activities). This implies that the organization of preschool activities is related to both the type of BD and the number of children displaying BD at a preschool unit.

The provision of support to children with BD and their need of special support might preliminarily be based on preschool staff’s perception of the children’s challenging behavior and how to handle it in everyday activities. While children’s right to special support is underscored in the school law and the preschool curriculum, appropriate support in everyday activities is not dictated in either of these. Thus, the kind of special support provided by the preschool staff is strongly related to the specific preschool context. The children’s need of special support to improve their engagement is the nodal point between environmental factors (i.e. organization of the preschool day) and the niches (child-child interaction, teacher-child interaction, available materials, and activities) available at specific preschool units.

Based on the theoretical framework and previous research, it is clear that engagement among children displaying BD occurs through processes that are mutually influenced by their characteristics (i.e. gender, age) on the one hand, and by proximal processes (e.g. peer interactions and teacher responsiveness) on the other. Furthermore, these processes occur within the preschool environment (i.e. preschool activities). There is a need for more research on the influence of social interactions on the link between behavior difficulties and engagement among children with and without need of special support.
Aim and research questions

The overall aim of this thesis is to enhance knowledge regarding engagement among children with and without need of special support due to behavior difficulties. The influence of social interaction as well as the provision of special support in Swedish preschool were investigated. Specifically, the aim was to explore children’s engagement at the nodal point between environmental factors, children’s behavior and characteristics, peer-to-child interaction and teacher responsiveness, both in a cross-sectional perspective and over time. In addition, predictive factors for special support were explored.

Research questions for the thesis

1. How do child engagement and BD vary due to child factors and classroom characteristics, cross-sectional and over time? (Studies I-III)
2. How do social interactions influence the link between engagement and behavior, cross-sectionally and over time? (Studies II-III)
3. What are the predictive factors of specific special support among children receiving special support because of behavior difficulties? (Studies I-III)
4. What causal relationships can be identified between social interaction, behavior difficulties, and engagement when young children with behavior difficulties are studied longitudinally? (Studies III-IV)
Method

Research design

In this thesis, a longitudinal survey design was used with both quantitative and qualitative data. The design was chosen to gain comprehensive knowledge of three phenomena: 1) the link between social interaction and engagement among children in need of special support due to behavior difficulties; 2) the link between the children’s engagement and behavior difficulties on the one hand and the special support provided in preschool on the other; and 3) the directional and transactional processes between social interactions, engagement and behavior difficulties. The data are based on preschool staff’s ratings of engagement and behavior difficulties among children, child-child interaction, and teacher-child interaction. The fact that the same instruments were used at three-time points and data were compared between the time points makes it possible to identify indicators of causal relationships between variables. The data for this thesis were drawn from the longitudinal research project “Early detection, early intervention” (Granlund et al., 2015), conducted between 2012 and 2014. The project group was an interdisciplinary team consisting of four senior researchers and two doctoral students within the fields of psychology, disability research, medical research, and special education. For the project, data collection was jointly conducted by the doctoral students. With the help of supervisors, I had the main responsibility for the analysis and production of the articles for Studies II-IV. As a co-author of the article for Study I, I carried out the content analysis along with an experienced researcher; otherwise, the analysis work was carried out by the first author, and the articles were co-written.

The present thesis had an abductive approach, including both exploratory hypothesis-generating and confirmatory elements (See Table 1). The abductive approach stems from the insight that most science does not follow a pattern of either pure deduction or pure induction (Collins, 1984). Abduction, or interference as the best explanation, is based on earlier evidence of a phenomenon (e.g. children’s engagement, behavior difficulties, need of special support). Thereafter, new data collection is done in order to test the hypothesis, which in turn is interpreted based on theoretical assumptions. The
theory provides deeper knowledge of the phenomenon (Danermark, Ekstrom, & Jakobsen, 2001).

Table 1. Overview of study designs, samples, data collection and analysis used in the present thesis

<table>
<thead>
<tr>
<th>Study</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Cross-sectional</td>
<td>Cross-sectional</td>
<td>Longitudinal</td>
<td>Longitudinal</td>
</tr>
<tr>
<td></td>
<td>Mixed-method</td>
<td>Confirmatory</td>
<td>Confirmatory</td>
<td>Confirmatory</td>
</tr>
<tr>
<td></td>
<td>parallel design</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample</td>
<td>232 children</td>
<td>663 children with and without</td>
<td>203 children with and without</td>
<td>203 children with and without</td>
</tr>
<tr>
<td></td>
<td>with need of</td>
<td>need of special support</td>
<td>need of special support</td>
<td>need of special support</td>
</tr>
<tr>
<td></td>
<td>special support</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data</td>
<td>Questionnaire</td>
<td>Questionnaire</td>
<td>Questionnaire</td>
<td>Questionnaire</td>
</tr>
<tr>
<td>collection</td>
<td>Point-biserial</td>
<td>Explorative</td>
<td>Latent growth curve</td>
<td>Cross-lagged</td>
</tr>
<tr>
<td></td>
<td>correlatin,</td>
<td>factor analysis,</td>
<td>modeling with</td>
<td>panel analysis</td>
</tr>
<tr>
<td></td>
<td>Logistic</td>
<td>Hierarchal</td>
<td>multivariate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>regression,</td>
<td>linear</td>
<td>analysis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Content analysis</td>
<td>mediation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Studies I and II are based on first data collection, while Studies III and IV are based on the same sample of children with data from three-time points.

For the present thesis, the theoretical assumption was that children’s engagement occurs through mutual influences between the child’s characteristics and the environment in which he or she interacts with other children and adults. The theoretical basis for this approach was the Bioecological Systems Theory, which was used in order to identify links between child factors, proximal processes (e.g. child-child and teacher-child interaction) in niches and preschool environmental factors (e.g. the organization of everyday activities such as circle time, routine situations). This type of approach was deemed appropriate for explicitly studying the links between social interactions, two types of engagement (core and developmental engagement), and externalizing behavior difficulties (i.e. hyperactive behavior and conduct problems) (Study II). The approach was
also used to explore how social interactions predict mutual influences between trajectories of children’s hyperactive behavior and core engagement (Study III and IV). As engagement is seen as a desired outcome of spending time in preschool for children in need of special support (Study I), an explorative design was used to study the links between the characteristics of the child and the special support provided by the preschool staff. Based on the results from Study I, Study II investigated the association between children’s engagement, BD and social interactions.

Results obtained in Study II demonstrated a negative association between core engagement, hyperactive behavior, and social interactions. This implies that children’s hyperactive behavior has a significant negative influence on one type of engagement – core engagement – which was not the case for conduct behavior difficulties. Therefore, the longitudinal design of Studies III and IV were used to explore the trajectories and transactional processes between the children’s hyperactive behavior, core engagement, and social interactions over three data points. Longitudinal research refers to studies in which data are collected over several time points, and is an appropriate approach when studying changes over time. In order to explore causal association and change over time, at least three data points are needed (Ployhart & Vandenberg, 2010). The confirmatory design aimed to confirm a generalization of predictive factors for engagement among children displaying behavior difficulties. It was further used to test the hypotheses concerning social interactions as predictors for trajectories of children’s engagement and hyperactive behavior (Study III), and hypotheses about the directional and transactional association between social interactions (e.g. teacher responsiveness and peer interaction) and children’s core engagement and hyperactive behavior, respectively (Study IV).

**Participants**

The sample for this thesis was based on a convenience sampling process representing one large sized municipalities (>200,000 inhabitants), four middle sized (50,000-200,000), and one small sized municipality (<50,000), with similarly distributed of children with Swedish and foreign origin representative of Swedish population. The final sample consists 8 percent from large sized municipalities, 45 percent middle sized, and 47 percent from small sized municipalities. Compared to Sweden as whole, the distribution is 41 percent large sized, 16 percent medium sized and 43 percent large sized
municipalities. Accordingly, the final sample has an under representative sample from large municipalities and over representative sample from middle sized municipalities.

In order to get enough power for multivariate analyses, approximately 700 children needed to be surveyed. An estimated loss of approximately 30-40 percent made it necessary to initially recruit 1,200 children aged one to five years. Data were collected for a period of two years, on three occasions. The final sample consisted of 832 children, 425 boys and 394 girls (13 missing) from 92 preschool units, at 31 preschools in six municipalities in Sweden. The children participated in at least one wave of data collection. In addition, for the longitudinal analyses 203 children participated in all three data points.

Studies I and II

Studies I and II are drawn from the first data collection in 2012. Parents of 1,596 children as well as 281 preschool staff were invited to participate in the project. Written consent was received from the staff and the parents of 663 children.

Study I

The sample for this study was a subsample of 232 children at 66 preschool classrooms and 29 preschools in six municipalities in Sweden from the first data point (663 children). The inclusion criterion is based on the preschool staffs’ estimation of children’s behavior difficulties according to the borderline or abnormal categories in the subdimensions of the Strengths and Difficulties Questionnaire (SDQ; Goodman 1997): emotional symptoms, conduct problems, hyperactive behavior and peer problems. The abnormal category has the ranges 4-10 (conduct and peer problems), 5-10 (emotional symptoms), and 7-10 (hyperactive behavior). Children can be classified as borderline in the different subdimensions if they score 3 (conduct and peer problems), 4 (emotional symptoms), or 6 (hyperactive behavior) (Goodman 1997). While this is only a rough estimation to detect behavior difficulties. Goodman argues that the SDQ ratings should be combined with SDQ impact supplement scores to provide a more accurate classification. Therefore, we also included children who were classified into the normal range category in all SDQ subdimensions, but were rated in the SDQ impact supplement as having difficulties with emotions, concentration, behavior or socializing with
others in preschool. According to the preschool staff, 31 percent of the total sample showed borderline or abnormal problems in at least one of the SDQ subdimensions (n=203), or small to serious problems in one or several of the abovementioned areas in preschool (n=29). According to the impact supplement, 50.4 percent (n=117) of the children in the subsample showed small to serious difficulties concerning emotions, concentration, behavior, or getting along and socializing with others in preschool. This includes both children rated as having behavior difficulties in one or more SDQ subdimensions and those only having difficulties in preschool functioning. Complete data on age and gender were available for all children; data on engagement and behavior difficulties had less than 5 percent missing data. Missing data were treated using available-case analysis and pairwise deletion. No outliers were detected.

Study II
Study II included 663 children (340 boys and 323 girls) between the ages 18 and 71 months, at 81 preschool classrooms at 29 preschools in six municipalities in Sweden. There were complete data for 640 children, while 23 children with incomplete data were removed. An independent t-test showed no significant differences between children with and without complete data according to gender, being formally identified as needing special support, core engagement, behavior difficulties, or interaction processes (i.e. teacher responsiveness, peer interaction). Meanwhile, there were significant differences in developmental engagement ($t=2.283$, df=653, $p<.05$, two-tailed) was medium ($d=0.71$).

Of the included children (N=640) in need of special support, 5 percent approximately (n=32) were formally identified due to disability. In addition, 31 percent (n=203) of the children displayed one or more behavior difficulties within the areas of emotional difficulty, hyperactive behavior, conduct problems, or peer problems, included in the supplement for SDQ. Child characteristics, demographic variables, and preschool staff education from Time Point 1 (T1) are described in Table 2.

Participants included 281 preschool staff participated from 81 preschool units located in six municipalities in Sweden, in both rural and urban settings. The units were organized in different age groupings depending on the organization
of the preschool. For example, children were placed in groups including ages one to three, three to five, or one to five years. The child group size ranged from 8 to 50 (M=23.2, SD=10.74), and the number of preschool teachers from 1 to 7 (M=3.97, SD=1.31). The adult-child ratio ranged from 1:2 to 1:9. Classrooms for younger toddlers (usually between 15 and 48 months) had fewer children per adult (M=4.5, SD=0.99) than those for older preschool children (M = 6.5, SD = 1.46).

Table 2.
Child, family and teacher demographic information.

<table>
<thead>
<tr>
<th></th>
<th>Frequency (%)</th>
<th>Mean</th>
<th>SD</th>
<th>Range Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Child demographic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>49</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>51</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (months)</td>
<td>44</td>
<td>15.5</td>
<td>18</td>
<td>18</td>
<td>71</td>
</tr>
<tr>
<td><strong>Housing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both parents</td>
<td>87</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother or father</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>missing</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Teacher education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preschool teacher</td>
<td>82</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Childcare worker</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Studies III and IV

Studies III and IV are based on the sample of children who participated in all three data points. Two hundred and three children from 45 preschool units at 22 preschools in six Swedish municipalities were included in the longitudinal analyses. For the remaining 629 children, questionnaire data were missing for one or two-time points. Missing data and dropout were mainly related to the children’s age; e.g. children usually start preschool when they are older than...
71 months. The inclusion criteria were children with and without need of special support with complete data for all three-time points. Child characteristics, demographic variables, and preschool staff education from Time Point 1 (T1) to Time Point 3 (T3) are described in Table 3.

Table 3.
Child demographic information and characteristics of preschool units (N=81).

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (months) Mean</strong></td>
<td>32</td>
<td>44</td>
<td>55</td>
</tr>
<tr>
<td>(range; SD)</td>
<td>(15–17; 9.05)</td>
<td>(24–69; 9.13)</td>
<td>(36–71; 8.88)</td>
</tr>
<tr>
<td><strong>In need of special support N (%)</strong></td>
<td>40 (20)</td>
<td>42 (21)</td>
<td>45 (22)</td>
</tr>
<tr>
<td><strong>EL2 N (%)</strong></td>
<td>48 (24)</td>
<td>50 (25)</td>
<td>52 (26)</td>
</tr>
</tbody>
</table>

**Characteristics of the preschool classroom**

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group size, median</strong></td>
<td>21</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>(range; SD)</td>
<td>(8 – 50; 11)</td>
<td>(8 – 45; 8)</td>
<td>(12 – 47; 9)</td>
</tr>
<tr>
<td><strong>Group size, median</strong></td>
<td>21</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>(range; SD)</td>
<td>(8 – 50; 11)</td>
<td>(8 – 45; 8)</td>
<td>(12 – 47; 9)</td>
</tr>
<tr>
<td><strong>Numbers of children in need of special support</strong> range (SD)</td>
<td>0 – 9 (.96)</td>
<td>0 – 6 (1.4)</td>
<td>0 – 4 (1.15)</td>
</tr>
<tr>
<td><strong>Number of children with EL2 range (SD)</strong></td>
<td>0 – 40 (12.0)</td>
<td>0 – 40 (10.6)</td>
<td>0 – 41 (10.5)</td>
</tr>
</tbody>
</table>

**Note:** EL2=Early second-language learners of Swedish; Children in need of special support due to formal diagnosis.

**Data collection**

The materials used for data collection at all three-time points included questionnaires with both closed-ended and open-ended questions.

**Questionnaires**

The questionnaires were developed to cover different aspects of characteristics of children’s engagement, behavior difficulties, developmental delay, social interactions within the peer group, preschool staff perceptions of
the interaction with the child group, collaboration with parents, and type of special support provided for children in need of support due to behavior difficulties. The whole survey package contained a total of 159 items; for more information see Granlund et al. (2015). For this thesis, only items related to the overall aim and research questions were used; that is, children’s engagement, behavior difficulties, type of special support provided, and teacher-child as well as child-child interaction. In addition, the responses to the open-ended questions concerning the content of the support provided were used in a content analysis. The subscales used in this thesis are described in more detail below.

Engagement (Studies I-IV)

Child engagement in preschool was measured using the Child Engagement Questionnaire (CEQ; McWilliam, 1991). The questionnaire was developed in the US to assess how the child typically spends his or her time at preschool. The preschool staff rated children’s engagement through free-recall impressions of the levels of their engagement with peers, teachers, materials, and activities. The original questionnaires, consisting of 32 items designed to rate children’s global engagement on a four-point Likert scale, record whether the child’s behavior was (1) not at all typical, (2) somewhat typical, (3) typical, or (4) very typical. For each item, the examples are provided to further clarify the intent of the item. For example, for the item “Solves problems quickly” the example given is: *When a toy falls behind the furniture, the child quickly finds a way to retrieve it*. As feedback from an expert panel consisting of preschool staff and special educators in preschool indicated that three items did not suit the Swedish preschool context, it was determined that only 29 of 32 items from the original questionnaire would be used. In addition, the instructions specify that “typical” means that the child spends quite a lot of time in the activity (DeKruif & McWilliam, 1999). With the intention of clarifying what “typical” means, the Swedish rating scale was already adapted in a previous study (Björck-Åkesson, 1994) to 1) almost never happens, 2) sometimes happens, 3) happens quite often, or 4) happens very often; this was used in the present studies.

A previous study found that children in need of special support tend to spend more time non-engaged or engaged in activities of lower complexity in preschool activities than other children, who spend more time in sophisticated
engagement (e.g. drama play) (Casey et al., 2012). Thus, with the aim to investigate the level of engagement among children in need of special support separately from complexity of engagement, the data were explored by means of a principal component analysis (PCA), with Varimax rotation, Kaizer normalization, and solution by two-factor extraction. The intent was to generate separate factors for level of engagement independent of the child’s age (core engagement) and the complexity of the activity he or she engaged in (developmental engagement). The Kaiser–Olkin value was .958, exceeding the recommended value of .6 (Kaiser, 1970, 1974). Barlett’s Test of Sphericity (Bartlett, 1954) reached statistical significance and supported the factorability of the correlation matrix into developmental and core engagement.

The content of the two-factor solution is supported by the results of an observational study by DeKruif and McWilliam (1999). They found that complex engagement behaviors such as problem-solving are more commonly observed in more mature children, whereas attentional behavior (an example of less complex engagement) was more frequently observed in toddlers. Persistent behavior was common regardless of the child’s age. Their findings support our decision to use a two-component model, in which Component 1, core engagement, represents engagement related to less complex behavior (e.g. the child seems to be aware of what’s going on around him or her, the child watches or listens to adults). Component 2, developmental engagement, represents complex behavior (e.g. the child tries to complete things even if it takes a long time, the child pretends that toys are something else). Component 1 was moderately correlated with chronological age ($r=.28$), while Component 2 had higher correlations with chronologic al age ($r=.54$). The internal consistency of the two components were $\alpha=.88$, .89, .87 for core engagement and $\alpha=.95$, .94, .94 for developmental engagement, for each time point respectively.

The overall engagement and the two subconstructs of core and developmental engagement were used in different ways in Studies I-IV. Study I aimed to explore how several factors (e.g. behavior difficulties, overall engagement, children entitled to early second-language learners of Swedish) influenced the type of special support (i.e. formal and informal special support) for children with behavior difficulties in preschool. In this study, the complexity of children’s engagement was not considered in relation to type of support. Thus, the total Child Engagement Questionnaire (CEQ) score was used. The
intention of Study II was to identify direct and indirect associations between two types of behavior difficulties (e.g. conduct problems and hyperactive behavior) and the two subcomponents of engagement, with social interactions as mediators. A strong association was found between hyperactive behavior and core engagement. Thus, it was determined that further investigations in Studies III and IV would only use scores from the subscales of core engagement and hyperactive behavior.

**Social Interactions (Studies I, III-IV)**

Social interactions were measured using an adapted version (Granlund & Björk-Åkesson, 2000) of the questionnaire Interaction – your child your interaction (Granlund & Olsson, 1998), in which preschool teachers rated their experiences of diverse types of social interaction with a child in the preschool context. The instrument consisted of 36 items covering following interaction patterns: teacher-child, child-teacher, peer-to-child, and child-to-peer. The responses are based on a five-point Likert scale between 1 and 5, where 1=seldom and 5=often. For Studies I, III, and IV, 15 items were used for two subscales measuring teacher responsiveness to the child (ten items) and other children’s interaction with the child (five items). Earlier studies (Guralnick, 2002; Pianta & Stuhlman, 2004) have shown the importance of teacher responsiveness and a high level of peer interaction for all children, but especially for children in need of special support. For the present thesis, the internal consistency at each occasion was: α=.75, .80, and .71 for teacher responsiveness, and α =.92, .90, and .91 for peer-to-child, for each time point respectively.

**Behavior difficulties (Studies I-IV)**

Children’s behavior difficulties (BD) were measured using the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). This instrument consists of 25 items covering five subscales: emotional symptoms, conduct problems, hyperactive behavior /inattention, peer relationship problems, and prosocial behavior. The response options are coded from 0 to 2, where 0=not at all, 1=only a little, and 2=quite a lot. The total scores on the behavior difficulties scales are divided into three subgroups – normal, abnormal, and borderline – using cut-off scores. The internal consistency for the SDQ subscales were α=.58 for emotional symptoms, α=.75 for conduct problems, α=.84 for
hyperactive behavior, $\alpha=.69$ for peer relationship problems, and $\alpha=.84$ for prosocial behavior.

Concurrent validity and reliability of the Swedish version of SDQ has been tested for two age groups (1-3 and 3-5 years) (Gustafsson et al. 2016). The utility of use of each item on the SDQ for both age groups were rated as good by at least 84 percent of the teachers for all items (Granlund et al. 2015). Validity and reliability were tested using factor analysis and test-retest correlations. The hyperactive behavior and conduct problem subscales had good validity and reliability for both age groups, whereas the subscales of emotional symptoms and peer problems were not as valid or reliable for children aged one to three years. The emotional symptoms and peer problems scales should primarily be used with older children.

The SDQ includes an impact supplement, designed to measure whether the child has (1) no problems (2) small difficulties, (3) clear difficulties, or (4) serious difficulties concerning emotions, concentration, behavior, or getting along and socializing with others in preschool. The staff were instructed to only respond to questions in the impact supplement if they had scored that the child had at least small difficulties. The impact supplement includes the questions “How long has the child suffered from these difficulties?” (1=less than 1 month, 2=1-5 months, 3=6-12 months, and 4=more than 1 year), “Does the child worry or suffer from the difficulties?”, “Are the child’s difficulties a burden to you or the preschool group as a whole?”, “Do the difficulties upset or distress the child?”, “Do the difficulties interfere with peer relationships?”, and “Do the difficulties interfere with classroom learning?”, each with the scale 1=not at all to 4=a great deal. To adapt the supplement to a Swedish preschool context, the last two items were replaced with the three items “Do the difficulties interfere with free play?”, “Do the difficulties interfere with organized activities?”, and “Do the difficulties interfere with routines?” According to a previous study, the SDQ impact supplement for one- to five-year-old children had shown good internal validity and reliability (Gustafsson, Gustafsson, & Proczkowska-Bjorklund, 2016).

For Study I, all the subscales and the supplement were used. Commonly, children displayed more than one type of behavior problem, so it was difficult to draw specific conclusions based solely on problem categories. Thus, the SDQ supplement was also used to determine whether or not a child had
behavior difficulties. The supplement provided a more comprehensive understanding of the extent to which children’s behavior difficulties had a negative impact on the preschool environment.

For Study II, the subscales of conduct problems and hyperactive behavior were used. A previous study using partly the same data as in this study reported appropriate content and construct validity, as well as intra-rater reliability, for these subscales (Gustafsson, Gustafsson, & Proczkowska-Björklund, 2015) for children aged one to five years. Other studies (Hong et al., 2015; Searle et al., 2013) indicated that only hyperactive behavior had a negative impact on engagement. This suggests a lack of research on how conduct problems have a negative influence on the child’s engagement. Thus, the respective relationships between both subconstructs in engagement and the two subscales were analyzed separately.

For Studies III and IV, only the hyperactive behavior subscale and the core engagement subconstruct were used. The reason for this was based on the result in Study II that showed that only hyperactive behavior had a significant negative influence on children’s engagement while the strong association was with core engagement. Further support for only using the hyperactive behavior scale was found in an earlier longitudinal study, showing a reciprocal relationship between inattention and academic achievement for children aged three to six. This relationship remained after socioeconomic status and family stress were controlled for (Metcalf et al., 2013). In contrast to the Bioecological Systems Theory (Bronfenbrenner & Evans, 2000), which proposes that development occurs through progressively more complex reciprocal interaction, children with behavioral difficulties seem to show higher levels of engagement regardless of complexity (i.e. core engagement).

Thus, it might be important to explore engagement regardless of complexity among children with and without need of special support, in order to build a more comprehensive understanding of the relationship between behavior difficulties, engagement, and the influence of social interaction in preschool. Based on these results, it was determined that Studies III and IV would further investigate the trajectories of children’s hyperactive behavior and engagement, as well as the transactional processes between children’s hyperactive behavior and social interaction.
Special support (Study I)

To investigate whether or not children in need of special support due to behavior difficulties receive special support in preschool, two additional questions included the SDQ impact supplement. The preschool staff were asked: (1) “Does the child receive special support in which you as preschool staff receive supervision from external support service teams?” and (2) “Does the child receive special support in which you as preschool staff do not receive supervision from external support service teams?” The response ratings were (1) yes and (2) no. The support format in which the staff received supervised support was entitled to SuS, and the support format without supervision was entitled to SiS. In addition, through open-ended questions for each support format, the staff were asked to describe the content of the support provided.

Missing data (Studies I-IV)

Overall, the pattern of missing data for the studies were at random (MCAR), or not completely random (MAR). In order to handle missing values in the studies different approaches were used. For Study I, complete data on age and gender were available among the subsample of 232 children. In addition, data on engagement and behavior difficulties had less than 5 percent missing data. Imputation of missing values could therefore be treated by using available-case analysis and pairwise deletion (Hair, Black, Babin, & Anderson, 2010). Concerning Study II, incomplete data were found for single items in the CEQ and SDQ questionnaires, and the items on peer-to-child interaction and teacher-child interaction. Little’s MCAR test showed 2 percent missing values in the CEQ and in the questions on social interaction, whereas approximately 10 percent was missing in the SDQ in the subdimensions used for this dissertation; i.e., hyperactive behavior and conduct problems. A multiple imputation was done using the Twin Method, conducted in the software Sleipner 2.1 (Bergman & El-Khoury, 2002). Imputed and complete data were used for 640 children; for 23 children it was not possible to impute data, and the determination was made to remove the incomplete cases. No significant differences between children with and without complete data were found according to gender, being formally identified as needing special support, core engagement, hyperactive behavior, conduct behavior difficulties, or social interactions (i.e. teacher responsiveness, peer interaction). Meanwhile, significant differences were found for developmental engagement ($t=2.283$, $df=653$, $p<.05$, two-tailed). The magnitude of the differences in the mean
values of developmental engagement (mean differences=0.43, 95% CI: 0.06-0.79) was of a medium effect size (d=0.71). Moreover, the pattern of missing data in Studies III and IV was at random (MAR), with less than 10% missing data for each variable. Due to the pattern of MAR, the missing data was handled by using full information maximum likelihood parameter estimation (Little & Rubin, 2002).

Data analysis

Study I
For Study I, children with behavior difficulties were categorized into three groups: (1) children receive teacher-initiated special support without supervision by external experts (SiS); (2) children receive special support in which preschool staff are provided supervision from external experts (SuS); and (3) children receive no support for BD. A chi-square analysis was used to identify characteristics of the children within each support group.

Point-biserial correlations ($r_b$) were used to analyze bivariate relationships between the predictors (e.g. SDQ impact supplement ratings, engagement) and support format. Based on these results, two separate logistic regression models were used to analyze the impact of independent variables. The first regression model analyzed the impact of four independent variables (i.e. degree of conduct problems, being a burden to the preschool staff or group, EL2, child engagement) on the likelihood of SiS. The second regression model analyzed the impact of four independent variables (i.e. EL2, degree of prosocial skills, degree of hyperactive behavior, and being a burden to the preschool staff or the group) on the likelihood of no special support for the children. Due to limited power, no logistic regression model was conducted to analyze predictors for the support format SuS.

To describe the content of the special support, a content analysis (Elo & Kyngäs, 2008) was used to analyze open-ended questions on the SDQ impact supplement. First, the researchers separately reread the text several times to obtain an overview of the types of support given to the child. Second, they separately coded each support content unit and grouped them into preliminary categories. Third, they reviewed each other’s codes and categories, and discussed this until agreement was reached. Finally, the researchers in collaboration grouped the preliminary categories into subcategories that were
abstracted into four categories of support content: *Adaptation of preschool environment, Individual support, Collaboration, and Special attention to children’s negative behavior.*

To synthesize the analysis, a chi-square analysis was first used to explore the frequency distribution of support content in the two different support formats, SiS and SuS. Second, a point-biserial correlation ($r_b$) was used to analyze the associations between support format, support content and sociodemographics, behavior (strengths and difficulties), the impact of behavior difficulties, and engagement.

**Study II**

In Study II, two steps were used in the analysis: (a) a hierarchal linear model (HLM) to investigate the amount of variance in core engagement and developmental engagement accounted for by child-level and classroom-level; and (b) a structural equation model with maximum likelihood estimation to examine the hypothesized mediation role of social interactions on the relations between behavior difficulties and engagement. The path analysis was performed using a complete-case approach (Hair, Anderson, Tatham, & William, 1998).

Clustering effects of the data are common in research in natural environments such as preschools or schools. Children in the same classroom tend to show similar behavior, due to the influence of the same context, compared to children in other classrooms (Killip, 2004; McCoach & Adelson, 2010). The intraclass correlation (ICC) provides a measure of how homogeneous individuals are within clusters (i.e. preschool units). An intraclass correlation above .05 indicates a clustering effect (Hedges & Hedberg, 2007), whereby the researcher could decide to either run multilevel analyses, or run the analyses on individual level but adjust the standard errors for the clustering effect. In the present study, ICC was 0.25 for core engagement and 0.44 for developmental engagement. This resulted in an adjustment to the standard errors, through a bias-corrected bootstrap resampling method in Amos (Arbuckle, 2013; Nevitt & Hancock, 2001). This method corrects for the bias in the central tendency of the estimate, accommodates the non-normal distribution of the estimator of the indirect effects, and adjusts the actual sample according to the clustering effect (Mackinnon, Lockwood, & Williams, 2004; Shrout & Bolger, 2002).
Study III
In order to explore whether social interactions in the preschool setting predict trajectories of core engagement and hyperactive behavior, latent growth curve modelling (LGC) was used, and two predictors (i.e. teacher responsiveness and peer interactions) were added to the models. In addition, gender was added to test whether there were differences between boys and girls according to the initial level of hyperactive behavior and core engagement, and trajectories of hyperactive behavior and core engagement. Missing data in the subsample were handled through full information maximum likelihood parameter estimation (Little & Rubin, 2002). The data were analyzed in Amos 21.0 (Arbuckle, 2012).

The model building proceeded in four broad steps. First, trajectories of core engagement and hyperactive behavior were examined separately with unconditional growth models for three-time points (baseline, 12 months, and 24 months). Initial models had intercepts with equal path weights, linear slopes with paths 0, 0.5, and 1, respectively, and equal error for the three measures. These assumptions gave a model with good fit for core engagement but not for hyperactivity. Therefore, different models were explored, it was found that a model in which the growth rate was not equal between time points (i.e., the path between slope and Time Point 2 was set free) and the error at all three-time points were allowed to differ from the other errors (i.e., error for measure at Time Points 1, 2 and 3 were set free). This resulted in the model having a good fit and being used for hyperactive behavior in the subsequent analyses. In a second step, the models with good fit were combined into a single unconditional multivariate model, in which covariance between the intercept and the slopes for core engagement and hyperactive behavior, respectively, were allowed. In a third step, two time-invariant predictors related to proximal processes, i.e. teacher responsiveness and peer interactions, were introduced with paths to both intercept and slope for core engagement and hyperactive behavior. Finally, gender was added as a time-invariant predictor of change.

Study IV
In Study IV, a series of auto regressive, cross-lagged panel analysis models were used to explore the directional association and transactional processes between teacher responsiveness/peer interactions and the child’s core engagement/ hyperactive behavior.
The analyses are presented in two main sections in the results. First, descriptive statistics for the variables of interest are described over the three-time points. Bivariate correlations were used to describe internal consistency for each construct: core engagement, hyperactive behavior, peer interactions, and teacher responsiveness. Second, a series of auto-regressive, cross-lagged path analysis models assessing the concurrent and prospective associations between children’s core engagement, hyperactive behavior, teacher responsiveness and peer interaction, respectively, are examined using Amos 21.0 (Arbuckle, 2013).

Ethical considerations

Research on children in general, and children in need of special support due to behavior difficulties in particular, along with the skills of professionals, is vital to making improvements to the everyday activities in preschool, which in turn have a positive influence on the children’s well-being and development. The present thesis contributes knowledge about children’s everyday experiences through the perspective of the preschool staff, and was based on a survey design. Above the Act concerning the Ethical Review of Research Involving Humans (2003:460), studies involving children under the age of 15 should always be reviewed by the ethics committee. The studies within this thesis were approved by the Regional Ethical Review Board in Linköping (Dnr. 2012/199-31).

Two concepts of survey design are central to ethical considerations in the treatment of respondents: informed consent and protection of confidentiality. The researcher exerts extensive effort to obtain respondents’ cooperation in the survey; the respondents’ agreement must be reasonably informed. This means that the researcher must not mislead respondents as to the nature and purpose of the research (Czaja & Blair, 2005). For the present research, the preschool leaders and preschool staff were initially invited to a formal information meeting. The participants announced their interest, and gave written informed consent to participate in the project. The preschool staff and all parents of the children in the preschool units were informed that participation in the study was voluntary, and that they could withdraw at any time without giving a reason for their decision. The written informed consent was based on the ethical principles formulated by the Swedish Research
To ensure confidentiality, a package of coded questionnaires and a code list were handed out to each preschool unit by the research team of the project. The questionnaires and code list were placed in envelopes that were sealed by teachers and principals before the research members collected them. This procedure guaranteed that no one other than the research team and the preschool staff knew the names of the children who were involved. However, it was still possible to keep track of the questionnaires from all three data points. Answered questionnaires and coding lists were kept in separate, locked archives. Only the researchers in the project had access to the code lists and answered questionnaires, which meant that no one else could identify the children who participated in the survey.
Results

In this section, the results of the four empirical studies are summarized. The summary consists of the main findings, framed by a thematic structure based on following research questions of the thesis: (1) How do child engagement and BD vary due to child factors and classroom characteristics, cross-sectional and over time?; (2) How do social interactions influence the link between engagement and behavior, cross-sectionally and over time?; (3) What are the predictive factors of specific special support among children receiving special support because of behavior difficulties?; (4) What causal relationships can be identified between social interaction, behavior difficulties, and engagement when young children with behavior difficulties are studied longitudinally? Each study is presented in full text at the end of this thesis.

Child engagement, BD and social interactions

Engagement among children with and without need of special support is accounted for at two different levels, i.e. child and classroom. Children who interact with the same teachers and peers tend to be more similar in their behavior and interaction paths, compared to behavior and interaction paths of children in other preschool units. Thus, in accordance with the main results of Studies II and III, the variation in child engagement due to child factors and environmental factors and the influence of social interactions on the link between behavior difficulties and engagement will be described.

Variation in children’s engagement and BD

The results from Studies II and III revealed that engagement among children with and without need of special support was explained partly by child factors and partly by classroom factors. For instance, Study II revealed that 25 percent of the variance in children’s core engagement and 44 percent of the variance of developmental engagement was accounted by attributable to classroom differences. The remaining variance, 75 percent and 56 percent respectively, were attributed to child differences, for example children’s BD, gender and to some extent age.

Concerning social interaction, the results from Study II revealed that proximal processes, operationalized as peer interaction and teacher responsiveness,
mediate the negative association between hyperactive behavior and engagement. The mediating effect of peer interaction explained 56 percent of the total effect for core engagement and 78 percent for developmental engagement. Meanwhile, teacher responsiveness explained 33 percent of the total effect for core engagement and 34 percent for developmental engagement. Similar patterns were found for the direct paths from both types of social interaction to both types of engagement. Specifically, peer interaction was a strong, statistically significant predictor for both types of engagement. Meanwhile, teacher responsiveness was a strong predictor for core engagement, but with somewhat weaker predictive power for developmental engagement. Concerning individual level, Study III revealed that children’s BD was the strongest predictor of low level of engagement in everyday activities. In addition, gender was a significant predictor for rate of change in hyperactive behavior and core engagement. More specifically, a steeper decrease in hyperactive behavior was found for girls, which was not the case for boys. Meanwhile, increasing change in core engagement was associated with decrease in hyperactive behavior, especially for boys. In addition, Study I show that children with BD received special support when their difficulties had a significant negative affect on their functioning in free play.

The results from Studies I-III revealed that the highest proportion of the variance in the two types of engagement was attributed to child factors, such as BD, gender and age. However, even if this was the case, the variance in engagement was also strongly dependent on factors in the preschool classrooms, e.g. levels if teacher responsiveness, occurrence of positive peer-to-child interaction, organization of activities, provision of special support format.

The next section offers a description of the association between children’s externalizing BD and engagement, as well as how social interactions influence this association over time.

**The influence of social interactions**

As mentioned above, children’s engagement varies due to both child and classroom characteristics. In accordance with the mediation analyses in Study II, different patterns were shown between children’s externalizing BD
Children’s hyperactive behavior was a significant predictor for low core engagement, and a significant but weaker for low developmental engagement. In addition, hyperactive behavior had a direct negative influence on the peer interactions and teachers’ responsiveness. Concerning conduct problems, the non-significant associations between this BD and both types of engagement and social interactions indicate that children’s conduct problems did not influence their level of engagement or social interactions in preschool. The results imply that hyperactive behavior, which is linked to lack of attention and self-regulation, seems to have a stronger negative influence on the children’s opportunities to be engaged in preschool activities than conduct problems. This was especially significant for core engagement. In addition, children with hyperactive behavior seemed to be less involved in peer interaction compared to other children, and were met with lower responsiveness from the preschool staff.

In order to further explore the relationship between hyperactive behavior and core engagement, a longitudinal analysis was conducted in Study III. The study was based on three data points and offered the opportunity to investigate change and interdependency between children’s core engagement and hyperactive behavior. The results revealed a pattern similar to that in Study II,
i.e. a negative association between core engagement and hyperactive behavior. A significant negative association was found between the slope of hyperactivity and core engagement (see Figure 3). In other words, when children's level of hyperactivity decreased their core engagement increased, and the other way around. To conclude, high levels of hyperactivity predict low levels of engagement both cross-sectionally and over time.

Concerning the influence of social interaction, it was found that positive peer interaction predicted a steeper decreasing trend in children’s hyperactive behavior, especially for those with high ratings of hyperactive behavior at T1. In addition, when children were met with positive peer interaction there was an increasing trend of core engagement, especially for those with low ratings in core engagement at T1. This was not the case for teacher responsiveness, which was found to be a significant predictor only for change in core engagement; not for hyperactive behavior.

These negative patterns between engagement, behavior difficulties, and social interactions might be an indicator of children’s need of special support in order
to be engaged in everyday activities in preschool. The next section will describe predictors and the content of both general and specific special support among children in need of special support due to behavior difficulties.

**Predictors for receiving special support**

The probability that a child receives special support or not was related to both child factors, such as level of BD or entitled to EL2, and classroom characteristics, such as the influence of BD on activities, peers and teachers in the preschool units. The children received two different types of support due to BD: special support, whereby preschool staff were supervised by external teams (SuS); and/or teacher-initiated special support, without supervision by external experts (SiS). The majority of the children exhibiting BD received no special support due to BD.

**Frequencies of children in need receiving special support**

The results from Study I revealed that 67 percent of the children in need of special support due to behavior difficulties received *no special support* in preschool. In addition, among children formally identified as in need of special support, 6 percent of children received SuS. Finally, 26 percent of the children received SiS. Two logistic regression models were performed to assess the likelihood of receiving SiS or no special support for BD. No logistic regression model was performed for children receiving SuS, due to the low number of children in this category.

The first logistic regression model consisted of four independent variables (see Table 4), which explained as a whole between 12.8 percent (Cox & Nell $R^2$) and 26.6 percent (Nagelkerke $R^2$). The strongest predictor of *no special support* was among children entitled to EL2; the next highest probability was among children whose behavior was perceived as not having a negative influence on the peer group or the teachers.

In addition, prosocial behavior decreased the likelihood of a child receiving special support due to behavior difficulties. Overall, *no support* for behavior difficulties in preschool was more than twice as likely for children perceived as not having a negative influence on the peer group or the teachers and entitled to EL2.
Table 4.
Logistic regression model assessing the probability of receiving no support

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>Df</th>
<th>p</th>
<th>OR</th>
<th>95% CI Lower</th>
<th>95% CI Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL2 in Swedish SDQ</td>
<td>.83</td>
<td>.44</td>
<td>3.52</td>
<td>1</td>
<td>.06</td>
<td>2.29</td>
<td>.96</td>
<td>5.44</td>
</tr>
<tr>
<td>SDQ Prosocial</td>
<td>.16</td>
<td>.08</td>
<td>3.90</td>
<td>1</td>
<td>.05</td>
<td>1.17</td>
<td>1.0</td>
<td>1.37</td>
</tr>
<tr>
<td>SDQ Hyperactivity</td>
<td>-.06</td>
<td>.08</td>
<td>.53</td>
<td>1</td>
<td>.47</td>
<td>1.06</td>
<td>.90</td>
<td>1.25</td>
</tr>
<tr>
<td>SDQ Suppl.: Burden to teacher/group</td>
<td>-.76</td>
<td>.34</td>
<td>4.94</td>
<td>1</td>
<td></td>
<td>2.13</td>
<td>1.09</td>
<td>4.14</td>
</tr>
<tr>
<td>Constant</td>
<td>-4.37</td>
<td>1.24</td>
<td>12.42</td>
<td>1</td>
<td>.00</td>
<td>1.00</td>
<td>.01</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Note: SDQ=Strengths and Difficulties Questionnaire. The SDQ Hyperactivity scale is reversed so that higher ratings represent greater difficulties. EL2 in Swedish is dummy coded: 1=yes, 0=no (Almqvist, Sjöman, Golsäter, and Granlund, submitted)

The second logistic regression model consisted of four independent variables (see Table 5), which explained between 19.7 percent (Cox & Snell $R^2$) and 26.4 percent (Nagelkerke $R^2$) of the variance in SiS. The highest probability of receiving SiS was related to the child not being entitled to early EL2, followed by high levels of engagement. Accordingly, children who were highly engaged and native Swedish learners were more than twice as likely to receive SiS because of BD.

The content of special support
The content analysis of the open-ended questions in the SDQ supplement was categorized into four main themes: adaptation of the preschool environment, individual support, collaboration, and special attention to negative behavior.

The adaptation of the preschool environment consists of two subcategories: adaptation of the physical environment and adaptation of the psychosocial environment. For instance, adaptation of the physical environment was done
by dividing the group into smaller units, with one group playing outdoors and the other indoors, which provided space for the child in need of special support. This type of action involved the whole peer group, and was done both for children receiving SiS and for those receiving SuS. Adaptation of the psychosocial environment entailed descriptions of how the staff prepared the child for new situations in order to facilitate transitions. These actions were most common for children who were suffering or worrying due to BD ($r_b=.27$, $p=.029$), and for those with high ratings on the SDQ total scale ($r_b=.30$, $p=.013$).

Table 5.
Logistic regression model assessing the probability of receiving SiS

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>p</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDQ Conduct</td>
<td>.15</td>
<td>.10</td>
<td>2.34</td>
<td>1</td>
<td>.13</td>
<td>1.16</td>
<td>.96</td>
</tr>
<tr>
<td>Burden to teacher/group</td>
<td>.51</td>
<td>.35</td>
<td>2.13</td>
<td>1</td>
<td>.14</td>
<td>1.66</td>
<td>.84</td>
</tr>
<tr>
<td>CEQ Engagement</td>
<td>.88</td>
<td>.38</td>
<td>5.22</td>
<td>1</td>
<td>.02</td>
<td>2.40</td>
<td>1.13</td>
</tr>
<tr>
<td>EL2 in Swedish</td>
<td>-1.01</td>
<td>.47</td>
<td>4.64</td>
<td>1</td>
<td>.03</td>
<td>2.76</td>
<td>.110</td>
</tr>
<tr>
<td>Constant</td>
<td>-3.40</td>
<td>1.34</td>
<td>6.44</td>
<td>1</td>
<td>.01</td>
<td>.03</td>
<td></td>
</tr>
</tbody>
</table>

Note: SDQ=Strengths and Difficulties Questionnaire. The SDQ Conduct scale is reversed, so that higher ratings represent greater difficulties. EL2 in Swedish is dummy coded: 1=yes, 0=no. (Almqvist et al., submitted)

The category individual support consists of descriptions of special support, such as the staff using responsive and approving actions regarding positive behavior by the child, but also actively supporting the individual child in play activities with peers. Support strategy such as teacher responsiveness was used if the difficulties did not negatively influence the teacher or the group ($r_b=-.30$, $p=.016$). Meanwhile, individual support in play activities were used to support children with emotional symptoms ($r_b=.31$, $p=.012$) or peer problems ($r_b=.26$, $p=.037$). Other actions such as language support, through both signing and specific training in Swedish, were also mentioned as a form of individual support, and were used in both support formats.
In both support formats, the most common content of special support involved attention to the child’s negative behavior. This was primarily achieved by at least one member of the staff staying close to the child, and was most common for children receiving SiS. Other examples of attention to the child’s negative behavior involved the preschool staff providing special support by paying attention to critical situations, proximity by the preschool staff, or distracting the child. The teachers’ attention to critical situations and staying close to the child were mentioned as ways to prevent the child from pushing and interfering with the other children in an unfriendly way. However, the most common action in this category was to distract the child from situations that could trigger negative behavior. Distractions were used more often for children with higher levels of engagement ($r_b=0.38, p<0.001$) and higher ratings of conduct problems ($r_b=0.43, p<0.001$), and for children who worried or suffered because of their difficulties ($r_b=0.38, p=0.002$). It was most common for children receiving SuS.

Further, the staff supported children by collaborating with parents, colleagues and external teams, e.g. through regular discussions with parents and within the staff group to assess the child’s needs. However, collaboration with external teams (supervision) was most common for children receiving SuS and when difficulties had been present for a longer time ($r_b=0.31, p=0.013$).

Teacher responsiveness and behavior approval were also mentioned as specific special support, and were used as support when children’s BD was not perceived to have a negative influence on the teacher or peer group. The content of the support format in Study I can be compared with the results in Studies II and III; i.e., lower levels of hyperactive behavior were associated with higher levels of teacher responsiveness and higher frequencies of peer interaction both within a current perspective and over time. The results from the previous cross-sectional analyses (Studies I-II) indicate that children’s BD and child characteristics have a negative influence on social interactions and engagement, and are predictive factors for whether or not the child receives special support. On the other hand, Study III revealed that the level of social interactions was a significant predictor for change in hyperactive behavior and core engagement. Thus, the directional and transactional associations between BD, social interactions, and core engagement need to be more carefully identified.
Causal relationships between behavior difficulties, social interactions, and engagement

A series of autoregressive, cross-lagged path analyses were used for two models, *Teacher – model* and *Peer – model*, to assess the directional and transactional association between levels of social interactions (i.e. peer-to-child interaction, teacher responsiveness), core engagement, and hyperactive behavior. The two models will be presented one at a time.

**Teacher – model: teacher responsiveness, BD, engagement**

Initially, significant stable paths were found between all three occasions for hyperactive behavior, core engagement, and teacher responsiveness. In addition, baseline covariates at each occasion showed a significant negative association between level of hyperactive behavior and level of core engagement. Moreover, teacher responsiveness was positively related to children’s level of core engagement for each occasion. Meanwhile, children’s hyperactive behavior was negatively related to level of teacher responsiveness for each occasion.

When all the variables were considered in the model (see Figure 4), teacher responsiveness at T1 had a significant negative association with hyperactive behavior at T2, similar patterns were found between T2 and T3.

**Figure 4:** Teacher – model with transactional paths with standardized estimates presented. Dashed lines indicate non-significant paths.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$ (Sjöman, manuscript)
In addition, children’s core engagement had a significant positive association with teacher responsiveness at T2, which in turn had a significant positive association with children’s core engagement at T3. On the other hand, teacher responsiveness at T1 and T2 had a significant negative association with children’s hyperactive behavior at T2 as well as at T3. These paths indicate that teacher responsiveness at T1 and T2, respectively, predict levels of hyperactive behavior T2 and T3, which was not the case from hyperactive behavior to teacher responsiveness over time. In other words, no transactional processes were found between children’s hyperactive behavior at T1 and T2 and teacher responsiveness at T2 and T3, meanwhile, transactional processes were found between children’s core engagement and teacher responsiveness over time.

*Peer – model: peer-to-child interaction, BD, engagement*

The peer – model with transactional paths showed a good fit to the sample data. Significantly stable paths were found between all three occasions for children’s hyperactive behavior and peer-to-child interaction, which was not the case for core engagement between T2 and T3 (see Figure 5).

![Fig. 5 Peer – model with transactional paths with standardized estimates presented. Dashed lines indicate non-significant paths. ***p < 0.001, **p < 0.01, *p < 0.05 (Sjöman, manuscript)*](image)

Significant negative associations were found between peer-to-child interaction at T2 and hyperactive behavior at T3, which was not the case between T1 and T2. In addition, significant positive associations were found
between core engagement at T1 and peer-to-child interaction T2, which in turn had a significant positive association with core engagement at T3.

Overall, transactional processes were found between peer-to-child interaction and the children’s core engagement over time, which was not the case for hyperactive behavior. In other words, if children showed a high level of attentive behavior and interest in their peers’ activities (i.e. level of core engagement) at T1, this predicted higher frequencies of peer-to-child interaction at T2, which in turn predicted an increase in children’s core engagement at T3.

To conclude, transactional processes were found between children’s positive behavior, such as core engagement, and teacher responsiveness as well as peer-to-child interaction. Transactional paths were not found for hyperactive behavior and social interactions. On the other hand, casual relationships were found from levels of teacher responsiveness to children’s levels of hyperactive behavior, and partly from levels of peer-to-child interaction and children’s levels of hyperactive behavior. These results were partly in contrast to those from Study III; i.e., both types of social interactions predict increased core engagement, whereas peer interaction predicts decreased hyperactive behavior over time.

Summary

Here a summary is given of the findings in this thesis that contribute to the overall aim of enhancing knowledge regarding classroom characteristics in Swedish preschools associated with engagement among children with and without special needs. The main findings from the Results section will be described below.

How do child engagement and BD vary due to child factors and classroom characteristics, cross-sectionally and over time?

- The variance in the of two types of engagement was mostly attributed to child characteristics (i.e. BD, gender, age).
- The variance in of engagement was also strongly dependent on classroom level, such as social interactions and the characteristics of the preschool unit.
• Peer interaction and teacher responsiveness explained a large percentage of the total negative effect of hyperactive behavior on both types of engagement.
• Individual differences were found between boys and girls. Girls showed a steeper decrease in hyperactive behavior over time, while a steeper increase in core engagement was associated with a steeper decrease in hyperactive behavior, especially for boys.

How do social interactions influence the link between engagement and behavior difficulties, both cross-sectionally and over time?

• Children’s hyperactive behavior was associated with a low level of core engagement, and had a significant but weaker association with developmental engagement.
• Hyperactive behavior had a significant negative influence on teacher responsiveness and peer interaction, which was not the case for conduct problems.
• Change in hyperactive behavior was associated with change in core engagement over time.
• Positive peer interaction predicted an increase in core engagement and a decrease in hyperactive behavior over time.
• A high level of teacher responsiveness predicted an increase in core engagement, which was not the case between teacher responsiveness and hyperactive behavior.
What are the predictive factors of specific special support among children receiving special support because of behavior difficulties?

- Children who were perceived as not having a negative influence on peers or teachers did not receive any special support, even if they exhibited BD.
- Children with a high level of engagement were more likely to receive SiS.
- Children formally identified as in need of special support received SuS. The staff provide this type of support format if the BD affected the children’s functioning in free play.
- Special support was provided through adaptations to the environment (i.e. groupings into small groups with fewer children per group) to provide more space for children in need of special support.
- The most common support was staff’s attention to children’s negative behavior, staying close to the child to prevent conflicts.
- Teacher responsiveness was mentioned as special support for those children with BD who did not have a negative influence on peers or teachers.
- Collaboration with external teams and supervision of the preschool staff occur only for children receiving SuS.

What causal relationships can be identified between social interaction, behavior difficulties, and engagement when young children with behavior difficulties are studied longitudinally?

- The level of teacher responsiveness showed a causal relationship with the level of hyperactive behavior over time, which was not the case for core engagement.
- The level of peer-to-child interaction at T2 showed casual relationships with hyperactive behavior at T3, which was not the case between T1 and T2.
- Transactional processes were found between children’s core engagement, teacher responsiveness and peer-to-child interaction respectively. That is, a high level of core engagement at T1 predicted a high level of social interactions at T2, which in turn predicted a high level of core engagement at T3.
Discussion

Discussion of the results

The rationale for this thesis is that children’s attendance in and active engagement in preschool activities are prerequisites for their well-being, development and learning. Children who are actively engaged in social interaction, show higher levels of well-being and have more opportunities to learn and develop new skills. However, children in need of special support because of BD tend to show lower levels of engagement and lower frequencies and durations of attending proximal processes (i.e. child-child interaction, teacher-child interaction). Over time, these negative paths might have a negative influence on the children’s well-being, development and learning. In accordance with the statements about children’s engagement, the overall aim of this dissertation is to enhance knowledge regarding engagement among children with and without need of special support due to behavior difficulties. The influence of social interaction as well as the provision of special support in Swedish preschool were investigated. Specifically, the aim was to explore children’s engagement at the nodal point between environmental factors, children’s behavior and characteristics, peer-to-child interaction and teacher responsiveness, both in a cross-sectional perspective and over time. In addition, predictive factors for special support were explored.

The overall findings in this thesis show that children in need of special support because of BD exhibit lower levels of engagement compared to those without need of special support in the preschool context. Engagement includes two components (core and developmental engagement) and is dependent on variables at different system levels, from the individual through micro- and exosystems to the macrosystem. The second study showed a strong within-group variance; i.e. engagement was strongly attributed to child factors such as BD, gender and to some extent age. Nonetheless, BD is only one of several factors that might explain the attendance to activities and level of engagement in everyday activities, and whether or not children receive special support (Simeonsson, 2006; Sommer et al., 2013). The within-group variance in engagement was also strongly dependent on what preschool classroom the child belonged to and classroom characteristics within these units. For instance, Study II revealed that teacher responsiveness and peer-to-child
interaction turned out to mediate the negative effect between hyperactive behavior and engagement. This indicates that children in need of special support due to BD are more vulnerable in a less supportive environment, such as low levels of peer-to-child interaction and less teacher responsiveness, and that class rooms characterized by positive social interaction can support hyperactive children in focusing and sustaining attention in everyday activities in preschool.

However, cross-sectional studies are not sufficient for analyzing slope and level of change of children’s engagement and BD. Neither are they sufficient for exploring causal mechanisms explaining the relations between social interaction, BD and engagement. Such analyses require at least three data points (Ployhart & Vandenberg, 2010). Through the addition of a longitudinal perspective in the third and fourth studies, trajectories of children’s engagement and BD could be studied. The trajectories for Study III showed that social interactions continued to have a significant influence on engagement and BD. In addition, Study IV revealed that children’s core engagement was a significant predictor for peer interaction and teacher responsiveness respectively. For example, children’s core engagement in activities or with materials at T1, predict increased level of peer-to-child interaction and teacher responsiveness at T2, which in turn increased other children’s interest in the child’s actions at T3. However, children’s hyperactive behavior was not found to be a significant predictor for social interactions. This indicates, that the individual child’s interest and core engagement might be a stronger driving force for increased level of peer-to-child interaction and jointly created niches than decreased hyperactive behavior.

Accordingly, children’s engagement (see Figure 6) is situated at the nodal point between their preferences, sense of self and activity competence on the one hand, and environmental factors on the other; that is, niches which are jointly created activities, available materials, and proximal processes (i.e. teacher responsiveness, child-child interaction) in the preschool classroom (Super & Harkness, 1986; Wachs, 2000). How children with BD manage to build positively valanced niches is related to the support provided. The results revealed that the probability of receiving support for BD children, as well as type of special support received, was associated with factors at several system levels. SuS was provided among children formally identified as needing
special support, and concerning these children preschool staff collaborate with external teams (e.g. habilitation services). Meanwhile, SiS was provided among children not formally identified, but still in need of support due to BD. Among these children there was no collaboration with external teams, and the decision regarding special support was solely related to actors (i.e. teachers) in the microsystem. Much support focused primarily on negative interactions (e.g. BD disturbed other children in activities), meanwhile, and a stronger emphasis on positive interaction should be emphasized.

For this thesis, positive interactions with teachers and peers were associated with the children’s level of engagement in what Bronfenbrenner and Evans (2000) call proximal processes.

**Figure 6.** Children’s engagement. The nodal point between environmental factors and niches includes jointly created activities, available materials, and proximal processes, such as peer-to-child interaction and teacher responsiveness, within the microsystems.

To be effective for a child’s functioning and development, proximal processes need to occur relatively regularly over an extended period of time (Rutter, 2012). Therefore, as shows in the longitudinal Studies II-IV, social interactions within the microsystems level (i.e. preschool) seems to be an important driving force for children’s increased level of engagement and decreased level of hyperactive behavior, which in turn improve child...
development and learning. Thus, how to improve child-child interactions and teacher responsiveness need to be emphasized much more in preschool in general, and specifically when planning interventions to improve engagement for children in need of special support because of BD. Accordingly, obstacles to and facilitators for children’s engagement are highly dependent on the niches available (e.g. proximal processes: peer interactions, teacher responsiveness; available materials), which are jointly created by the child, preschool staff, and peer group in relation to the environmental factors (e.g. planned activities: i.e. circle time, free play) in the microsystem.

Children’s need of special support - who and why?
The findings of this thesis show that the children’s need of special support was related to several levels of the ecological systems – from child characteristics, via the preschool environment, to the surrounding systems such as professionals in the exo system and laws and regulations in the macrosystem. In Study I, children were perceived as in need of special support when their BD had a negative influence on peers or teachers, as well as on preschool structural environmental factors such as the amount of time set aside for free play. The odds ratio for receiving the support format SiS was higher among children with BD and showing a high level of engagement. Similar results were pronounced in an observation study by Coplan et al. (2001). Children with externalizing behavior difficulties that are very active tend to have a negative influence on other children’s play activities. The children may become excluded which over time lead to higher occurrence of solitary active play. Solitary active play behavior was found to occur more frequently during free-choice play activities and where the children were not involved in social interaction with peers. The authors stressed that solitary active play behaviors might be an early marker of being at risk for learning difficulties. They recommend that children with these tendencies need special support during free play activities, in order to counteracts the negative trend in child-child interaction. Preschool staff need to be aware of the potentially negative consequence of solitary play behaviors and have skills in designing special support to raise their level of engagement in play with peers in a socially accepted manner in free-choice play activities.

Accordingly, free-choice play activities place high demands on children’s ability to initiate, maintain and finish the activity in a socially accepted
manner. If a child has difficulty regulate their affection and managing the demands in free play, there is a risk that they might be excluded by the other children and miss being engaged in activities that improve their development and learning. The impact of a high level of BD, as well as a high level of engagement, might be perceived as a contextual problem for the group or the teacher, e.g. interfering with other children’s interactions in free play, routines, or whole group activities (Drugli & Hjemdal, 2013). Consequently, preschool environments with a high proportion of time in free-choice play activities places high demands on children’s abilities to regulate their behavior and teacher’s skills in supporting free play in individual children. Children’s externalizing BD might influence proximal processes negatively, and can decrease the number of available niches for children in need of special support.

Another factor that might be associated with the child’s need for special support due to BD is related to structural aspects, such as group size and teacher-child ratios. A Swedish study by Sandberg et al. (2010) showed that one aspect of how preschool staff identify children’s need of special support was related to environmental resources. Study II in this dissertation showed that teacher-child ratios in different preschool groups ranged from 1:2 to 1:9. A high teacher-child ratio probably places higher demands on the children’s ability to exclude non-relevant stimuli, which in turn might increase their hyperactive behavior and decrease the probability that the staff can provide special support to improve engagement among all the children in the group. This might lead to support as general interventions for the whole child group. Moreover, a longitudinal study by Granlund et al. (2015) shows that free-choice play activities were less common in preschool units with high numbers of children with BD and instead had more teacher-initiated activities (small groups, circle time). The results also indicate a negative association between high numbers of children with hyperactive behavior and the use of approving behavior by the staff. This indicates that children’s BD influences the microsystem (such as environmental factors, i.e. number of staff for each child, organization, and structured everyday activities) and niches (i.e. the quality of the teacher-child interaction). A lack of opportunities to engage in free play may impact children’s development of self-regulation negatively (Fuhs et al, 2013). Studies II and III showed that children’s need of special support was associated with a low level of engagement due to child factors, such as BD
and gender, which was found both cross-sectionally and over time. Children exhibiting a high level of hyperactive behavior were not engaged to the same extent as other children were, both in a current perspective and over time. These results are in line with those of earlier studies (Buhs, Ladd, & Herald, 2006; Gunnar, Sebanc, Tout, Donzella, & Van Dulmen, 2003a; Metcalfe et al., 2013). For Study II, this association between hyperactive behavior and engagement were especially strong for core engagement, which is related to less complex engagement behavior, such as persistence and attention to the surroundings. This is consistent with a meta-analysis by Allan et al. (2015), which showed that children with externalizing behavior difficulties have problems regulating their attention and excluding non-relevant stimuli. Lack of self-regulation is related to difficulty managing and modulating positive and negative emotions, controlling one’s own behavior, and shifting and focusing attention (Raver et al., 2012). Children exhibiting high levels of hyperactive behavior tend to be very active, which in turn may lead to less time interacting with other children, adults, materials or activities in a developmentally and contextually appropriate manner. Over time, this pattern might lead to later learning difficulties and negatively influence a child’s long-term well-being. This is in line with the results by Coplan and colleagues (2001) as were mentioned earlier. That is, children with externalizing behavior difficulties were excluded from other children’s play activities, which in turn have a negative influence on their well-being, later adjustment, and academic skills.

According to the results of Study III, the non-linearity path was showed by a significant association between core engagement and hyperactive behavior. More specific, when children showed higher level of core engagement a decreasing trend in hyperactive behavior was found. This indicate the importance to promote children’s engagement in everyday activities instead of solely focusing on how to decrease BD. These findings were explained partly by child characteristics (i.e. gender) and behavior (i.e. core engagement, hyperactive behavior), and partly by teacher responsiveness and peer interaction. A high level of teacher responsiveness and peer interaction at time point one predicted an increase in core engagement and a decrease in hyperactive behavior. This was especially strong for boys.

Moreover, Study II showed that social interactions mediated the negative association between hyperactive behavior and engagement. Children with
hyperactive behavior were more likely to be engaged in preschool activities when they had positive interactions with peers and teachers. This was especially strong for peer interaction, which explained 56-78 percent of the total negative effect of hyperactive behavior on core engagement and developmental engagement. Meanwhile, teacher responsiveness explained 33-34 percent of the total negative effect for both types of engagement. The results are partly related to earlier studies (Cadima et al., 2016; Searle et al., 2013; Williford, Maier, et al., 2013) which stressed the importance of teacher-child interaction to improve children’s engagement and cognitive achievement. However, the results of this thesis indicate that child-child interaction might be even more important for engagement among children with BD. One explanation to the results might be that teacher responsiveness is necessary for a positive child-child interaction and work as a role model for children’s approach towards each other. Earlier studies show that teacher’s skills to plan and organize activities promote learning and development (Sylva et al., 2006), and teacher’s use of approval responses to children’s behavior have been found improve positive child-child interaction (Spivak & Farran, 2016).

When children exhibit both a low level of engagement and a high level of BD, this cannot automatically be viewed as two sides of the same problem. Even if children with and without special support due to BD attend the same environment and are exposed to the same type of preschool activity (i.e. free play, circle time, small group activities), the experiences of the activity and how to act within it may vary among the children as well as among the preschool staff (Imms et al., 2016). Thus, children’s engagement and special support do not exist in a vacuum but rather in the niches where conditions at the micro level, as well as the exo and macro levels, contribute to the understandings of the processes within the microsystem (Bronfenbrenner & Evans, 2000).

Accordingly, in order to design appropriate special support to improve children’s engagement, preschool staff need to consider individual children’s need of special support as a multidimensional construct involving their abilities and preferences, as well as environmental factors, which are influenced by norms and values and lead to processes such as the inclusion or exclusion of the children in need of special support due to BD (Fischbein & Österberg, 2003). Moreover, in order to create an inclusive preschool
environment, special support for these children needs to target both the level of engagement as well as the BD, and consider characteristics of the child as well as the ongoing proximal processes, for example teacher-child, child-child interaction, within the microsystem.

**Special support to improve engagement or counteract behavior difficulties**

This thesis assumes that special support in preschool will improve engagement and counteract BD. However, Study I showed that among children who displayed BD, 67 percent did not receive any type of special support beyond what is provided to all children, which is consistent with other studies conducted in Sweden (Lillvist & Granlund, 2010; Sandberg et al., 2010). One explanation for this might be that the preschool staff provide indirect support to all children regardless of whether they need special support, which constitutes the overall quality, norms, values, and practices based on the central concepts of the preschool curriculum (Sandberg et al., 2009). The Swedish policy documents proclaim that staff should stimulate all children’s learning and development, and that activities should be adapted to the needs and prerequisites of all children (Swedish National Agency for Education, 2016). This can be interpreted as *indirect support* that should be given primarily within the ordinary everyday activities by adapting the activities to the needs of the individual child. Accordingly, these types of actions are common among the staff’s everyday work, which might mean that they do not perceive them as special support among children with BD. Moreover, in accordance with Study II, high level of positive social interactions was a supportive factor for hyperactive children in focusing and sustaining attention in activities. For children who receive any type of special support, the preschool staff made certain adaptations to the preschool environment, such as creating several play groups with few children in each and/or individualizing the support in peer interaction. These types of adaptations were the most common for children with emotional problems, or when a child’s behavior was not perceived as a burden to the peer group or preschool staff. Thus, the arrangement and organization of preschool activities in order to improve positive child-child interaction, as well as teachers’ awareness of responsive behaviors towards the needs of children with BD, might function as proactive support in order to prevent learning difficulties and improve children’s engagement. However, these types of *indirect support* seemed to
be common if children’s BD did not have a negative influence on the surroundings, or if the child suffered due to BD.

Direct support, such as SiS and SuS, was provided among children who were perceived to have a negative influence on the surroundings. The most common direct support involved attention to the children’s negative behavior, with the preschool staff staying close to the child to prevent conflicts with other children. This might be related to norms and values within microsystem as well as macrosystem, and how the staff team perceives the child’s BD and what kind of support the child needs. In addition, it might also be a strategy for the teacher to maintain the balance between supportive behavior towards the whole peer group and the specific needs of the individual child. Such a balancing act can be seen as a self-stabilization process in the microsystem (i.e. preschool group), which refers to the system’s ability to respond to external or internal influences (Bornman & Granlund, 2007). Moreover, high numbers of children with BD might place higher demands on teachers’ didactic skills and knowledge, ability to transform the content of preschool curriculum, and positive beliefs and views concerning children displaying BD (Sheridan et al., 2011; Williams et al., 2014). Regarding teachers’ ability to handle BD in the peer group, similar patterns were found in a study conducted in Swedish and German preschools. Classrooms with a high proportion of conflicts between teacher and children and/or in the peer group were characterized by teacher use of either dominance, overriding the children’s initiative to interact, or abdication, in which the teacher gave up his/her professionalism. On the other hand, classrooms characterized by teacher’s use of democratic/learning strategies promote children participation and interactions between the teacher and children as well as among children in the peer group (Sheridan, 2007).

Concerning the support format, SuS was only provided for children formally identified as being in need of special support. The difficulties these children displayed are probably more complex, and might be linked to developmental delay, impairment or a specific diagnosis. These children were more likely to receive special support when their difficulties disturbed free play or if the BD have been present for more than 12 months. However, according to the Swedish school law (SFS 2010:800), the severity or diagnosis should not underpin the decision of whether or not a child receives special support; i.e. “children needing special support for their development for physical,
psychological or other reasons should be given the support their special needs require” (Ch. 8§ 9). Moreover, collaboration with external teams were much more common among children receiving SuS. These results indicate that children received the support format SuS was planned and decided on in the exosystem (i.e. service organizations’ way of working), more distal from the child, which is regulated by other laws and regulations decided at the macrosystem. Meanwhile, when the SiS support format was provided, the staff did not collaborate with professionals (e.g. psychologist, physiotherapist) from external teams (e.g. habilitation services) from outside the preschool. Thus, provided special support seemed to be related to norms and values as well as regulation at different system levels (Bronfenbrenner & Evans, 2000). This indicates that concerns and decisions regarding special support are related both to the microsystem where the children’s BD has a negative influence on the environment, as well as to the macrosystem and exosystem, more distal from the child, where other professionals might decide the type of support solely based on how to improve child development and not how to improve child functioning in preschool activities.

Supportive strategies such as teacher responsiveness was mentioned to decrease conflicts between the child with BD and other children. These strategies were not mentioned as a way of supporting children and improve their engagement. Instead, the results from Studied II and III showed the opposite; that is, children with hyperactive behavior were met with lower responsiveness from teachers and interacted with their peers to a lower extent than children without behavior difficulties. In addition, children displaying low engagement did not receive special support. These relationships have been found to be associated with the proportion of children with hyperactive behavior in the preschool classroom (Granlund et al., 2015), which in turn might explain the teachers’ behavior towards them. These kinds of environmental factors at the unit level place high demands on teachers’ responsiveness and skills for encouraging engagement and positive interaction between peers even under unfavorable unit conditions.

To conclude, indirect support might not be sufficient for improving engagement among children in need of special support due to BD; rather, a combination of indirect and direct support would meet the individual child’s need of special support. When the preschool staff perceive children’s BD as mainly linked to child characteristics they seem to use more individualized
support, such as staying close to the child to prevent conflicts and attending to behavior that is not contextually adaptive. Meanwhile, when staff perceive children’s difficulties as partly context-based they seem to adapt the preschool context in hopes of helping the child function in the group, such as adapting the physical or psychosocial environment to better fit the child’s needs. Thus, whether or not children receive support seems to be more dependent on the staff’s ability to manage children with BD at the same time as they support the whole group, than on the individual child’s need of special support in order to be engaged in everyday activities.

**Causal relationships between behavior difficulties, engagement and social interactions**

As shown in Studies II and III, a significant negative association between children’s hyperactive behavior and engagement were found both in a current perspective and over time. These results are in line with those of earlier studies (Buhs et al., 2006; Gunnar, Sebanc, Tout, Donzella, & van Dulmen, 2003b; Metcalfe et al., 2013), which also indicate that hyperactive behavior may have an impact on children’s engagement. However, children’s everyday functioning in preschool settings involves bidirectional influences between their lived experiences on the one hand and proximal processes as well as niches on the other, where child-child interaction and teacher-child interaction play an important role (Bronfenbrenner & Evans, 2000; Super & Harkness, 1986; Wachs, 2000). According to Study III, a decreasing trend in hyperactive behavior was associated with an increasing trend in core engagement. The findings were explained partly by the children’s own behavior and partly by teacher responsiveness and peer interaction; i.e. a high level of teacher responsiveness and peer interaction at Time Point 1 predicted an increase in core engagement and a decrease in hyperactive behavior. Corresponding results were found in Study II, which confirmed that engagement among children in need of special support is dependent on proximal processes in the microsystem. That is, social interactions explained a large percentage of the total negative effect of hyperactive behavior on both types of engagement. Similar patterns were also shown in the longitudinal study by Fuhs et al. (2013). In classrooms where the teachers used more approving behavior in activities, e.g. encouraging the children’s positive behavior in combination with a positive emotional tone, there was a significant positive effect on engagement that predicted gains in the children’s cognitive self-regulation and pre-academic achievement in kindergarten. Thus, in Study III, teacher
responsiveness was a significant predictor for trajectories in core engagement, which was not the case for the rate of change in hyperactive behavior. This indicates that teacher responsiveness might be indirectly associated with change in hyperactive behavior via child engagement. In other words, niches with available materials and responsive teacher might counteract and accordingly improve children’s engagement over time. These results might contribute knowledge about the idea of inclusive learning practices (i.e. engagement for all) (Ahlberg, 2009; Göransson & Nilholm, 2014).

Besides teacher responsiveness, peer interaction was found to be a predictor for change in children’s core engagement. This implies that a child’s engagement in activities increases the probability that other children perceive the child as someone who is able to initiate, maintain, and end play in a socially accepted manner. This is consistent with a study by Coolahan et al. (2000), which showed that children with prosocial behavior were more likely to be involved in positive peer interaction, whereas, children displaying BD were less likely to be engaged in peer interaction. The results from Study IV confirm this pattern, i.e. that children’s level of core engagement at T1 causes higher frequencies in positive peer interaction at T2, which in turn promote children’s core engagement at T3. On the other hand, in contrast to previous research concerning children’s hyperactive behavior as a predictor among teacher-child conflicts, Study IV showed that children’s level of hyperactive behavior did not predict teacher responsiveness over time. The results revealed the opposite path, high levels of teacher responsiveness at T1 and T2, i.e. teachers showing interest in the child’s action and adapting their behavior to improve the child’s interest in a common activity, was associated with low levels of hyperactive behavior at T2 and T3. In contrast to the cross-sectional analysis in Study II, no significant directional association was found over time from children’s level of hyperactive behavior at the previous time to the teachers’ level of responsiveness at T2 or T3. This indicates the importance of teacher responsiveness, especially among children with hyperactive behavior, in efforts to improve core engagement. Thus, even though proximal processes are reciprocal in nature (Bronfenbrenner, 1999a), the results of the present thesis indicate that children’s behavior difficulties are not the only factors affecting trajectories of engagement and social interactions. In fact, the results from this dissertation stress the importance that the design of interventions for these children needs to target core engagement as well as behavior difficulties, such as hyperactive behavior. In addition, it is also important to consider child
characteristics and behavior for the ongoing proximal processes between the child and social interaction which is the mechanism and driving force for engagement and jointly created niches.

**Comprehensive understanding**

The factors that promote or hinder engagement among children in need of special support can be identified within the individual, at different ecological levels as well as between ecological levels. From an individual level, it can be argued that children with BD are not engaged in preschool activities to the same extent as other children which might can be explained by lower levels of self-regulation, as expressed in hyperactive behavior (Searle et al., 2013). On a micro level, it can be claimed that proximal processes seem to be the mechanism that is the driving force for engagement (Bronfenbrenner & Evans, 2000; Vygotskij & Cole, 1978) also when not taking increased complexity in processes into consideration. In addition, proximal processes, such as positive social interaction, mediate the negative effect of BD on engagement. In other words, children with BD shows higher level of engagement when they are met by positive social interaction with peers and teacher (Buyse et al., 2008; Graves & Howes, 2011).

The bidirectional association between environmental factors and the child creates niches jointly constructed by staff, peer group and the child. These niches might either limit or create opportunity for engagement among children with and without need of special support (Super & Harkness, 1986; Wachs, 2000). Accordingly, engagement among children need of special support occurs in the nodal point between environmental factors (i.e. organization of the preschool day) and the child. Engagement is an expression of the proximal processes (child-child interaction, teacher-child interaction, available materials, and activities) in the preschool units (Super & Harkness, 1986). From an exo level, it can be argued that different professionals, e.g. habilitation services, preschool staff, working towards different regulations, becomes more involved in designing special support in preschool among child formally identified as in need of special support, which was not the case for children not formally indentified as in need of special support. Specifically, the staff were more likely to collaborate with external teams when children were formally indentified as in need of special support and when children’s problems had been present for a long time. Consequently, the collaboration between the
staff and external team were less likely for children not formally identified as in need of special support which might be related to different regulations for external team and staff in preschool. Thus, from a macro level, it can be argued that identification of children in need of special support is related to norms and values at different system levels (Super & Harkness, 1986). Norms and values influence policy documents and laws regulating definition of children in need of special support and who of them that receives special support or not. In order to design appropriate special support, the professionals need to consider children’s need of special support as a multidimensional construct involving the children’s abilities and preferences, as well as environmental factors, which are influenced by norms and values (Fischbein & Österberg, 2003).

To summarize, in order to create inclusive learning practices, i.e. engagement among all children in preschool and to design effective interventions, the interdependency between factors at different levels need to be considered; individual -, group-, organizational-, and policy-, organizational-, group- level. In addition, when several of these factors are co-acting it will contribute to engagement among all children, with and without need of special support.

**Barriers**

- Children in need of special support due to hyperactive behavior spend less time engaged in everyday activities. This implies that children with hyperactive behavior are at risk for learning difficulties and a low sense of well-being because of fewer opportunities to stay engaged in learning activities in order to improve their skills.

- Lower occurrence of teacher responsiveness and child-child interaction and high proportion of time in free-choice activities place higher demands on the child’s ability to regulate their own behavior and to exclude non-relevant stimuli. Specifically, less supportive environment, i.e. less responsive teacher, less positive child-child interaction, reduce the child’s chance to be actively engaged in everyday activities in preschool.

- The majority of children in need of special support do not receive special support because of BD. Children receive special support if they display high levels of engagement and high levels of BD that negatively influences negative influence the peer group or the
preschool staff. This indicates that the staff strives to avoid conflicts between children and create a balance within the child group. The focus is on how to decrease children’s disturbing behavior, not on how to improve engagement for individual children in need of special support.

- The policy documents do not provide guidelines how to identify children’s need of special support or how special support should be designed. Lack of guidelines might be one of the explanations why the majority of children in need of special support did not receive special support because of BD:

- Teachers perception of the child’s everyday functioning and need for special support might be another explanation of why some children receives support when other is not.

- Special support is partly explained by the content of policy documents and partly by socially constructed norms and values by the staff team in the preschool unit. In addition, structural factors such as teacher-child ratio, group size or number of children entitled EL2 might influence preschool staff perceptions of whether the child needs special support or not.

- The identification of children in need of special support is, on the one hand, based on formally documentation of children’s developmental delay or diagnosis by external teams, on the other hand, based on children’s everyday functioning in preschool activities by preschool staff. Thus, the collaboration between different professions might be problematic due to different policies, objectives and goals among children in need of special support and how to design interventions for them.

**Facilitators**

- Preschool environments characterized by high levels of teacher responsiveness and peer interaction (proximal processes) mediate the negative effect of child hyperactive behavior on engagement. This implies a supportive environment where children in need of special support spend more time as actively engaged in social interaction and jointly create different preschool activities (niches), which in turn promote the child’s learning and well-being.

- Trajectories of children’s core engagement predict teacher responsiveness and positive peer interaction. This indicate that
children’s positive behavior increases proximal processes, which in turn improve learning and well-being over time.

- By facilitating social interactions, we can protect children with hyperactive behavior from the negative consequence of their difficulties.

**Conclusion**

In general, engagement among children with and without need of special support was partly related to individual factors and partly to environmental factors, proximal processes and available niches. Children in need of special support due to hyperactive behavior showed lower levels of engagement, these paths were especially strong for core engagement. This support the importance of identifying obstacles and facilitators for engagement among children with hyperactive behaviors in preschool settings. These children seem to have difficulty in regulating and maintaining attention long enough in order to stay engaged with materials, in activities, or in social interaction with peers, which in turn has a negative influence on their learning and developing new skills. However, preschool settings with responsive teachers and positive peer interactions improve children’s engagement, whether or not they exhibit behavior difficulties. Over time, these paths were confirmed, i.e. levels of teacher responsiveness and peer interaction were significant predictors for trajectories of core engagement and hyperactive behavior.

Even though the staff identified children’s need of special support due to BD, most of them did not receive any additional support beyond what was provided to all children. The highest probability of receiving special support was among children showing high levels of engagement, BD and was perceived to have a negative impact on the staff, peers or during activities in free play. Meanwhile, children with low levels of engagement or children who displayed behaviors that did not have a negative influence on their surroundings did not receive any special support due to BD. Teacher’s perception of children’s need of special support due to BD is probably influenced by norms and values of the preschool team in the microsystem, i.e. the preschool teams’ idea of who and why a child is in need of special support. Collaboration with parents and external professionals were not mentioned when children who received SiS, whereas it was a common action among children received SuS due to formal identification of their need of special support. The decision about who receives
special support and what type of support is decided at different systems level (i.e. micro-, and exo-level), related to different law systems (i.e. school law, law of health and medical care), and consequently related to different professionals (i.e. solely preschool staff, both preschool staff and external teams). The consequence is that children need to be formally identified as in need of special support in order to receive special support from other professionals outside the microsystem, and the staff do not receive supervision from external team unless the child is formally identified. In addition, other aspects that might influence the staff perception of children’s need of special support is related to available resources mainly decided by the principals of the preschool at the microlevel, but also on political level and is related to regulations and norms in the society at the exo-level.

Implications for practice

- In order to improve engagement for children in need of special support due to BD, the staff need to increase their use of approving behavior in order to improve children’s engagement in everyday activities, instead of disapproving the behaviors of children with BD.
- The principal of the preschool needs to encourage and provide time for the staff to have critical discussion how to identify children’s need of special support and how improve engagement among children displaying BD.
- In order to improve engagement for children in need of special support due to BD there is a need to increase teacher responsiveness and peer interactions.
- The staff needs to critically discuss how to plan and organize everyday activities, and the balance between teacher-initiated activities vs child-initiated activities.
- The staff needs to increase their awareness of how children's positive and negative behaviors affect their view of the child and need of special support.
Discussion of the method

This dissertation is based on a longitudinal study design with both quantitative and qualitative elements. The data are based on preschool staffs’ ratings of social interactions, BD and engagement. In order to reflect on the issues of validity and reliability, the following aspects will be discussed: scientific approach and design; participants and procedure; and analysis.

Scientific approach and design
Within (special) education research, explanatory models addressing why special support is needed for some children have a tendency to be presented as a dichotomy (Nilholm, Almqvist, Göransson, & Lindqvist, 2013). However, the reality is complex, and engagement in preschool activities among preschoolers in need of special support due to BD should not be reduced to either biological conditions or shortcomings in the environment and the preschool practices. In fact, the scientific approach needs to address several factors at different levels, as well as the influences between the child factors (i.e. BD, engagement) and the environmental factors and characteristics (i.e. type of activities, social interactions), which are influenced by norms and values at the micro and macro levels as well as exosystems including professionals in other support system (i.e. habilitation services) more distal from the child (Fischbein & Österberg, 2003). If a reductionist approach is used – meaning from either a biological perspective or a preschool practices and environmental perspective (Rosenqvist, 2013) – the multidimensional perspective of children’s engagement will be lost. A multidimensional perspective on children’s need of special support and the field of special education research needs to be considered, based on two major assumptions. First, human beings interact with their environment; and second, reality consists of both objects and experiences (Fischbein, 2007). The first assumption implies that children’s difficulties in preschool practices cannot be attributed either solely to the child’s circumstances or solely to environmental factors. In fact, the difficulties and opportunities experienced in everyday activities in preschool arise at the nodal point between these two factors; i.e., factors of both the child and the environment. The second assumption implies that both children’s biological conditions and their experiences of the situation are important for understanding reality. For this thesis, the child’s everyday functioning and social interactions are rated by the
staff, based on their perceptions of the children’s need of support, engagement, BD, and social interactions. For this thesis, the Bioecological Systems Theory (Bronfenbrenner & Evans, 2000), in combination with Transactional Model (Sameroff, 2009), have been used in order to explore children’s engagement and need of special support involved from a multidimensional view of point, both from a cross-sectional perspective and over time.

Moreover, one of the purposes of a longitudinal design is to test causal inferences among different factors in relation to the outcome (i.e. engagement) in a natural context, such as preschool. Researchers have argued that experimental design/randomized controlled trials (RCTs) might be needed in order to draw conclusions about causal relationships (Bryman & Cramer, 2011). However, experimental design/RCTs might not be appropriate designs for exploring causal interferences with regard to the objective of this thesis; i.e., children’s engagement in everyday activities with a focus on children in need of special support (Rutter, 2011a). Instead, a longitudinal design in a naturalistic environment has been used to identify causal relationships between variables (i.e. BD and engagement) and the prediction of variables (i.e. social interaction, gender) over time. Through the measurement of the same phenomena using the same measures over several time points, the changes in relations between variables over time can be seen as indicators of causal relationships. The design provides an opportunity to explore important mechanisms for engagement among children in need of special support. The ratings of preschool staff mirror both children’s positive and negative functioning, and the occurrence of proximal processes, such as child-child interaction and teacher responsiveness, constructing niches in relation to environmental factors. In addition, a combination of questionnaires with closed- and open-ended questions offers the opportunity to gain a more comprehensive understanding of the content of special support needed by children with behavior difficulties in preschool. However, in a nonexperimental longitudinal design the researcher needs to consider possible sources of confounding factors (unobserved or unmeasured) (Rutter, 2011b). These issues will be discussed in more detail below in the Conclusion validity section.

**Sampling procedure**

The intention of this thesis was to provide knowledge about a vulnerable group of children (e.g. children in need of special support due to BD).
dissertation is based on a nonexperimental longitudinal research design implemented in a natural environment (i.e. preschool). This design requires somewhat different sampling procedures compared to experimental research. In an experimental design, the researcher manipulates the independent variables in order to explore causal effect on the dependent variable, and commonly uses a control and an experimental group. Meanwhile, in nonexperimental research the interest is the investigation of associations between variables in some predefined population (Rutter, 2011a; Tabachnick & Fidell, 2014).

Based on a stratified sampling process, the following criteria were used for the predefined population: proportion of small, medium, and large municipalities (for more information, see Method section); and a variation between preschools with many children entitled to EL2 and other preschools where the majority of the children have Swedish as their mother tongue. Within each stratum (i.e. small, medium, large municipalities) a convenience sampling process was used, which resulted in an underrepresentation of samples from large municipalities while medium-sized municipalities were somewhat overrepresented compared to the whole of Sweden (SCB, 2014).

The final sample consists of a quite balanced number of 425 boys and 394 girls (13 missing), aged between 15 and 71 months at T1 (M_{age}= 44.3, SD=15.5). Furthermore, 21 percent of the children were entitled to EL2 and 4.5 percent of the children were formally identified as being in need of special support. The figures on children entitled to EL2 are quite similar to those presented by the Swedish National Agency for Education regarding Preschoolers in Sweden (2015). The number of children in need of special support in preschool settings is not documented by the Agency for Education, and it is therefore not possible to compare the present sample with the population of Swedish preschools. However, these figures are in line with earlier studies conducted in a Swedish preschool environment (See Lillvist & Granlund, 2010; Almqvist, 2006), with group sizes ranging between 8 and 50 children for each classroom (M=20 children/group, SD=9.5). These figures were slightly above those presented by the Swedish National Agency for Education concerning group size for Swedish preschools in 2014 (Education, 2015), in which the mean group size was 17 children in the classroom. The range of number of preschool staff was between 2 and 7 teachers (M=3.9, SD=1.1) from 92 preschool classrooms, at 31 preschools in the six
municipalities, divided into large, medium and small municipalities. To conclude, the combination of a stratified sample and convenience sampling process might negatively influence the external validity, of the study which in turn would lower the possibility of generalizing the results to a whole population (Creswell, 2009). On the other hand, as was mentioned above, the figures of the present sample are in line with earlier studies and the preschool population presented by the Swedish National Agency for Education, and therefore the results are likely applicable to the Swedish preschool context in general.

**Internal validity**

There are several factors that can threaten internal validity in nonexperimental design: maturation, instrumentation, selection bias, missing data, dropout, control for confounders (Hair et al., 2010; Rutter, 2011a). In order to handle these issues for the present research, several approaches have been used; these will be described more carefully here. Initially, both maturation and instrumentation are of great concern in longitudinal design. Maturation refers to processes within the participants that change over time, i.e. children becoming older. In addition, instrumentation refers to changes in the measuring instrument (Kazdin, 2017).

Studies III and IV include data from three occasions over two years, whereby maturation is of great concern; i.e., children become older and more mature which might lead to change in engagement behavior. In order to handle the issue of maturation, a principal component analysis was used in Study II with a cross-sectional design. The analysis resulted in a two-component model, with the components of core engagement and developmental engagement. Core engagement represented engagement in less complex behavior and had a lower correlation with developmental age ($r=.28$). Meanwhile, developmental engagement represented complex behavior and had a higher correlation with developmental age ($r=.54$). These results are in line with earlier research conducted in the US (See Blasco et al., 1993; DeKruif & McWilliam, 1999; Pierce-Jordan & Lifter, 2005). Thus, based on these results and the previous PCA in Study II, only core engagement was used for the longitudinal analyses in Studies III and IV, and to handle the issue of maturation.
The issues of instrumentation over time were handled within the latent growth curve modeling in Study III. The first unconditional model showed that the growth rate for hyperactive behavior was not equal between time points, whereas the second unconditional showed good model fit. Due to poor model fit in the first conditional model for hyperactive behavior, the path between slope and Time Point 2 was set free, and the errors at all three-time points were allowed to differ from the other errors. One explanation of might be related to teachers’ ratings of children’s hyperactive behavior differing between the time points due to their interpretation of the questions. These so-called gamma effects might also be checked through PCA at T1 and T3, in order to explore the factor loadings of the items. Another explanation might be related to the maturity of the children in the sample; i.e., hyperactive behavior might look different when a child is three years old compared to five.

Selection bias is another threat to internal validity. Studies I-IV include low numbers of children formally identified as being in need of special support, which might have had a negative influence on the statistical power and effect size. That is, the population of children in need of special support is too small to find significant correlations, even though they might exist (Type II error). However, children at risk of developing learning difficulties were also included, since a child might be in need of support even if he or she is not formally identified as such. Children’s difficulties and need of special support can also be identified in relation to their functioning in the studied microsystem; i.e., the preschool setting (Lillvist, 2010; Lillvist & Granlund, 2010; Simeonsson, 2006). Through the use of this broader definition of children in need of special support, selection bias was avoided.

Another threat to internal validity in a cross-sectional and longitudinal study is missing data on one or more variables, and/or loss of participants over time (Bryman & Cramer, 2011). Missing data, if ignored, might lead to misleading conclusions and be a threat to internal and external validity (Jelicic, Phelps, & Lerner, 2009). Meanwhile, loss of participants might reduce the power of the analysis and increase the risk of Type II error (Hair et al., 2010). In both cases external and internal validity might be reduced.

Overall, the pattern of missing data was both random (MAR) and completely random (MCAR), which require different methods in order to avoid bias if not handled correctly (Hair et al., 2010). One way of handling incomplete data in
a longitudinal design have been by using listwise or pairwise deletion. These methods require missing data completely random (MCAR); i.e., missing values in X variables are unrelated to other variables as well as the underlying values of X itself. Missing data completely random were found for Studies III and IV, and were treated by using available-case analysis and pairwise deletion. For the Studies I and II missing data was random (MAR), i.e. missing values does not depend on data values. The reasons for the missing pattern might be related to not answering certain items because an item was not suitable to the context, or that there is an unwillingness to answer due to the sensitive nature of the questions. For the present thesis, the utility of use of each item on the SDQ among children aged one to three and three to five were rated as good by at least 84 percent of the preschool teachers for all items (Granlund et al., 2015; Gustafsson et al., 2016). Accordingly, missing values were likely not related to the staff’s perception of answering questions about preschoolers’ BD.

Another threat to the internal validity in longitudinal studies is loss of participants, as differences may exist between those who remain in the study and the dropout participants (Polit & Beck, 2006). In Studies III and IV, which have a longitudinal design, dropout of participants was mainly related to the children’s age; i.e., a child stops attending preschool and starts preschool class during the year he or she turns six. No significant differences were found according to outcomes such as hyperactive behavior and core engagement, or predictors such as gender and social interactions.

A threat to internal validity in nonexperimental design is confounders; i.e., other unmeasured variables that might explain the outcome (Rutter, 2011b). One way to handle confounders is through structural equation modelling (SEM), which was used in Studies II-IV. Within the framework of SEM, unexplained variance in T1 (i.e. intercept) and rate of change in engagement and hyperactive behavior were treated as residuals. Other types of confounders might include children’s earlier experiences before having entered the preschool setting. In order to control for earlier experiences, additional data collection is needed; however, this was outside the scope of the present thesis. On the other hand, careful interpretation of the results is warranted, due to the nonexperimental design.
Content and construct validity
In order to ensure good internal validity and reliability, the measures of children’s engagement, BD, special support, and social processes need to show good face validity, content validity, construct validity, and predictive validity. The construct engagement comprises two components: the children’s attendance to the activity, and their involvement while there (Imms et al., 2016). In order to identify predictors and draw causal interferences regarding engagement among children in need of special support, different factors related to child and environmental characteristics need to be investigated. For the present dissertation, questionnaires have been used in which preschool staff have rated children’s everyday functioning. Earlier studies have shown that professionals’ ratings of children’s everyday functioning can be more reliable than merely using observations (Lillvist, 2010). Observations require a great deal of data in order to gain a comprehensive understanding of typical functioning, while proxy ratings are based on professionals’ knowledge of the child’s everyday functioning for an extended period of time.

Content validity is largely a matter of judgment, for instance having a team of experts indicate whether each item on the scale is relevant to the constructs and context (Polit & Beck, 2006). Face validity has been shown to strengthen the overall internal validity of an instrument. In order to ensure high face validity of the questionnaire, an expert panel was initially used in order to discuss the ability to measure children’s engagement, BD, special support, and social interactions processes. The panel consisted of professionals (i.e. preschool staff, special educator) from preschool with long working experience. During the discussion, some of the examples provided in the CEQ were refined in order to improve the ability to answer the questions about the child’s engagement in preschool activities and in social interaction with peers and teachers.

Moreover, content and construct validity also refer to whether or not the instrument measures the construct of interest. One aspect of content validity is whether the instrument has an appropriate number of items for the construct being measured (Polit & Beck, 2006). The construct of engagement was measured using the Child Engagement Questionnaire (CEQ) (McWilliam, 1991), consisting of 29 items. Strong internal consistency between the items has been found in earlier studies conducted in contexts of both Swedish preschool (Almqvist, 2006) and US preschool (DeKruif & McWilliam, 1999).
Based on the fact that earlier studies show relationships between children’s maturity and increased complexity in their engagement behavior (Casey et al., 2012; Sandra Pierce-Jordan & Lifter, 2005), the influence of maturation on engagement ratings were investigated. Study II shows that the engagement constructs consist of two underlying dimensions: core engagement and developmental engagement. Core engagement refers to items related to attentional and persistence behavior not associated with the child’s maturity (DeKruif & McWilliam, 1999), whereas developmental engagement refers to items describing engagement behavior associated with the child’s chronological age (Aguiar & McWilliam, 2013). The two underlying dimensions in the CEQ were explored using principal component analysis (PCA) with a two-factor solution. The content of the two-factor solution is comparable to the two factors found in an observational study of engagement by DeKruif and McWilliam (1999). They found that more mature children exhibited more complex engagement, such as make-believe play or problem-solving, to a greater extent, while toddlers exhibited less complex engagement, such as attentional behavior towards activities or other children and teachers, to a greater extent. The results from the observational study and the factor analysis in the present thesis indicate that engagement measured with the CEQ is multidimensional; i.e., one dimension related to complex behavior, and one related to less complex behavior). If the total scale of engagement had been used in Study II, the knowledge that there was a stronger negative indirect effect of hyperactive behavior on developmental engagement compared to core engagement through teacher responsiveness and peer interaction would not have been seen. This knowledge indicate that hyperactive children might be show high levels of core engaged (e.g. attentional behavior and persistence behavior), which in turn improve their learning and activity skills.

The construct of behavior difficulties (BD) was measured using the Strength and Difficulties Questionnaire (SDQ) (Goodman, 1997). The SDQ consists of five items for each subscale that measure children’s behavior difficulties and strengths: emotional problems, hyperactive behavior, conduct behavior difficulties, peer problems, and prosocial behavior. There has been controversy as to whether Goodman’s (1997) recommended five-subscale factor solution provides an appropriate measure for screening BD, or whether a two-subscale factor (internalizing and externalizing problems) solution should be used to identify early markers of mental health problems in low-risk
samples (Goodman, Lamping, & Ploubidis, 2010). However, a large cohort study in Denmark by Niclasen, Skovgaard, Andersen, Somhovd, and Obel (2013) examined the factor structure of the SDQ using the parent and teacher versions of the questionnaire with children 5-7 and 10-12 years of age. Three theoretical models were examined using a confirmatory factor analytic approach: (1) a first-order model with Goodman’s five-factor model (i.e. hyperactive behavior, conduct problems, emotional problems, peer problems, and prosocial behavior); (2) a second-order model with two factors (i.e. externalizing consisting of hyperactive behavior and conduct problems, and internalizing consisting of emotional problems and peer problems); and (3) a second-order model with one factor, based on the total difficulties score in the SDQ. The authors recommended a five-factor or two-factor model, applied to a low-risk epidemiological sample among the present age span. However,

Another validation of the SDQ teacher version questionnaire was conducted in a Swedish preschool setting among children aged one to three years and four to five years, using the same sample as in this thesis (Gustafsson et al., 2016). Concurrent validity and reliability were found to be satisfactory for both age groups (i.e. age 1-3 and 3-5) for the subdimensions of hyperactive behavior and conduct problems; this was not the case for the emotional problems and peer problems scales, which were reliable and valid only for older children. For Study I in this thesis, all subscales and the impact supplement in the SDQ were used in order to define the subsample of children in need of special support due to BD. The reason for this choice was that one child might show one or several BD according to the SDQ subdimensions, and/or overall problems that have a negative influence on the child’s everyday functioning or on peers or staff at the preschool. A significant correlation was found between the support format SiS or no support on the one hand and the two subdimensions of hyperactive behavior and conduct problems on the other. That is, children with high levels of hyperactive behavior and conduct problems were more likely to receive SiS if their behavior also had a negative influence on peers and staff. In accordance with Study I and the previous validation study using the same sample, the subdimensions of hyperactive behavior and conduct problems seem to be valid measures for identifying children’s need of special support due to BD in preschool settings in a cross-sectional design.
Although good content and construct validity and reliability were found in the earlier cross-sectional Studies I and II for the hyperactive scale, Study III with its longitudinal design showed that the rate of change in hyperactive behavior was not equal over time. Moreover, the unconditional model for hyperactive behavior showed a nonsignificant covariance between children’s hyperactive behavior at T1 and change over time. This shows that children’s levels of hyperactive behavior were not associated between initial levels and change over time, which might indicate a weak predictive validity for measuring change over time with the SDQ. One reason for this might be that one or more items within the subdimension measure of hyperactive behavior related to the development of self-regulation skills that tend to change over time, whereas other items might measure aspects of “pure hyperactive behavior” that are stable over time (Campbell, Shaw, & Gilliom, 2000). Two of the hyperactive behavior items measure children’s ability to stop and think before doing something, and the ability to follow tasks well, i.e. good concentration. These items show a developmental trajectory and are more sensitive to children’s maturity. The three other items in the hyperactive behavior subdimension pose questions about whether the child is restless, is overactive, cannot be quiet for long periods of time, has a hard time sitting still, moves and continually turns around, and is easily disturbed and loses concentration. According to a meta-analysis by Allan et al. (2015), children with externalizing BD have problems regulating their attention and excluding non-relevant stimuli. These difficulties seem to be captured by the last three items in the subdimensions in SDQ, and might be more sensitive to environmental factors. However, all five items were used in the analysis in order to identify trajectories of hyperactive behavior, even though the scale was not entirely coherent. An alternative could have been to use only three of five items in the analysis. On the other hand, reducing numbers of items might have a negative influence on the structural models and the effect size.

Proximal processes were measured using an adapted version (Granlund & Björk-Åkesson, 2000) of the questionnaire Interaction – your child your interaction (Granlund & Olsson, 1998), in which preschool teachers rated their experiences of diverse types of social interaction with a child in the preschool context. The instrument was initially developed for use in habilitation services in order to measure child-parent interaction (Granlund & Olsson, 1998), but was later adapted by Granlund and Björck-Åkesson (2000) in order to measure child-child and teacher-child interaction. The adapted version has been further
used in other research conducted in the Swedish preschool setting, and has shown high internal consistency (Almqvist, 2006). For the present dissertation, 16 items were used to measure aspects of proximal processes; i.e., other children’s initiatives to interact with the child and teacher responsiveness, such as adapting the communication to the child’s communicative levels. The scales showed high internal consistency among peer-to-child interaction as well as teacher responsiveness.

**Predictive validity**

Predictive validity refers how well an instrument measures a construct over time and future functioning (Hair et al., 2010. For the present thesis, including a longitudinal design, this is especially important in order to draw conclusions about causal relationships. Pearson’s product moment correlation coefficient (Pearson’s $r$) is commonly used for exploring predictive validity. Cohen, Manion, and Morrison (2013) suggest that correlations below .19 are very low; those between .20 and .39 are low; those between .40 and .69 are modest; those between .70 are .89 are high; and those between .90 and 1 are very high. However, these guidelines are not definitive indicators and should be used with caution. Most of the indexes used for the longitudinal analyses in this dissertation showed modest predictive validity, except for the scale measuring teacher-child interaction. The teachers rated their own interaction with the individual child. Thus, one reason for the low predictive validity between T1 and T2 might be that it was not the same preschool staff who answered the questions at T1 and T2. On the other hand, the same circumstance was evident between T2 and T3; even so, modest correlations between T2 and T3 were found.

In addition, as stressed earlier, the hyperactive behavior subscale showed a nonsignificant path between T1 and change over time, which indicates weak predictive validity or that children with hyperactive behavior might not change their behavior to the same extent. On the other hand, modest predictive validity in teacher responsiveness between T1 and T2, and between T2 and T3, was shown, according to the longitudinal analysis, which was not the case for peer interaction (see result section, Figure 4). An alternative way to interpret predictive validity is to use the significant levels to determine whether or not the null hypothesis would be rejected. The significant level is related to the probability of making false inference; a more stringent significant level at .001 might generate a higher risk of Type I error – i.e.,
rejecting the null hypothesis even if it is true according to reality (Bryman & Cramer, 2011). In order to reduce the likelihood of rejecting the null hypothesis, a significant level of .05 was used. With this level of significance, children’s trajectories of hyperactive behavior and core engagement are related to previous time points and predict future functioning. In addition, trajectories of child-child and teacher-child interaction are related to previous time points and predict future functioning.

**Conclusion validity**

Good statistical conclusion validity holds when the conclusions of the research are founded on the use of adequate statistical methods in order to answer the research questions (Garcia-Perez, 2012).

One of the purposes of longitudinal design is to explore possible causal relationships between variables. However, it is well-known that there is seldom merely a single cause for any outcome (Rutter, 2011a). Accordingly, change in engagement among children with and without need of special support is related to child factors, as well as to factors at ecological system levels. For the purpose of the present thesis, both correlation and regression analysis as well as multivariate procedures have been used to explore these relations. For Study I, logistic regression analysis was performed in order to explore predictors of children receiving different support formats (SiS or SuS) or no support at all. However, no logistic regression analysis was performed due to the low number of children receiving SuS. Concerning the two other models, the predictors explained approximately 27 percent of the variance of no support and the support format SiS, respectively. This indicates that there are other indirect variables not included in the model that explain additional variance of no support and the support format SiS, such as structural aspect or norms and values. For instance, in their study Sandberg et al. (2009) showed that the structural aspect (i.e. proportion of children in need of special support) was related to whether the children received direct or indirect support. Units with a low number of children in need of special support receive support outside ordinary activities to a greater extent, whereas units with a high number of children in need of special support are provided support within ordinary activities. Accordingly, the support received is related partly to child factors and partly to structural factors within the preschool setting. In addition, regulations and laws as well as norms and values would also explain the variance of no support and the support format SiS. An exploration of
interaction effects between variables within each model might also provide even more in-depth knowledge of why the majority of children in need of special support do not receive any support or receive SuS.

For Study II, a structural equation model with path analysis was used in order to explore direct and indirect associations between BD and engagement. Even though earlier studies have shown that children displaying BD tend to show less engagement in preschool activities (Bulotsky-Shearer & Fantuzzo, 2011; Coplan et al., 2001; Fantuzzo et al., 2005), there are probably additional factors that might explain low levels of engagement among children in need of special support due to BD. To avoid a spurious relationship (Hair et al., 2010), social interactions were used as mediator to identify the indirect effect of BD on two types of engagement; i.e., core engagement and developmental engagement. Both teacher responsiveness and peer interaction explained a large proportion of the total negative effect of hyperactive behavior on core engagement and developmental engagement, cross-sectionally. This indicate that low level of engagement among children in need of special support is partly explained by the individual child’s behavior and partly by the social interaction processes at the specific preschool. Consequently, due to the effect of nested data in the classrooms in Studies II and IV, there are risks for underestimated models and Type II errors. One way to handle the clustering effect might have been to run multilevel analyses (Kozlowski & Klein, 2000). If a multilevel analysis has been used for the present dissertation, structural variables such as teacher-child ratio, number of children entitled EL2 and number of children in need might be some factors that explain on classroom level engagement among children in need of special support. However, in order to test causal inferences between social interactions and the outcome (i.e. engagement, BD) in a natural context such as preschool, a multivariate analysis was used. To avoid Type II errors adjustment of standard errors were handled by using bias-corrected bootstrap resampling method in Amos.

Implications for further research

To expand on the findings in this thesis about the mutual relationships between environmental factors in the classroom, children’s engagement, behavior difficulties and special support, interventions in preschool environment need to be implemented and evaluated. In accordance with a systematic review by Adair, Ullenhag, Keen, Granlund, and Imms (2015) few studies so far have
evaluated engagement focused intervention for children and youth with disabilities in educational environments. For the target group of this thesis, an intervention study would provide a deeper understanding of how an intervention focused on teacher’s perceptions and skills in how to facilitate engagement for children in need of special support due to behavior difficulties can affect child functioning. Another goal for interventions can be to evaluate interventions focused on how to design special support in order to increase child-child interactions.
Svensk sammanfattning


Material och metoder

Avhandlingen består av både tvärsnitts- och longitudinell design. Empirin bygger på enkätdata för enskilda barn, besvarad av förskolans personal. Datainsamlingen genomfördes vid tre tillfällen (T1, T2, T3) under 2012–2014. Urvalet består av 829 barn (18–71 månader med ett medelvärde på 44 månader), 425 pojkar och 394 flickor (10 bortfall) från 92 förskoleavdelningar i fem små till medelstora svenska kommuner samt en storstadskommun. Förskolans personal skattade barnets engagemang, sociala samspel, betendesvårigheter, och i vilken grad svårigheterna påverkade andra barn,

**Resultat**

Barn som enligt personalens skattningar uppgivit hög grad av hyperaktivt beteende, uppgivde lägre grad av engagemang i förskolans aktiviteter. Andra barn samlade i lägre grad med det enskilda barnet, som också bemöttes med lägre lyhördhet hos personalen. Detta mönster återkom vid en viss tidpunkt och över tid. Barnets nivå av hyperaktivt beteende hade signifikant negativ påverkan på barnets grundläggande engagemang, jämfört med utvecklingsrelaterat engagemang. Variansen i de olika typerna av engagemang förklarades till hög grad av det sociala samspellet på den specifika avdelningen. Andra barns samlad förklarade 56–78 procent av barnets engagemang, medan lärarnas lyhördhet förklarade 33–34 procent av barnets engagemang. Sammanfattningsvis visar resultatet ett signifikant samband mellan barnets hyperaktiva beteende och engagemang, det vill säga barn som är aktivt engagerade i aktiviteter tenderar att uppriva lägre grad av hyperaktivt beteende. Graden av barnets engagemang kan dock förklaras av andra barns samspel med barnet och personalens lyhördhet på förskoleavdelningen.

Grad av hyperaktivt beteende minskade markant över tid hos flickor jämfört med pojkar, vilket till viss del kan förklaras av barns ålder. Samtidigt visade resultatet att när pojkarnas engagemang ökade, minskade deras hyperaktiva beteende över tid. Majoriteten (63%) av barn, som enligt personalen var i

Över tid visade resultatet att barnets grundläggande engagemang var en signifikant sannolikheten att andra barn samspelede med barnet och ökad lyhördhet hos personalen. Men andra ord, högt engagemang vid T1, bidrog till ökat barnsamspele och personal lyhördhet vid T2, vilket i sin tur bidrog ökat engagemang vid T3. Till skillnad från tvärsnittsanalyserna, visade de longitudinella analyserna att barnets hyperaktiva beteende vid T1 och T2 inte en signifikant påverkan andra barns samspele med barnet och personalens lyhördhet. Däremot predicerade båda typerna av socialt samspele vid T1 och T2 graden av barnets hyperaktiva beteende över tid, det vill säga T2 respektive T3. Återigen visade resultatet att andra barns samspele med barnet och lärarnas lyhördhet var en signifikant prediktor för att minska barnets hyperaktiva beteenden över tid. Barnets positiva beteende, dvs grundläggande engagemang, ökade sannolikheten för att andra barn samspelede med barnet samt att personalen visade högre grad av lyhördhet gentemot det enskilda barnet. Detta i sin tur bidrog till barnets engagemang över tid.

Sammanfattningsvis förekom en rad olika signifikanta statistiska samband mellan barnets engagemang, beteendesvårigheter, socialt samspele och om barnet erhöll särskilt stöd eller ej, samt vilken typ av stöd. Mer specifikt visar resultatet att ett välfungerande barnsamspele och lyhördhet hos personalen kan stödja engagemang hos barn som uppvisar hög grad av hyperaktivt beteende, som i sin tur har lättare att bibehålla uppmärksamheten och intresset i aktiviteten. Samtidigt visar resultatet nödvändigheten i att uppmuntra barnets engagemang i aktiviteter som bidrar till dess vardagsfungerande. Dock indikerar resultatet att särskilt stöd i förskolan sällan eller aldrig utformas för att stödja barnets engagemang i aktiviteter, utan snarare syftar till att minska beteendesvårigheter. Det är därför angeläget att personalen genom kollegial
reflektion samtalar om aktiviteternas syfte, innehåll samt hur de planeras och organiseras utifrån olikheter inom barngruppen. Barnets behov behöver definieras och särskilt stöd måste planeras med hänsyn till barnets engagemang och beteendesvårigheter i relation till förskolans krav och förväntningar på det enskilda barnet.

Nyckelord: förskola, engagemang, hyperaktivt beteende, lärares lyhördhet, barnsamspel, bio-ekologisk systemteori, nischer, proximala processer, miljöfaktorer, transaktionella processer, tvärsnittsdesign, longitudinell design
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