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Hyperactive Behavior and Participation in Social Play in a Swedish Preschool Context: A Cross-Sectional Study

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ABSTRACT

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The present thesis sought to compare participation in social types of play of children with and without hyperactivity in a Swedish preschool context. Based upon observational design of cross-sectional type, this study was built on a secondary analysis of data collected within two previous research projects that were merged into one dataset. A total of 583 children (n = 298 boys) aged 16 to 72 months (M = 52.55, SD = 11.01) were initially included in the sample. Preschool teachers rated children's behavior difficulties on a hyperactivity scale using Strengths and Difficulties Questionnaire (SDQ). Structured observations of children's attendance, engagement, verbal interaction, proximity and location during associative and cooperative interaction were conducted across day-long visits by three trained researchers using Children Observation in Preschool (COP) tool. Conditional probability looping syntaxes were created and Independent sample t-Tests were used to analyze the data. Out of 572 children included in the analysis, n = 60 (10,2%) were rated as having some form of hyperactivity. On the whole, the findings illustrated that the observed averages of attendance and overall engagement in social types of play did not differ significantly between children with and without hyperactivity. However, an in-depth analysis of participation patterns, linked to contextual and environmental factors such as proximity and play location, revealed several considerable differences between the two groups of children. It seems that preschoolers with hyperactive behavior seek social play opportunities as much as their typical behavior peers, but the quality aspects of their experience defined by a specific context and environment may differ further as the interaction develops. Contextual and environmental factors are crucial determinants to take into account when studying participation. Play, operating as a natural booster of self-regulation and engagement may have the potential to serve as a mediating factor accommodating hyperactivity and promoting participation in Early Childhood Education settings.

Keywords: Hyperactivity, Hyperactive behavior, Behavior problems, Play, Social play, Participation, Engagement, Early Childhood Education, Preschool, Questionnaire data, SDQ, Observations, COP

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Abbreviations

ADHD	Attention Deficit/Hyperactivity Disorder
COP	Children Observation in Preschool
ECE	Early Childhood Education
fPRC	The Family of Participation-Related Constructs
ICF-CY	The International Classification of Functioning, Disability and Health – Children and Young
SDQ	Strengths and Difficulties Questionnaire
SES	Socio-economic status
TOP	Teacher Observation in Preschool
UNCRC	The United Nations Convention on the Rights of the Child
UNCRPD	The United Nations Convention on the Rights of Persons with Disabilities

I Introduction

Considered as one of the frequently encountered types of externalizing behavior problems in preschool, hyperactivity is an important child factor to look at when studying everyday functioning and participation in Early Childhood Education settings. To date, there is little discussion concerning the participation in social play of preschool children with hyperactivity.

Participation in play and recreational activities with peers is a fundamental right guaranteed to all children by the United Nations Convention on the Rights of the Child [UNCRC] (1989). Learning through play is one of the distinguishing aspects of the Swedish National Curriculum for Early Childhood Education (National Agency for Education, 2011). In Sweden, children aged one to six years spend a significant amount of time in free play, compared to relatively little time spent in lesson-like structured activities led by teachers (Åström, Björck-Åkesson, Sjöman, & Granlund, 2020*;* Gustafsson, Danielsson, Granlund, Gustafsson, & Proczkowska, 2018; Coelho, Åström, Christopher, Sjöman, Nesbitt, Granlund, & Grande, *submitted*). Play is among the most optimal tools for epigenetic construction of the social brain functions (Panksepp, 2008) and is crucial for acquiring self-regulation skills (Vygotsky, 1978) starting from early childhood.

Social types of play in particular, such as associative and cooperative play, involve more complex interaction with peers and require a higher level of engagement, inflicting a greater demand of child's ability to initiate, maintain and terminate activities in a socially appropriate manner (Farran & Son-Yarbrough, 2001; Lillvist, 2010; Sjöman, Granlund, & Almqvist, 2015). This might be particularly challenging for preschoolers with hyperactivity who have difficulties to resist distractions, respect rules and conversational turns. As a result of scarce self-regulation, children who display hyperactive behavior tend to experience more social isolation and exclusion from peer interactions in the preschool classroom (Buhs, Ladd & Herald, 2007; Bulotsky-Shearer & Fantuzzo, 2011; Sjöman, Granlund, & Almqvist, 2015). Of concern, these children tend to spend lower proportions of time engaged in developmentally appropriate activities and may not be sufficiently engaged in play interaction with peers (Searle, Miller-Lewis, Sawyer, & Baghurst, 2013; Metcalfe, Harvey, & Laws, 2013).

For children with hyperactivity, being engaged in social play is as paramount, as it is for their typical functioning peers. Participation in play, conceptualized as attendance and engagement, can be considered both as a means of learning, development and functioning, and as a desired outcome in itself in Early Childhood Education settings. Hyperactivity in preschool children may, if not accommodated by the adapted environment, result in lower levels of participation in social play with peers. Up to the present time, social play of preschool children with hyperactivity has received little attention in the research (Cordier, Bundy, Hocking, & Einfeld, 2009). This study focused on participation in social play and hyperactive behavior in a Swedish preschool context.

2 Background

2.1 Hyperactive Behavior in Preschool

In Sweden, up to 11% of preschool children aged between one and five, reportedly, exhibit some form of behavioral difficulties that negatively affect their everyday functioning (Lillvist & Granlund, 2010; Lutz, 2009). Hyperactivity is one of the frequently encountered types of externalizing behavior problems in preschoolers that has been considered a predictor of developing conduct problems over time (Rescorla, Otten, Achenbach, Ivanova, Harder, Bilenberg, Kristensen, & Zubrick, 2011; Gustafsson et al., 2018). Although most preschoolers who display hyperactive behavior tend to go back to typical functioning later in life, in some children hyperactivity has been linked to major psychiatric diagnoses such as Attention Deficit/Hyperactivity Disorder (ADHD) and Oppositional Defiant Disorder, manifesting years later (American Psychiatric Association, 2017). Gender has been considered an important discriminant factor, with boys displaying higher degrees of hyperactive behavior compared to their female peers (Leblanc, Boivin, Dionne, Brendgen, Vitaro, Tremblay, & Pérusse, 2008; Gustafsson, Proczkowska-Björklund, & Gustafsson, 2017).

Hyperactivity is generally described as a condition characterized by an excessive spontaneous gross motor activity or restlessness. Compromised self-regulation and poor behavior inhibition in young children caused by hyperactivity lead to inability to sit still, concentrate on tasks, respect conversational turns and to other forms of disruptive behavior (Alessandri, 1992; Allan, Allan, Lerner, Farrington, & Lonigan, 2015). Hyperactivity, along with the frequently co-occurring symptoms of impulsivity and inattention, has been associated with

scarce academic performance, compromised mental health in late adolescence, anti-social behavior and substance abuse in adult life (Washbrook, Propper, & Sayal, 2013; McGee, Partridge, Williams, & Silva, 1991; Lee, Lahey, Owens, & Hinshaw, 2008; Barkley, Fischer, Smallish, & Fletcher, 2004). Preschool children who display hyperactivity and inattention tend to have difficulties initiating and maintaining positive peer interactions in play and may consequently spend more time in solitary and less group play compared to typical behavior children (Alessandri, 1992). A previous study by Cordier, Bundy, Hocking and Einfeld (2009) showed that children with hyperactivity may lack awareness of their peers' emotions during play interaction, which makes it difficult for them to remain in a play transaction.

As a result of poor self-control, children with hyperactivity often experience peer rejection and isolation from social activities, as well as negative response from teachers in the preschool classroom (Buhs, Ladd, & Herald, 2007; Bulotsky-Shearer & Fantuzzo, 2011). Previous research has shown that preschoolers with hyperactivity tend to spend lower proportions of time engaged in developmentally appropriate activities. Of concern, these children may additionally not be sufficiently engaged in play interaction with peers in the preschool classroom (Melnick & Hinshaw, 1996; Searle, Miller-Lewis, Sawyer, & Baghurst, 2013; Metcalfe, Harvey, & Laws, 2013). Gustafsson and colleagues (2018) argue that hyperactivity can be considered as a functional limitation at the child level. Therefore, hyperactivity in preschool may, if not accommodated by an adapted environment, result in lower levels of participation in social play with peers, which can in turn, place the affected children at higher risk for poor long-term functional and developmental outcomes, with particular regard to self-regulation.

2.2 Participation in Play

Promoting participation of children and young people has been a primary goal of major policy makers around the world for the last decades (UNCRC, 1989; United Nations Convention on the Rights of Persons with Disabilities [UNCRPD], 2006). Being engaged in age-appropriate play and leisure activities with peers is a fundamental right guaranteed to all children by the Convention on the Rights of the Child alongside with other participation rights, such as the right to freedom of expression in all matters affecting them, the right to get involved and to take an active role in their communities and nations (articles 12-15, UNICEF, 1989). Furthermore, article 30 of the UNCRPD ensures that children with special needs have equal access

with other children to participate in play, recreation, leisure and sporting activities, including those in the school settings.

Despite the progressive change of the National curriculum for the Preschool Education (Swedish National Agency for Education, 2019) over the last decades, "learning through play" remains one of the fundamental aspects of the Swedish preschool context. In Sweden, young children aged one to six years spend a significant amount of time in free play, considered an essential criterion for learning, development and functioning (National Agency for Education, 2011; Pramling & Pramling Samuelsson, 2011), compared to relatively little time spent in lesson-like structured activities led by teachers (Gustafsson et al., 2018; Åström et al., 2020*;* Coelho et al., *submitted*).

The importance and multiple pedagogical properties of play have been long supported by scientific evidence. Starting from Early childhood, children develop their physical, cognitive, emotional and social skills through play interaction (Piaget, 1962; Vygotsky, 1978; Bandura, 1989). Play is also a means by which young children learn to meet their own needs, as well as the needs of other children around them. Free play in particular has been linked to higher levels of engagement (DiCarlo, Baumgartner, Ota, & Geary, 2016; Vitiello et al., 2012) and well-being in preschool (Storli & Hansen Sandseter, 2019). During play interaction the child is continuously required to resist his or her immediate impulses that may go against the rules, as the child seeks a great pleasure in remaining in the game (Vygotsky, 1978). The inborn capacity and desire to play, operate as driving forces for acquiring self-control (Vygotsky, 1978), or self-regulation, as children gradually learn how to manage impulses, resist distractions, respect the rules of the game and conversational turns. The capacity of self-regulation is crucial for understanding what it means to be human, and Early childhood in particular, is a critical period of time when infants and toddlers become increasingly capable of directing external behavior and internal mental processes, consequently affecting their surrounding environment (Bronson, 2000).

In keeping with Gray (2015), play is an expression of freedom by all means, where child's attention is focused on the process rather than outcomes. Children are also free to choose whether to participate in play or not, to direct their actions and to quit the play interaction when desired. The main characteristics of play can be synthesized as follows: "(1) Play is self-chosen and self-directed. (2) Play is an activity in which means are more valued than ends. (3) Play has structure, or rules, which are not dictated by physical necessity but emanate

from the minds of the players. (4) Play is imaginative, non-literal, mentally removed in some way from "real" or "serious" life. (5) Play involves an active, alert, but non-stressed frame of mind" (as ci in Gray, 2015).

Panksepp, whose research focus has been on the biological nature of play for the last three decades, argues that play is among the most optimal tools for epigenetic construction of the social brain functions (2008). This argument in favor of play is presented to contrast the concerning worldwide trend for an increasingly prescribed psychostimulant medication as means to combat early symptoms of ADHD in young children, such as hyperactivity, impulsivity and inattention. While play has been found to facilitate the maturation of behavioral inhibition, psychopharmacs, on the other hand, led to reduced playfulness. In light of the reviewed evidence, play is critical for child self-regulation, particularly for children with behavioral and emotional difficulties.

2.3 Play types in Preschool Children

One of the most frequently adopted ways of categorizing children's play stages was developed by Parten (1932), who differentiated between non-social types of play, i.e. solitary play, unoccupied-, and onlooker behavior; and social types of play, which include associative play and cooperative play. When young children are simply observing, often performing random body movements without any specific purpose, their behavior is described as unoccupied, whereas children who are observing other children playing in their proximity but not interacting with them directly, are described as onlookers. Onlooker behavior is typical for toddlers but can occur at any age. Solitary or, alone play, occurs when a child is in possession of unique toys or materials and is not interacting with other children, although he or she might be in their proximity.

As children gradually become more interested in their peers, they begin to engage in social types of play. Thus, associative play occurs when a child starts to interact with other children, which includes some form of verbal interaction and working on a common goal using similar materials (i.e. building a tower out of blocks) but does not imply any formal set of rules or roles. Subsequently, as children start to acquire more social competence, usually by the age of four, cooperative form of play eventually begins to take place, which is characterized by clearly organized and structured activity with specific roles. Verbal interaction is an important aspect of these complex social types of play that allows the child to engage in peer

interaction in appropriate way, providing the child with language skills and overall school-based literacy success (Snow, Burns, & Griffin, 1998; Farran & Son-Yarbrough, 2001). Finally, within Parten's categorization, parallel play represents a separate type, and is described as a transitory stage from non-social types of play, to more advanced socially mature types, such as associative and cooperative. Children involved in parallel play may be occupied with a similar activity or using similar materials but are working in an independent way without interacting with each other (Parten, 1932).

Social types of play imply a more complex form of peer interaction and require a higher level of engagement, inflicting a greater demand of child's ability to initiate, maintain and terminate activities in a socially appropriate manner (Farran & Son-Yarbrough, 2001; Lillvist, 2010; Sjöman, Granlund, & Almqvist, 2015). Children displaying externalizing behavior problems, such as hyperactivity may spend less time and be less engaged in associative and cooperative play compared to their typical behavior peers. Engagement in social interactions in preschool is one of the major desired outcomes in ECE settings (see European Agency for Special Needs and Inclusive Education, 2017), and is proposed to be one of the two dimensions, with attendance being the other, that constitute participation.

3 Theoretical framework

3.1 Family of Participation-Related Constructs (fPRC)

Within the International Classification of Functioning, Disability and Health – Children and Young [ICF- CY] (WHO, 2007), participation is defined as "involvement in a life situation" (p. xvi) and represents the social dimension of functioning. Participation is one of the core domains in the ICF-CY and probably the most debated one. Although the ICF framework differentiates participation from activity, the two constructs are often used as interchangeable within the classification. This in turn, provides a limited understanding and measurement of participation, merely conceptualized in terms of frequency of attending an activity (Imms, Granlund, Wilson, Steenbergen, Rosenbaum, & Gordon, 2017).

The Family of Participation-Related Constructs (fPRC) (Imms et al., 2017) was developed with the purpose to bring conceptual clarity and linguistic consistency concerning participation. Within the fPRC framework, participation is described as both "being there" and "be-

ing involved while being there". Some other major constructs related to participation are further introduced and described. The framework suggests that child internal factors that affect and are affected by participation are preferences, activity competence and sense of self, together making up self-regulation. External factors impacting participation are mainly provided by context and environment. Context is constructed in the interplay between the child and his or her environment, where environment is represented by more distal factors that are independent of the child (Imms et al., 2017).

Participation: Attendance, Involvement and Engagement

In line with what has been suggested by Granlund (2014), within the fPRC framework participation covers two main dimensions: *attendance* and *involvement*. Attendance, defined as "being there", is measured in terms of frequency and/or variety of attended activities, whereas involvement refers to emotional, developmental and behavioral processes that constitute individual experiences when attending an activity, and may or may not include elements of engagement. The fPRC conceptualize engagement as a unifying construct that operates at child-, environmental- and between systems levels. At the level of the child, engagement refers to a set of cognitive, behavioral and emotional components that together build up child's *self-regulation*. They may imply elements of attention, focus, effort, persistence, reactions and sense of belonging. At the level of the environment, engagement is operationalized through bidirectional processes occurring between the child and his or her specific context (Imms et al., 2017). Engagement can be therefore seen as a snapshot of proximal processes (see Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Evans, 2000; Bronfenbrenner & Morris, 2006), that can draw the overall picture of how the child usually spends his or her day in the preschool classroom (Åström et al., 2020).

Children's engagement in daily activities has been associated with positive functioning and achievement, with both short-term and longitudinal effects (Fuhs, Farran, & Nesbitt, 2013). Engagement concerns the amount of time children are actively involved in a developmentally appropriate daily activities or social interaction, at different levels of complexity (Raspa, McWilliam, & Maher Ridley, 2001). Structured observations of the proportion of time the child is engaged in different types of play interaction allow to capture meaningful aspects of proximal processes that characterize his or her patterns of participation in preschool daily.

Because participation is a rather complex construct, both attendance and the level of involvement and/or engagement need to be assessed when studying social play interaction of children in preschool. While being physically present is an important pre-requisite of participation, it does not always imply elements of involvement or engagement, which are crucial for child learning, development and functioning, starting from Early Childhood (Imms et al., 2017; Bartolo, Björck-Åkesson, Giné, & Kyriazopoulou, 2016). Children's engagement in preschool has, in a study based on teacher ratings, been associated with increased levels of peer-to-child interaction and teacher responsiveness, which in turn resulted in increased levels of engagement over time (Sjöman, *submitted*). The fPRC framework holds that participation should be conceptualized as both an entry point (a process) and an outcome in order to promote growth, development and to ensure that children and young people reach their full potential (Imms et al., 2017). Participation in social play is paramount for children with hyperactive behavior, as it is for their typical functioning peers, and should be considered both as a means of learning, development and functioning, and as a desired outcome in itself in ECE settings.

Child factors and Self-regulation

The fPRC recognizes the effect of multiple child factors that influence and are influenced by participation. Child factors refer to intrinsic person-related concepts, namely *activity competence*, *sense of self* and *preferences*.

Activity competence includes child's cognitive, physical and affective skills and abilities, and is defined as "the ability to execute the activity being undertaken according to an expected standard" (*Table 1*, p. 20, Imms et al., 2017). Within the fPRC, activity competence is measured as *capability, capacity* or *performance*. Capability refers to a set of skills and abilities that the child is able to use in a daily environment. Capacity is described as "best ability of the child within a structured environment" (*Table 1*, p. 20, Imms et al., 2017), whereas performance denotes skills and abilities the child uses in his or her everyday functioning. In the fPRC, preferences are described as the interests or activities that hold meaning for and are valued by the child. Lastly, sense of self refers to intrapersonal factors related to confidence, satisfaction, self-esteem and self-determination.

Skard and Bundy (2008) define play as a transaction with the environment that is intrinsically motivated, internally controlled and free of many of the constraints of objective reality. The findings of a study by Cordier and colleagues (2009) examining the efficacy of a model for play-based intervention for children with ADHD suggests that the symptoms commonly associated with this neurodevelopmental disorder, – with hyperactivity being one of them, can be offset by addressing motivational aspects of play, that is creating a more appealing environment which also provides an opportunity to choose activities that reflect the things the child seeks through play. This indicates that child intrinsic factors are crucial determinants of participation in play interaction, that should be taken into account. These intrinsic factors are bound together by a self-regulatory process that represents the person or child, within the framework. Self-regulation is a key construct of the fPRC that mediates the interaction between child factors and participation (Imms et al., 2017).

Another reason for employing fPRC stays in its attention to self-regulation processes, which are crucial for understanding externalizing behavior problems and hyperactivity in particular. Importantly, within the frames of the present thesis, self-regulation can be seen as a construct that unifies hyperactivity and participation in play interaction. Early childhood is a time of critical development in self-regulation skills (Shonkoff & Phillips, 2000) that can be acquired through participation in social play with peers starting from preschool. Previous research has suggested that self-regulation capacity reflects reciprocal and transformational influences between children and their peers, whereas self-regulation impairments lead to child behavior problems (Sameroff, 2009). Within the fPRC framework, self-regulation refers to "executive processes that enable the individual to direct and monitor their thinking, emotions, actions and interactions" (Imms et al., 2017, p.20), which occurs in a specific context and environment. The fPRC model places self-regulation construct at the level of an individual child, seen as a bearer of specific intrinsic characteristics. Poor self-regulation skills in children with hyperactive behavior often manifests through restlessness, scarce concentration and attention span, impossibility to sit still, to see tasks through and to think things out before taking an action. Overall, self-regulation skills allow the child to adapt to the context and environment and to choose an activity to participate in.

Context and Environment

The fPRC separates *context* from *environment*, which are conceptualized as most immediate- and most distal settings to the child, respectively. Within the framework, context is personal,

and is described as a child's closest "setting for activity participation that includes people, place, activity, objects and time", whereas environment refers to more "broad, objective social and physical structures in which we live" (*Table 1*, p. 20, Imms et al., 2017).

In line with the guiding principles of General Systems Theory and the transactional model (Sameroff & Chandler, 1985; Sameroff, 2009), the fPRC recognizes hypothetical processes or, transactions that occur between the child and their context and environment at large (Imms et al., 2017). Transactions occur every time an activity of one element within the system changes the usual activity of another element, by either increasing or decreasing the usual response level (quantitatively), or by triggering a new type of response (qualitatively) (Sameroff, 2009). Similarly to the transactional model, the fPRC suggests the bidirectional nature of outcomes of the child and of the context/environment(s) (Imms et al., 2017). A previous study (Sjöman, *submitted*) nested in the same research project as the present thesis, identified transactional paths between children's engagement, teacher responsiveness and peer-to-child interaction in preschool. Child's core engagement resulted in increased levels of both peer-to-child interaction and teacher responsiveness, which in turn increased child's core engagement over time. At the same time, responsive teachers and peer-to-child interaction operated as predictors of decreased hyperactive behavior over time. However, decreased hyperactivity did not lead to changes in responsiveness or peer-to-child interaction. Thus, it appears that only engagement leads to positive interactions.

This logic implies the rejection of linear, static way of looking at hyperactivity, instead defining hyperactive children and their typical behavior peers as an active system, and not just separate elements. Hence, development of any process or behavior in child is a product of the continuous dynamic transactions of the child and the experience provided by his or her social contexts (Sameroff, 2009). It may be therefore useful to look into specific contextual and environmental characteristics that shape child participation in social play in preschool.

Starting from the innermost ecological systems, proximity to teacher, another child, a small or whole group of peers, verbal interaction and schedule (type of activity) are contextual factors that might affect children's engagement in learning activities. These aspects may further help understand how children interact with others, as well as the complexity of their learning experience (Farran, Kang, & Plummer, 2003). Elements of verbal interaction, that is, talking or listening and to whom, are important aspects to capture when examining child participation in preschool. The use of language allows children to facilitate the internalization of

social rules and structures and is related to their capacity to take into account another's perspective and emotional states (Vygotsky, 1962; Nelson, Skwere, Goldman, Henseler, Presler, & Walkenfield, 2003; Hofer, Farran, & Cummings, 2013). Proximity and verbal interaction may, however, have different impact on participation in social types of play in children with and without hyperactivity.

Furthermore, at a more distal level, indoor or outdoor location in which social play interaction occurs may as well affect participation. Children in Sweden spend a considerable amount of time in both indoor and outdoor free play (The National Agency for Education, 2011). The results of a recent study based on the same dataset as the present thesis (Åström et al., 2020), indicated that indoor free play was the main setting for activities in preschool, with a significantly higher levels of child engagement, followed by outdoor free play.

While there is a growing number of observational studies reporting the impact of environmental factors on participation and engagement of typical development children in preschool settings, little is known on how these factors affect children with behavioral difficulties, such as hyperactivity (Sjöman, Granlund, & Almqvist, 2015).

4 Rationale

Early evidence suggests that the proportion of time young children spend in social types of play tends to increase by the time children enter preschool as they start interacting with peers, whereas time spent in non-social play, on the contrary, shows decrease. The level of complexity across different categories of play, ranging from unoccupied to cooperative, increases with each subsequent type becoming more cognitively demanding and requiring a higher level of engagement in child-to-peer interaction (Farran & Son-Yarbrough, 2001). This might be particularly challenging for children with hyperactive behavior. The findings of the study based on teacher ratings conducted by Sjöman (2018), indicated that high levels of hyperactivity in preschool children were associated with low levels of core engagement in peer interactions, and had a weak association with developmental engagement both cross-sectionally and longitudinally. Moreover, children who display hyperactivity tend to be more isolated from social activities with peers in the preschool classroom (Sjöman, Granlund, & Almqvist, 2015; Gustafsson et al., 2018). One can deduct that, due to lower engagement and peer rejection, chil-

dren displaying hyperactive behavior will also have lower occurrence and engagement in social types play, conceptualized as a form of peer interaction. While there is a considerable body of scientific evidence concerning Early Childhood play and its various functions, social play interaction of preschool children with hyperactivity has received little attention in the research (Cordier et al., 2009). What limited research there is, is merely based on teacher-ratings. Therefore, more observational studies are needed. Moreover, there is a gap in the literature concerning contextual and environmental aspects that characterize social play interaction of preschool children with hyperactivity.

5 Aim and research questions

The overall aim of this study was to compare participation in social play of preschool children with and without hyperactivity. It was hypothesized that children with hyperactivity will have lower attendance and lower level of engagement in social types of play, – associative and cooperative, as opposed to their typical functioning peers. The study was guided by the following research questions:

1. How does the average amount of observed time spent in social types of play differ between children with and without hyperactivity in a Swedish preschool context? (attendance)
2. How does the average observed level of engagement in social types of play differ between children with and without hyperactivity in a Swedish preschool context? (involvement/engagement)
3. How does the average observed social play interaction differ between children with and without hyperactivity in terms of verbal interaction, proximity and play location in a Swedish preschool context? (context/environment)

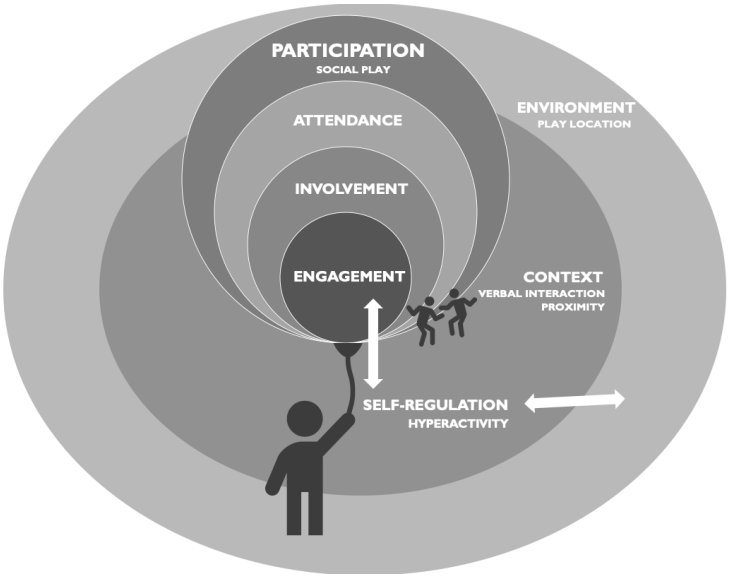
6 Method

6.1 Study design

The present observational study used an analytic cross-sectional design. This type of research design allows to identify and compare subjects with the condition of interest and a group of

subjects without the condition, who are further subjected to systematic assessments in relation to current characteristics at a specific time point (Kazdin, 2002). For the present study, a general sample population was initially selected, regardless of hyperactivity. All children included in the sample were further assessed and classified as either having hyperactivity or not, based on proxy ratings. Preschoolers with hyperactivity represented the group with the condition of interest, whereas typical behavior children acted as a group without condition. Both groups were further compared in terms of participation in associative and cooperative types of play, considered as the outcome of interest. In line with the fPRC (Imms et al., 2017), participation was measured both in terms of the average observed frequency of attendance, and involvement/engagement level. Lastly, a between group comparison of contextual and environmental factors of the average observed social play interaction was made. Associative and cooperative play of the two groups were compared in terms of proximity to teacher, another child, small- and whole group (without teacher); in terms of overall observed talking, listening and verbal interaction to another child; and lastly in terms of indoor and outdoor play location. The study model is illustrated in Figure 1 in relation to the fPRC framework.

Figure 1
Participation in social play and hyperactive behavior in preschool based on the fPRC framework (Imms et al., 2017).



6.2 Data collection and procedure

Overall, this study was based on a secondary analysis of data collected within the two previous research projects and merged into one dataset. The two research projects were i) Early Detection-Early Intervention (TUTI) (Granlund, Almqvist, Gustafsson, Gustafsson, Golsäter, Prozchowska, & Sjöman, 2015) and ii) Participation and Engagement in Preschool International (PEPI), described elsewhere (Åström et al., 2020) from CHILD research group of Jönköping University, Sweden. The data were collected during fall season 2014 for the TUTI project, and between 2015 and 2016 for the PEPI project. Overall, the data utilized for the present thesis were derived from teacher-rated questionnaires and structured observations. Preschool teachers rated children's behavioral difficulties, which further allowed to identify participants that display hyperactive behavior. Three trained researchers conducted structured observations of consented children in each preschool classroom throughout day-long visits. The observers arrived at preschool before breakfast and started coding after breakfast routines were completed. Every observation session started by first identifying a child and then proceeded with observation of his or her behavior for count of one, two, three and coding. Children were observed both indoors and outdoors during the whole day in different activities regardless of schedule organization, i.e. free play, teacher-led activities, in small or whole groups activities. The maximum number of observational sweeps per child ranged between 20 (TUTI project) and 30 (PEPI project) (M = 18,27; SD = 6,725).

6.3 Participants and sampling strategy

In total, 583 children (n = 298 boys) aged 16 to 72 months (M = 52,55, SD = 11,010) were included in the sample. In the PEPI project participating children (n = 371) were aged between three and five years, whereas in the TUTI project, the age ranged from 1,5 to five years. A total of 68 preschool units based in 48 preschools and located in 12 Swedish municipalities participated. On average, the child-preschool staff ratio was 5:1 (M = 5,3; SD = 1,07). The number of children per unit varied from nine to 42 (M = 20,25; SD = 5, 891), with the range of 0-8 children identified by the preschool staff as in need of special support (M = .55; SD = 1,141), and 0-24 entitled to mother tongue support (M = 3,15; SD = 5,472). Children from preschool units in the TUTI project were recruited using a combination of purposive and convenience sampling strategies. The recruitment of participants in the PEPI project was enabled by means

of stratified convenience sampling based on municipality size and population density (as described in Åström et al., 2020).

6.4 Instruments

Strengths and Difficulties Questionnaire (SDQ)

Children's hyperactivity was rated by preschool teachers by means of behavioral screening questionnaire – Strengths and Difficulties Questionnaire [SDQ] (Goodman, 1997). The original tool consists of 25 items covering five scales related to emotional symptoms, conduct problems, hyperactivity, peer relationship problems and prosocial behavior, with five items each. For the purpose of the present study, only Hyperactivity scale was utilized, which comprised the following items: "Restless, overactive, cannot stay still for long", "Constantly fidgeting or squirming", "Easily distracted, concentration wanders", "Thinks things out before acting", "Sees tasks through to the end, good attention span". The internal consistency for the SDQ hyperactivity subscale was $\alpha = .84$, as reported by a previous study (Sjöman, Granlund & Almqvist, 2015). The response options ranged from 0 to 2, where 0 = "Not at all", 1 = "Only a little", and 2 = "Quite a lot". The total difficulties score was further calculated as a sum of scores of each of the five items, which ranged from 0 to 10. This total score was consequently divided into three subgroups using cut-off scores, whereas 0-6 = normal behavior, 6 = borderline hyperactive behavior and 7-10 = abnormal (hyperactive) behavior (*Appendix A*).

Children Observation in Preschool (COP)

Children Observation in Preschool [COP] (Farran, Kang & Plummer, 2003) is a tool for observing children's behavior and interactions in preschool classrooms across a day-long visit. The original version of the tool comprises nine variables capturing different aspects of child learning and functioning in preschool, including environmental aspects, activity structures, materials and objects used, etc. (see *Appendix B*). For the purpose of the present study, only six variables were employed which are further described. Moreover, several modifications to the original version were made to adapt the tool to the Swedish preschool context (see *Appendix C*). These adaptations were successfully implemented in the previous study based on the same dataset as the present thesis (Åström et al., 2020).

To test the adopted hypothesis and enable comparison of participation in social types of play among children with and without hyperactivity, the variables "Interaction state" and

"Involvement" were utilized. The nominal variable "Interaction state" allowed to measure the frequency of attendance or, occurrence of different types of play and its codes are an adaptation of Parten's (1932) scale of play stages described in the background section, altered to reflect the types of interaction children have in preschool. The original coding options are the following: 0 = "Non-academic", 1 = "Parallel", 2 = "Associative", 3 = "Cooperative", 4 = "Alone", 5 = "Onlooker", 6 = "Social", 7 = "Unoccupied" and 8 = "Time out". In line with the aim of the present study, only the codes "Associative" and "Cooperative" were used for the data analysis. The original coding option "Social" refers to rather unformal random activities, such as hugging or talking about holiday plans, and therefore it was not included in the analysis.

Secondly, the ordinal variable "Involvement" enabled to capture the level of child engagement when attending social types of play, where 1 = "Low – Medium-Low", 2 = "Medium" and 3 = "Medium-High – High". This is an important aspect to look at, as being engaged while attending an activity or in an interaction process is an essential requisite of participation and learning in the preschool classroom (Sjöman, Granlund, & Almqvist, 2015; Imms et al., 2017). Due to cross-sectional nature of the study design, engagement was considered only as a snapshot of daily proximal processes or, transactions occurring daily between the child and environment in the preschool context.

To delve deeper into contextual and environmental aspects of the observed social play, the nominal variables "Verbal"/ "To Whom", "Proximity" and "Location" were included. The variables "Verbal" and "To Whom" allowed to capture whether children were "Talking" or "Listening" and to whom: i.e. "Another child". These behaviors are important to code because, according to Vygotsky, Vakar and Hanfmann (1962), language facilitates children's internalization of social structures and rules through their interactions within the social world around them. The variable "Proximity" originally was meant to record who was within one-meter distance from a target child during indoor activities (regardless of schedule organization). The Swedish adaptation included an extended definition for the outdoor activity, ranging from one and a half- (TUTI) to three meters (PEPI). The utilized coding options distinguished between proximity to "Teacher", "Another child", "Small group" and "Whole group".

One of the modifications for the Swedish version of COP included an additional variable "Location", with the following coding options: "Play hall", "Group room", "Dining

room", "Hallway" and "Outdoors". This variable allowed to distinguish between the indoor and outdoor setting of learning experience in preschool. Children in Swedish preschools spend a significant amount of time in both inside and outside activities, in contrast to other countries (Coelho et al., *submitted*). The context in which play interaction occurs is important to study, as it determines the setting or, structural aspects of participation. The coding option "Dining room" was excluded from the analysis.

6.5 Data analysis

All analyses were performed using SPSS version 26.0. The dataset was previously checked for errors and outliers prior to the analysis and the normality test was performed to check for the normality of distribution. Out of 583 preschoolers initially included in the sample, $n = 11$ were excluded from the analysis due to missing values on all five hyperactivity items of the teacher-rated questionnaire, leaving 572 children for the assessment. Descriptive statistics were performed, including mean, range, standard deviation, standard error and confidence intervals. The prevalence rate (PR) of hyperactivity (exposure) was calculated. On the whole, the data analysis was based on the sums of observational sweeps for each child conducted during one-day visits and consisted in comparing the mean values of the two groups of preschoolers. In addition to the between-group analysis, a number of within-group comparisons was carried out. To provide a visual description of the analyzed data and display the trends in each group, inferential statistics were supported by clustered bar charts of means, based on groups having hyperactivity or not.

In order to group variables capturing hyperactivity scores based on the five SDQ scales (see *section 6.5*) into one, the index "Hyperactivity" was created with initial coding options ranging from 0 to 10. This grouping variable was further recoded into a categorical variable to allow the differentiation between children with and without hyperactivity, in line with the bandings defined by Godman (1997). The coding options were the following: 1 = "Some hyperactivity" and 2 = "No hyperactivity", whereas children whose overall score was below six (<6) were considered as non hyperactive, and children who scored six and above (≥ 6) were considered to manifest symptoms of hyperactivity. The Cronbach's alpha reliability coefficient of the new index was $\alpha = 0.78$ (acceptable).

First, to compare the frequency of the average observed associative and cooperative play among children with and without hyperactivity, Independent Samples t-Test was performed. Secondly, to compare the average level of engagement during associative and cooperative play between the two groups, two main steps were undertaken. The first step included creating looping syntaxes with intention to capture the following sweep combinations:

"Interaction state" = "Associative" + "Involvement" = "Low – Medium-low"/ "Medium"/ "Medium-high – High";

"Interaction state" = "Cooperative" + "Involvement" = "Low – Medium-low"/ "Medium"/ "Medium-high – High".

The second step included conducting Independent Samples t-Tests to compare means of the two groups based on having hyperactivity or not, for associative and cooperative play independently. Lastly, environmental and contextual differences in participation in social play types among the two groups in terms of proximity, verbal interaction and location of play were analyzed. This was equally done following two steps, – by first looping the data to obtain the average of sweep combinations of interest, and by carrying out Independent Samples t-Tests for each combination. The following looping syntaxes were created to capture who was in child's proximity when he or she was observed in associative or cooperative play:

"Interaction state" = "Associative" + "Proximity" = "Teacher"/ "Child" / "Small group" / "Whole group";

"Interaction state" = "Cooperative" + "Proximity" = "Teacher"/ "Child" / "Small group" / "Whole group".

To determine whether children were talking to another child while in associative or cooperative play at the moment of observation, the following variable combinations were looped:

"Interaction state" = "Associative" + "To Whom" = "Another Child";

"Interaction state" = "Cooperative" + "To Whom" = "Another Child".

To identify children's location during observed associative or cooperative play, the following sweeps were combined:

"Interaction state" = "Associative" + "Location" = "Indoors"/ "Outdoors";

"Interaction state" = "Cooperative" + "Location" = "Indoors"/ "Outdoors".

The index "Indoor" was created as a sum of the variables "Play hall", "Group room" and "Hallway".

6.6 Validity and intra-rater reliability

To determine to which degree the conclusions of the study are valuable and well-grounded, different types of validity were assessed (Cook & Campbell, 1979). The probability of committing type II error was increased due to a relatively low statistical power of the study. The population size of the two groups on which the statistical comparison was based differed significantly, with 60 preschoolers in the exposure group and 572 children without the condition. Secondly, due to simultaneous assessment of the exposure and the outcome, it might be difficult to draw conclusion concerning the causality, or to determine that the association between the exposure and the outcome is not explained by a confounding variable (Almqvist, 2019; Fransson, 2019). Furthermore, adopting convenience sampling strategy increased the risk of sample selection and information bias, as the probability of being included in a specific group was merely related to the hyperactivity score (exposure). As for all cross-sectional design research, this resulted in overall weak internal validity of the study (Cook & Campbell, 1979).

The study, however, has more external validity, as the observations were conducted in real-life settings and the observers did not have any control over the external factors. External validity of the study was established by a relatively large population size (Cook & Campbell, 1979). The use of standardized measures, such as SDQ and COP, ensured plausibility and overall construct validity (Almqvist, 2019). The internal consistency for the SDQ hyperactivity subscale was $\alpha = .84$, as reported by a previous study (Sjöman, Granlund & Almqvist, 2015). Another study conducted by Gustafsson, Gustafsson and Proczkowska-Björklund (2016), reported good concurrent validity and intra-rater reliability of the Swedish version of SDQ for two age groups, one-three and four-five years old. Concerning the COP instrument, researchers conducting observations had performed double coding in two preschool units external from the sample in order to establish intra-rater reliability agreement. The average agreement for COP behavioral variables was 79,7%, Cohen's kappa = ,76; and 72,7% for engagement variables, Cohen's kappa = ,53. (Åström et al., 2020). Previous studies additionally reported high intra-rater reliability of the COP tool (Coelho et al., *submitted*; Nesbitt, Farran, & Fuhs, 2015). The threat of observer bias was reduced by the fact that all three researchers received a training in conducting structured observations and followed the established procedures and guidelines. A modified version of COP adapted for the Swedish preschool context

was successfully implemented for the combined TUTI and PEPI dataset in a previous study (Åström et al., 2020).

6.7 Ethical considerations

The two research projects on which the present study was based, received approval from the Regional Ethical Review Board in Linköping, Reference No 2012/199-31 and 2014/479-31, respectively. Preschool staff was contacted and informed about the research project and further assigned to transmit the information to the families. Children, parents and teachers were informed about the aim of the study. Parents received written consent request for their children to take part in the research project. Teachers, children and parents were encouraged to discuss any doubts and concerns with the researchers. Participants were guaranteed confidentiality and a possibility to withdraw from the study at any time without consequences. In the TUTI project, all children were observed, on condition that children whose parents did not provide informed consent were not identifiable once data were collected. In the PEPI project only observational data from children with informed consent were collected (Åström et al., 2020).

This study was based on an existing data set, which allowed to obtain results at a lower cost and without exposing new research population to potential harms associated with research participation (Doolan & Froelicher, 2009). In both research projects only passive observations were used that did not interfere with children's regular daily routine in the preschool classroom in anyway, in line with the core ethical principle of non-maleficence (Powell, Fitzgerald, Taylor, & Graham, 2012). None of the children was observed during toileting or other sensitive circumstances (i.e. diaper changing) (Åström et al., 2020). The observations and coding were conducted in a way to guarantee none of the participated children can be identified, which ensured confidentiality. In line with the principle of beneficence, participants from both TUTI and PEPI projects were promised to receive information concerning the results of the conducted research in both verbal and written form (Åström et al., 2020).

In regard to the type of research design which the present thesis is based upon, one of the major ethical concerns is related to the lack of child's perspective (Nilsson et al., 2015). Overall, the data collection process in both research projects was entirely based on teachers' and observing researchers' interpretation of children's behavior. Although adult's perspective on the matters affecting children can represent a valuable source of information, including

youth in a participatory, rights-based research is fundamental, as children are the best experts of their own lives (Beazley, Bessell, Ennew, & Waterson, 2009; Nilsson et al., 2015). Early evidence suggests that children as young as three years old can provide graphic descriptions and have excellent recall of experiences related to adverse life events like illness, violence or disaster (as ci in Docherty & Sandelowski, 1998, p. 177). Furthermore, autobiographical recall of children aged between three and six years has been found to be very accurate and stable over time (as ci in Docherty & Sandelowski, 1998, p. 179).

Although within the frames of the present study externalized behavioral problems were considered as a product of interplay between child- and environmental characteristics, children's own perception and opinion on their hyperactivity could not be properly assessed. As a consequence, there is an increased risk for ethical dilemma concerning stigma and child dignity required by the article 36 of the UNCRC (1989) (Beazley, Bessell, Ennew, & Waterson, 2009). This, however, can be partly justified by the young age of the participants and the complexity of the study focus.

Lastly, this study adopted an interdisciplinary approach, based on the integration of vertical and horizontal perspective on child hyperactive behavior in preschool, - by taking into account causal mechanisms operating at bio-psycho-social levels and of which hyperactivity is a product; and horizontal perspective, - by making a comparison between children with and without hyperactivity (Rönnberg, 2004; Rönnberg, 2019).

7 Results

Out of 572 children, n = 60 were rated by the preschool staff as displaying some form of hyperactivity (PR = 10, 5%). Both groups samples were normally distributed. There were no statistically significant differences in terms of child age, gender, special support need, mother tongue support and teacher-child ratio between the two groups. While the distribution of boys and girls in the typical behavior group was almost equal, – 244:252, in the hyperactivity group boys were represented twice as frequent compared to girls, – 39:18.

The results of the Independent samples t-Test indicated that, on average, there were no statistically significant differences in the frequency of observed associative play between children with hyperactivity (M = 3.60; SD = 3.54) and without hyperactivity (M = 4.29; SD = 3.43), $t(555) = 1.466$, p = .143, 95% CI [.234 to 1.61]. Similarly, no significant differences

were found in the average observed occurrence of cooperative play between the two groups (M = .43; SD = .789), (M = .43; SD = .791), respectively, $t(555)$ = -.007, p = .995), 95% CI [.211 to .213]. In terms of within-group comparison, associative play was observed more frequently than cooperative play in both hyperactivity and typical behavior groups ($p < 0.05$) (see Figure 2).

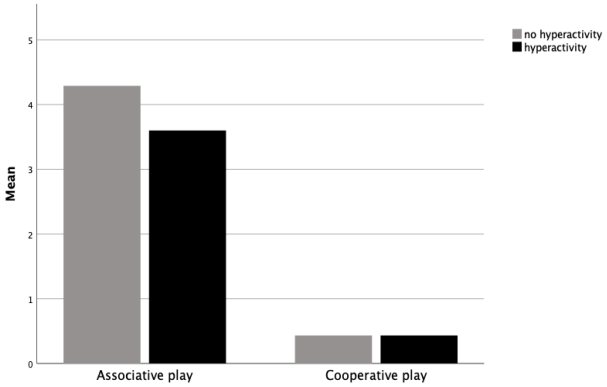


Figure 2
Clustered Bar Means of Associative and Cooperative Play by groups based on having hyperactivity or not

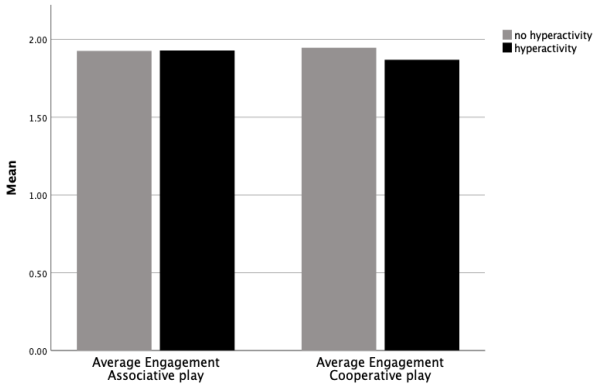


Figure 3
Clustered Bar Means of Average Engagement in Associative and Cooperative Play by groups based on having hyperactivity or not

No statistically significant differences in the average level of observed engagement during associative play were identified between children with hyperactivity (M = 1.91; SD = .189) and children without hyperactivity (M = 1.94; SD = 1.38), $t(464)$ = 1.186, p = .236, 95% CI [.018 to .073]. Analogously, the results showed no significant differences in the average observed level of engagement in cooperative play between children with and without hyperactivity, (M = 1.9; SD = .262), (M = 1.95; SD = .21), respectively, $t(157)$ = 1.186, p = .376), 95% CI [.06 to .157] (Figure 2). However, when the three levels of engagement were compared separately, the mean differences for Medium level in associative play reached significance: children in the typical behavior group were observed to have Medium engagement (M = 2.19; SD = 2.35) significantly more often compared to children in the hyperactivity group (M = 1.48; SD = 1.92), $t(555)$ = 2.233, p = .026, 95% CI [.085 to 1.33]. No statistically significant differences between the two groups were found in the three levels of engagement during cooperative play (Figures 4 and 5).

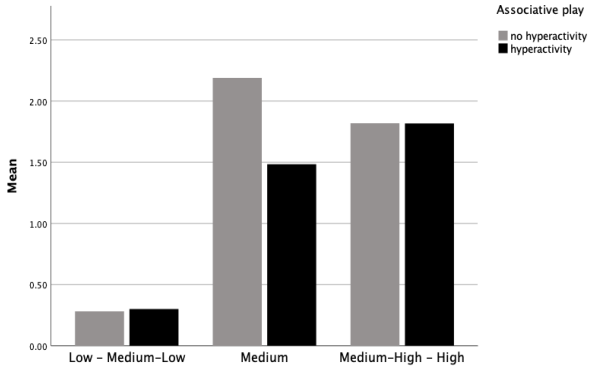


Figure 4
Clustered Bar Means of the 3 levels of engagement in Associative play by groups based on having hyperactivity or not

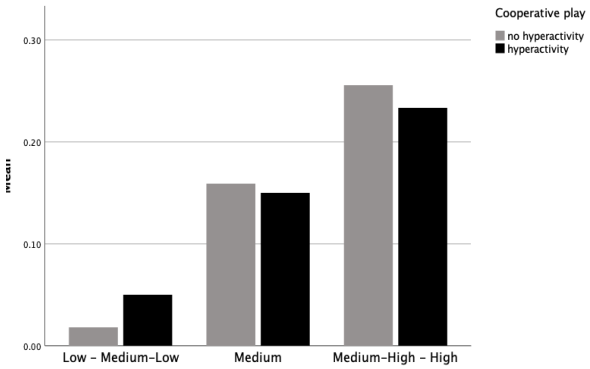


Figure 5
Clustered Bar Means of the 3 levels of engagement in Cooperative play by groups based on having hyperactivity or not

Further, there were no significant differences between the two groups of children neither in terms of average observed talking, nor listening during associative and cooperative play. No statistically significant between group differences were found for the observed verbal interaction with another child during associative and cooperative interaction. A within group comparison indicated that children were observed talking significantly more often than listening in both associative and cooperative play in both groups ($p < 0.05$) (Figure 6 and 7). Talking and listening occurred very rarely during cooperative interaction in both groups, with mean values approaching zero (see Figure 7). Talking to another child was observed significantly more frequently in associative rather than cooperative play in both groups ($p < 0.05$) (see Figure 8).

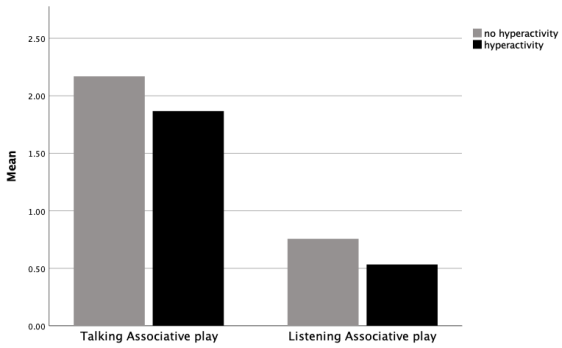


Figure 6
Clustered Bar Means for Talking and Listening in Associative play by groups based on having hyperactivity or not

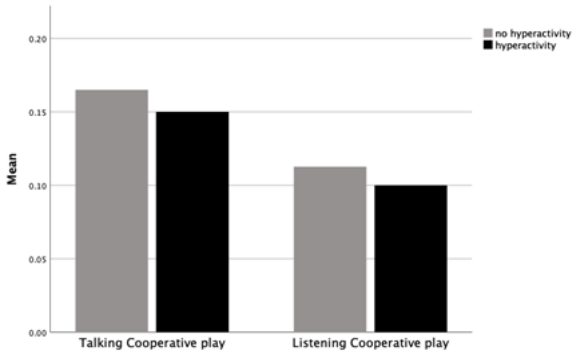


Figure 7
Clustered Bar Means for Talking and Listening in Cooperative play by groups based on having hyperactivity or not

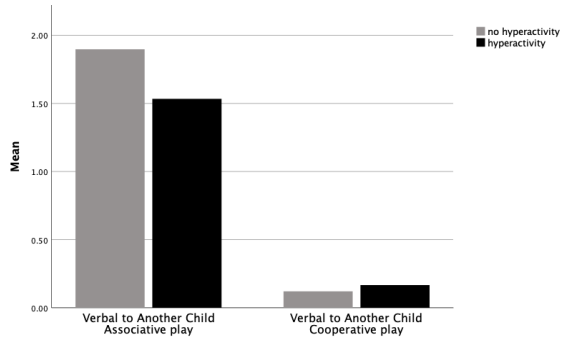


Figure 8
Clustered Bar Means for verbal interaction with another child in Associative and Cooperative play by groups based on having hyperactivity or not

The between group comparisons children's average observed physical whereabouts during associative play did not showcase any significant differences in terms of proximity to teacher, another child and whole group (without teacher). However, children in the typical behavior group were observed in proximity to a small group of peers (without teacher) significantly more often (M = .926; SD = 1.2) than children in the hyperactivity group (M = .583; SD = .98), $t(555) = 2.125$, $p = 0.034$, 95% CI [.026 to .662]. There were no statistically significant differences in terms of proximity to teacher, another child, small and whole group during cooperative play between the two groups. Overall, as emerged from the within group comparisons, the two groups were observed in proximity to a small group of children in both associative and cooperative play significantly more often than in proximity to the whole group, another child and teacher ($p < 0.05$). As illustrated by the Figures 9 and 10, the mean values for proximity to teacher and whole group during both types of social play were almost equal to zero in both typical behavior and hyperactivity groups.

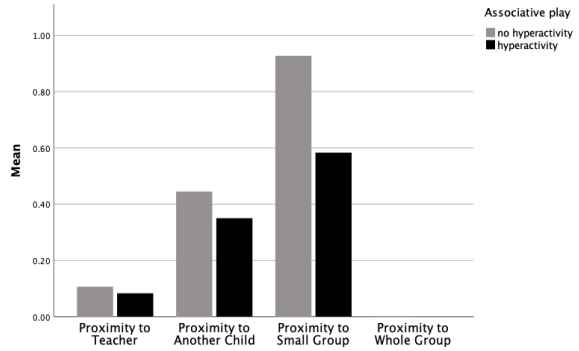


Figure 9
Clustered Bar Means for proximity in Associative play by groups based on having hyperactivity or not

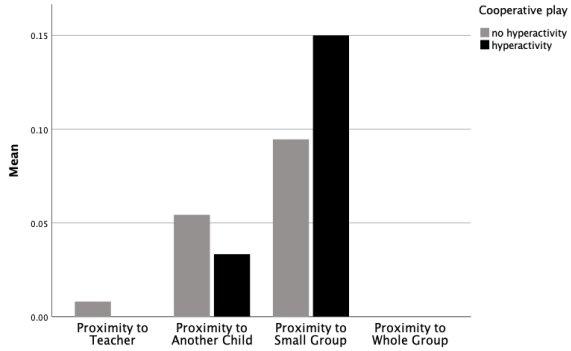


Figure 10
Clustered Bar Means for proximity in Cooperative play by groups based on having hyperactivity or not

Finally, in regards to the average observed location of social types of play, the results of the analyses indicated that while there was no statistically significant difference for associative play observed indoors between children with and without hyperactivity, outdoor associative play was observed significantly more often in typical behavior children (M = 2.016; SD = 2.00), as opposed to their hyperactive behavior peers (M = 1.35; SD = 1.614), $t(555) = 2.478$, p = .014, 95% CI [.138 to 1.194]. As for indoor cooperative play, no significant differences occurred between hyperactive (M = 1.77; SD = .044) and non-hyperactive group (M = 1.85; SD = .355), $t(121) = .755$, p = .451, 95% CI [.13 to .293]. Overall, outdoor cooperative play was observed very rarely in both groups, with mean values approaching zero, and mean differences were not statistically significant (Figure 11 and 12). The within group comparisons indicated that in the hyperactivity group both types of social play occurred significantly more often indoors than outdoors ($p < 0.05$), whereas for the typical behavior children the difference reached significance only for cooperative play, mostly occurred indoors ($p < 0.05$).

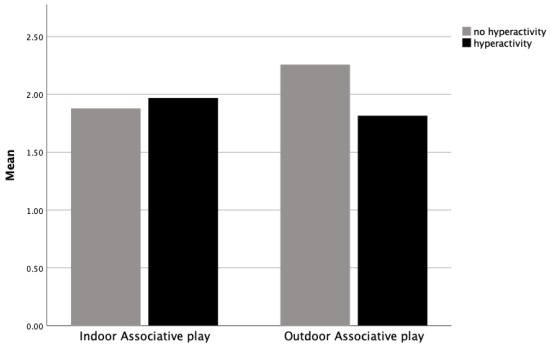


Figure 11
Clustered Bar Means for indoor and outdoor Associative play by groups based on having hyperactivity or not

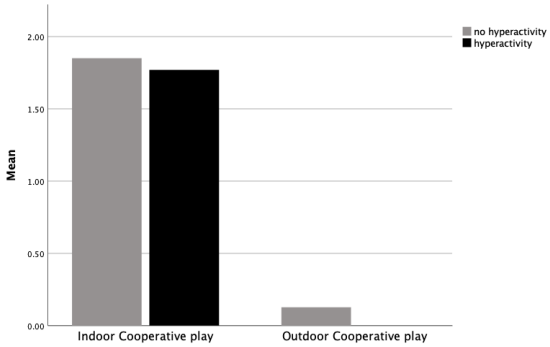


Figure 12
Clustered Bar Means for indoor and outdoor Cooperative play by groups based on having hyperactivity or not

7.1 Overview of results

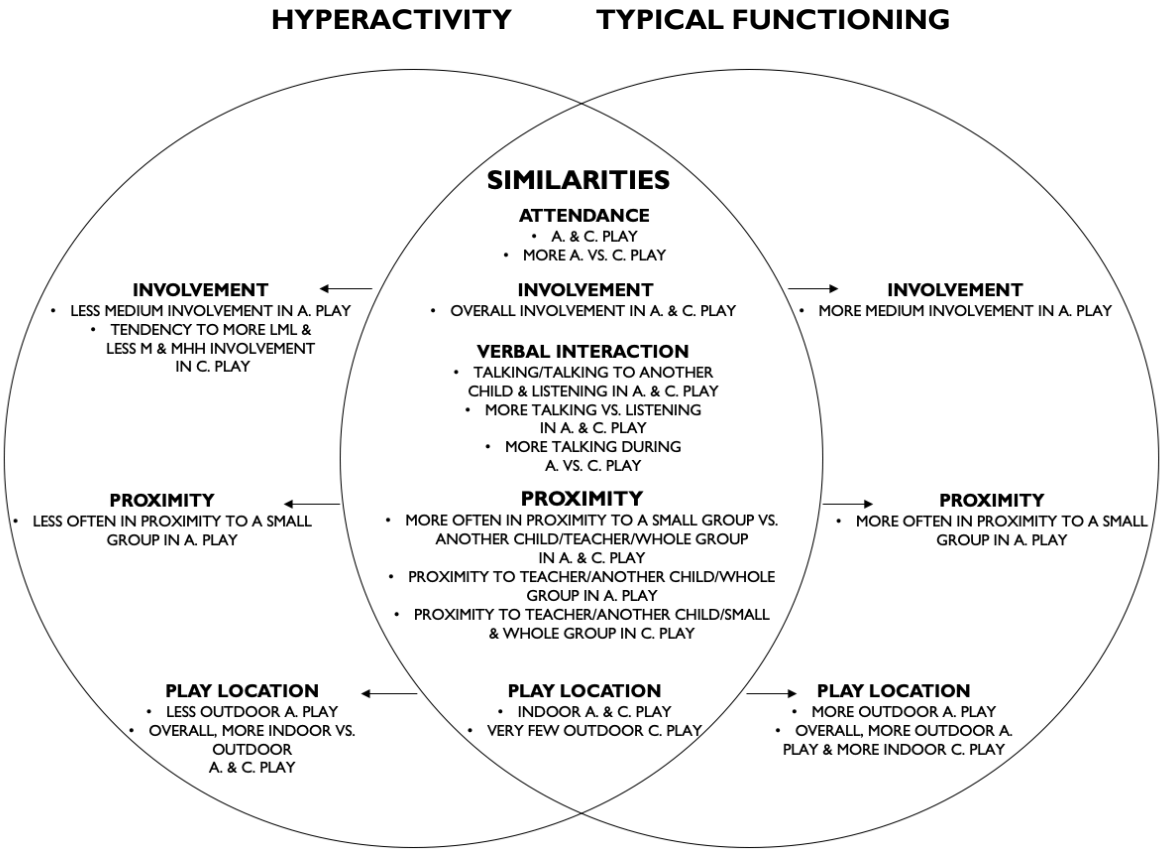
The results indicated that the average amount of observed time spent in associative and cooperative play daily did not differ substantially between children with and without hyperactivity. Associative interaction was observed considerably more often in both groups, – about three to four observations during a day per child, compared to only one observation in cooperative play. Neither were there any between group differences in the average level of engagement observed in the two types of social play interaction. The results did not show any substantial variations in the extent of verbal interaction during both types of social play between children

with and without hyperactivity. The average amount of observed listening during associative and cooperative interaction was not different either between the two groups of preschoolers. Similar trend was observed for the verbal interaction directed to another child during social play. Children in both hyperactivity and typical behavior groups were talking significantly more often than listening, and talking was observed mostly during associative- and very rarely during cooperative interaction. Another between-group similarity concerned children's physical whereabouts during social play interaction. Generally, preschoolers in both groups tended to be close to a small group of peers rather than a single child during social play types, and very rarely in proximity to teacher and the whole group. On average, the observed frequency of proximity to teacher, another child and the whole group of peers during associative play did not differ between the groups. As for cooperative play, preschoolers in both groups spent an equivalent amount of time observed in proximity to teacher, another child, small and whole group. Lastly, the average amount of observed indoor associative and cooperative interaction was not different between hyperactive and non-hyperactive participants. Outdoor cooperative play, on average, was observed very rarely in both groups of preschoolers.

However, the results additionally shed light on some considerable differences between the two groups of children. An in-depth analysis showed that when the three levels of engagement were compared independently, Medium engagement in associative play was observed significantly more often in typical behavior children. Overall, in the typical behavior group, Medium engagement was observed more frequently than Low – Medium-Low and Medium – Medium-High during associative play, whereas in the hyperactivity group, children tended to have Low – Medium-Low- and less High – Medium-High engagement in cooperative play. Another aspect that differed between the two groups was related to proximity during social types of play. The between group comparisons of children's average physical whereabouts during associative interaction revealed that typical functioning preschoolers were observed in proximity to a small group of peers considerably more often than children with hyperactivity. Finally, the results illustrated some differences between the two groups of children in terms of location of social play. In particular, outdoor associative play was observed significantly more often in the typical behavior group. Furthermore, within-group comparisons indicated that associative and cooperative interaction of children with hyperactivity was observed more often indoors than outdoors, whilst typical behavior children had more outdoor associative play and

more indoor cooperative play. An overview of the main findings, with differences and similarities in participation in social play between hyperactive and typical functioning children is presented in Figure 13.

Figure 13
Overview of results: differences and similarities in participation in associative (A.) and cooperative (C.) play between children with and without hyperactivity.



8 Discussion

The present thesis sought to compare participation in social play of children with and without hyperactivity in a Swedish preschool context. It was hypothesized that preschoolers with hyperactivity, on average, will be observed in less associative and cooperative play interaction, and with lower levels of engagement, in comparison to their typical behavior peers. The study further investigated how social play of the two groups of children differs in terms of contextual and environmental factors, such as verbal interaction, physical proximity and location of play. The analysis yielded some contrasting results, revealing both differences and similarities

between the two groups of preschoolers. On the whole, the findings illustrated that the observed averages of attendance and overall engagement in social types of play did not seem to differ fundamentally between children with and without hyperactivity. However, an in-depth analysis of participation patterns, framed with contextual and environmental factors, revealed several trends that do, although not strongly, support the adopted hypotheses. The findings are further discussed.

Upon initial consideration, it might seem that children with hyperactivity had the same attendance in social play as their typical behavior peers, which contradicts the study hypothesis and early evidence reporting that preschoolers who display symptoms of ADHD, such as hyperactivity, inattention and impulsivity, tend to have less associative and cooperative interaction compared to typically developing peers (Alessandri, 1992). However, when attendance was linked to contextual and environmental factors, it became evident that during associative play preschoolers with hyperactivity were observed in proximity to a small group of peers without teacher considerably less frequently than typical behavior children, and overall very rarely in proximity to another child, teacher or the whole group (without teacher). Furthermore, children with hyperactivity were also observed less frequently in the outdoor associative play compared to children without hyperactivity. In keeping with the fPRC framework (Imms et al., 2017), when studying participation, it is important to take into account not only the frequency of attended activity, but also the influential aspects of child context and environment that shape the quality of child experience. A recent study by Åström et al. (2020) investigating everyday environments of children and teachers in Swedish preschools, based on the same dataset as the present thesis, found that indoor free play was the main observed activity setting, followed by free play outdoors. In general, free play involves more child-initiated activities, with little or no directions from teachers (Åström et al., 2020). At the same time, child-directed activities may also require a higher competence to initiate, sustain and terminate activities in a socially appropriate way (Farran & Son-Yarbrough, 2001; Lillvist, 2010; Sjöman, Granlund, & Almqvist, 2015). Due to scarce self-regulation and impulse control, children with hyperactivity may therefore have had less associative interaction in a group setting, which can be further confirmed by the fact that these children were also observed in less outdoor associative play. On the other hand, it is important to consider the differences in pedagogical approach and the decisions of the preschool teachers on how to organize children

into groups, which in turn defines the context for child interaction. A recent study by Nasiopoulou (2019) investigating the intentions of the Swedish teaching staff behind the grouping strategies in preschool shows that teachers classified under the "organizational profile" are more likely to group children into smaller constellations in order to create a calm and sustainable environment, mostly guided by teacher-initiated activities. Whereas teachers under the "relational profile" tend to promote children's free expression and exploration by stimulating active engagement in play, communication, interaction, as well as opportunities for children to share their interests and experiences with each other. While the two grouping strategies provide different quality of experience and benefits, participation outcomes may be further dependent on the set of intrinsic characteristics of an individual child, such as competence and preferences.

Being the second and most crucial requisite of participation (Imms et al., 2017), the overall level of observed involvement or engagement during social types of play, at first review, did not differentiate between children with and without hyperactivity either, in contrast to what has been hypothesized. Previous studies reported that free play interaction in preschool has been linked to higher levels of child engagement (DiCarlo, Baumgartner, Ota, & Geary, 2016; Vitiello et al., 2012). However, a detailed analysis of the three levels of engagement taken separately showed that hyperactive children spent less time in Medium engagement level while being in associative interaction, and generally had a tendency for Low – Medium-Low and less High – Medium-High engagement in cooperative play. This result supports the adopted hypothesis and previous research evaluating engagement of preschool children with hyperactivity based on proxy ratings (Searle, Miller-Lewis, Sawyer, & Baghurst, 2013; Metcalfe, Harvey, & Laws, 2013), although only partly. It does not, however, provide solid foundation to draw any specific conclusion, as the overall picture of the observed engagement during associative and cooperative play was similar between the two groups of children. Future research may consider a more detailed analysis of engagement of children with hyperactivity in social types of play by linking it to contextual and environmental factors.

On the other hand, in supporting the absence of compelling differences between social play participation of children with and without hyperactivity, the results of a recent study by Sjöman (2018) indicate that while high levels of hyperactivity in preschool children are associated with low levels of engagement, positive peer interactions and teacher responsiveness,

contrarily, operate as strong mediating factors promoting engagement and decreasing hyperactive behavior over time. Within the fPRC framework (Imms et al., 2017), engagement is seen as a unifying construct across ecological levels, which is in part determined by child factors introduced earlier and bound by self-regulation, in part by contextual and environmental factors (i.e. verbal interaction, type of activity, proximity and location of play in this study), as well as by the interplay between the two. In light of this and considering hyperactivity as a child-intrinsic factor (Gustafsson et al., 2018) that per se does not seem to influence social interaction (Sjöman, 2018), one can argue that its negative impact on child participation may be partly neutralized by an appropriately accommodated environment. Or better, by positive transactions between the child with its intrinsic characteristics and the environment, that together build up engagement. It might be that hyperactivity in the observed children was to a degree compensated by positive peer-to-child and teacher interactions that increased child engagement, which further mediated hyperactive behavior.

Another consideration that follows the logic of the previous argument and that is proposed to be central to the present discussion is related to play and its unique impact on child self-regulation and engagement (Vygotsky, 1978; DiCarlo, Baumgartner, Ota, & Geary, 2016; Vitiello et al., 2012). The argument is that being in a play transaction with peers can operate as a mediating factor in itself, promoting self-regulation and engagement and decreasing hyperactive behavior, which may explain why the results did not yield contrasting differences in the average observed attendance and engagement in social play between children with and without hyperactivity. In keeping with the theoretical framework guiding the present thesis, child self-regulation and engagement are the two crucial processes-determinants of participation that bind together factors at child-, environmental- and between-systems levels (Imms et al., 2017). With this in mind, one can argue that the contextual and environmental aspects of the observed play settings were, on average, aligned with and accommodated to the peculiarities of intrinsic factors of the children and were therefore sufficient to provide a sustained play situation, evenly for children with hyperactivity. Furthermore Gray (2015) underlines the unbound, free and relaxed nature of play interaction. Play is self-chosen and self-directed process, whereas the rules and structures are different from the ones of traditional learning activities that are generally directed by teachers. In Swedish preschools, children spend about 74% of all time in free-choice play, which is the most frequently observed activity schedule

(Granlund et al., 2015; Åström et al., 2020*;* Coelho et al., *submitted*). The findings of the research project by Granlund and colleagues (2015) focusing on Swedish preschools that partly provided the data for the present thesis, showed that preschool units with lower percentages of observed free play and higher percentages of structured teacher-led activities were associated with higher occurrence of behavioral difficulties among children, such as hyperactivity and conduct problems. Therefore, play interaction by its nature boosting child self-regulation and engagement, which both crucial determinants of participation outcome, may be considered as another mediating factor decreasing hyperactive behavior.

Another possible explanation of the lack of significant differences between the two groups in terms of observed frequency and overall engagement in social play relies on the fact children who are in the same classroom are not completely independent on each other, as they mutually affect one another's experiences (Nesbitt, *unpublished manuscript*; Sameroff, 2009). This may imply some similarities in everyday activities and behavioral patterns of children belonging to the same preschool unit, regardless of hyperactivity or other child factors. The fact that both groups of preschoolers were observed more frequently and were more engaged in associative interaction rather than in cooperative may further support this assumption. At the same time, a very low occurrence of cooperative play can be partly explained by the results of a follow-up analysis that revealed parallel play to be the first most observed type of interaction in both groups of children, followed by associative play. This finding is consistent with the results of the previous research (Farran & Son-Yarbrough, 2001, Åström et al., 2020). On the other hand, it might be that cooperative interaction, being the most complex and cognitively taxing among the play types, was somewhat too demanding for the age and developmental stage of the observed children.

Social types of play set up the context for verbal interaction that can be considered an indicator of engagement in a peer interaction (Snow, Burns, & Griffin, 1998; Farran & Son-Yarbrough, 2001; Imms et al., 2017). The findings illustrated that children with hyperactivity were as much verbal as their typical functioning peers during both associative and cooperative interaction, with significantly more talking than listening and with no evident differences in the observed proportion of verbal interaction directed to another child. Associative play, however, served as the main context where the major proportion of verbal interaction occurred, as opposed to cooperative play. These findings are consistent with the ones of an earlier study that investigated play interaction and verbal behavior of preschool children by means of COP

(Farran & Son-Yarbrough, 2001). The absence of differences in the observed amount of verbal interaction between children with and without hyperactivity can be largely explained by the previously discussed finding regrading the average engagement level observed during social types of play, which was similar between the two groups. Since there were no significant between group variations in the overall level of engagement in social play, it may indicate that the verbal behavior was neither different between the two groups. A very low proportion of observed verbal behavior during cooperative play in its turn, may be explained by the overall low attendance and engagement level in such type of interaction observed in both groups of children.

In introducing the final consideration on the impact of environment, a study by Almqvist, Sjöman, Gölsater and Granlund (2018) nested in a Swedish preschool context found that behavioral difficulties, such as hyperactivity, is among the strongest predictors of receiving special support. Children displaying externalizing behavior are more prone to disturb the overall group functioning and therefore tend to receive more teacher's attention and direction. One can argue that the overall patterns of social play participation of children with hyperactivity did not differ substantially from the one of their typical behavior peers due to fact that these children were already identified by the preschool staff and were entitled to special support at the moment of observations. Having access to a high-quality preschool environment that is inclusive, in a sense that it accommodates special needs of all young learners, is as essential for children with behavioral difficulties, as it is for their typical functioning peers, and can be considered as an early intervention in itself (Sjöman, 2018). Early childhood is a critical period for child learning and development, promoting participation and preventing delays and maladjustments later in life (Bartolo, Björck-Åkesson, Giné, & Kyriazopoulou, 2016).

8.1 Limitations and future research

The findings of the present thesis should be interpreted by taking into consideration several limitations worth noting.

First, to provide a larger study population, the data analysis was built upon aggregated data based on the sum of observational sweeps on child level rather than classroom level, meaning that the overall play patterns characterizing each individual preschool classroom were lost for assessment. Even so, despite a relatively large sample, the sizes of the two

groups of preschoolers were unequal, with a significantly lower number of children in the hyperactivity group, thus decreasing overall statistical power of the study. Moreover, using the averages of observations per child as a basis for analysis and interpretation may have limited the possibility for some outlying contextual and environmental aspects of social play to emerge, which could only be visible when analyzed individually. Further, rarely occurring codes may have had abnormal distributions, making the results of the analysis difficult for interpretation. The way observational codes were organized in the data set partly limited the possibilities of examining multiple variable combinations. As suggested by the results of the present thesis, some between group differences in attendance or frequency of observed social play could only be identified after linking each type of social play to a single contextual and environmental aspect, such as small group or whole group, indoor or outdoor. Future research may consider creating looping syntaxes combining these factors and child engagement by means of COP to reveal potential differences in involvement between children with and without hyperactivity. Lastly, it is important to consider that the processes under the focus of the present study, such as play transaction, hyperactive behavior and engagement, were analyzed as static rather than dynamic transactions, and therefore could not be properly assessed due to implemented cross-sectional design of the study. Future research addressing similar processes may consider adopting a larger and better distributed group samples, using longitudinal design.

Due to confidentiality reasons, some demographical characteristics could not be linked to each individual child for the data analysis. Although the results of a follow-up analysis showed that mean differences of child age, gender, teacher-child ratio, language- and special support did not vary significantly between the two groups of children, each of these factors could have additionally affected participation in social play operating as cofounding variables. Future research should examine the association between participation in social play and other child factors, such as gender, age and background.

Given the crucial impact of context and environment on child outcomes, more information on family factors is needed, such as cultural background, SES, child rearing practices and child-parent transactions. These factors are important to look at when studying child hyperactivity. Low levels of observed maternal warmth, paternal self-reported overreactive and less authoritative parenting practices and low SES were all significant predictors of child hy-

peractivity (Keown, 2010; Russell, Ford, & Russell, 2015; Russell, Ford, Williams, & Russell, 2016). Another important consideration regarding challenging behavior is related to differences in cultural expectations on how children should or should not behave (Garcia Coll & Magnuson, 2000). This might be particularly relevant for the present study, considering that each preschool unit included in the sample had an average of three children who had their mother-tongue different than Swedish. Future research may additionally consider adding teacher-related factors to the analysis in order to get a fuller picture of how environmental structures affect the quality of child's everyday experiences and behavioral difficulties in the preschool classroom. This can be done by using Teacher Observation in Preschool [TOP] (Bilbrey, Vorhaus, Farran, & Shufelt, 2010), – a complementary tool used in combination with COP, allowing to capture the amount of teacher verbal interaction and voice tone, teacher-led activities, etc. To conclude, it is worth mentioning that the SDQ score bandings used to classify children as having hyperactivity or not allowed to identify "likely" cases of behavioral problems, which is "only a rough and ready method for detecting disorders" (as cited in Godman, 1997) and can vary across countries, child age, gender and other factors.

Overall, participating children in the present study were mainly passive actors. This type of approach, therefore, classifies the study design as a research *on* children, rather than *about* children (Kumpunen, Gibson, Shipway, Taylor, Aldiss, & Gibson, 2012). Future studies should aim at capturing both child perspective, including the perspective of child's proxy person or other significant adults, and the child's perspective (Nilsson et al., 2015).

8.2 Practical implications

Despite several limitations, the results of the present thesis do support a potential mediating effect of participation in social play on child hyperactivity in preschool. The findings inform preschool staff, benefiting both regular and special support teachers. In the absence of more robust evidence, researchers and interventionists may consider developing and evaluating the effects of play-based interventions for preschoolers with hyperactive behavior. Policy makers may consider potential modifications in classroom practices and implementation of childhood intervention aiming at promoting participation in social play.

9 Conclusion

Although the diverging findings of the present study do not put forward any definite conclusion, they do, although not strongly, suggest that hyperactivity may lead to less participation in social play, if not accommodated by the adapted environment. It seems that children with hyperactive behavior seek social play opportunities as much as their typical behavior peers, but the quality aspects of their experience defined by a specific context and environment may differ further as the interaction develops. Contextual and environmental factors are crucial determinants to take into account when studying participation. The onset of hyperactive behavior is proposed to be a participation limitation at the child level, occasionally manifested whenever the demands of the environment exceed or do not reflect child's unique reserve of intrinsic factors, including activity competence, preferences and sense of self, that result in poor self-regulation, which in turn decrease engagement and overall participation outcome. Conversely, when met with an appropriately tailored environment, matching the individual peculiarities, the negative effect of hyperactive behavior may be neutralized. Furthermore, play may have the potential to serve as a mediating factor accommodating hyperactivity and promoting participation in preschool. Operating as a natural booster of self-regulation and engagement, participation in social play should be implemented in the daily preschool diet supported by an adequately qualified staff, to help children reach their full potential. Participation in social play is paramount for children with hyperactivity and should be considered as an entry point for learning, development and functioning, and a desired outcome in ECE.

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Appendices

Appendix A

Strengths and Difficulties Questionnaire (SDQ). Full version for teachers

Emotional Symptoms Scale	Not true	Somewhat true	Certainly true
Often complains of headaches, stomach-aches…	0	1	2
Many worries, often seems worried	0	1	2
Often unhappy, downhearted or tearful	0	1	2
Nervous or clingy in new situations…	0	1	2
Many fears, easily scared	0	1	2
Conduct Problems Scale	Not true	Somewhat true	Certainly true
Often has temper tantrums or hot tempers	0	1	2
Generally obedient, usually does what…	2	1	0
Often fights with other children or bullies them	0	1	2
Often lies or cheats	0	1	2
Steals from home, school or elsewhere	0	1	2
Hyperactivity Scale	Not true	Somewhat true	Certainly true
Restless, overactive, cannot sit still for long	0	1	2
Constantly fidgeting or squirming	0	1	2
Easily distracted, concentration wanders	0	1	2
Thinks things out before acting	2	1	0
Sees task through to the end, good attention span	2	1	0
Peer Problems Scale	Not true	Somewhat true	Certainly true
Rather solitary, tends to play alone	0	1	2
Has at least one good friend	2	1	0
Generally linked by other children	2	1	0
Picked on or bullied by other children	0	1	2
Gets on better with adults than other children	0	1	2
Prosocial Scale	Not true	Somewhat true	Certainly true
Considerate of other people's feelings	0	1	2
Shares readily with other children	0	1	2
Helpful is someone is hurt, upset or feeling ill	0	1	2
Kind to younger children	0	1	2
Often volunteers to help others	0	1	2

*Somewhat true is always scored as 1, but the scoring of Not true and Certainly true varies with the item, as shown above scale by scale. For each of the 5 scales the score can range from 0 to 10 if all five items were completed. The total difficulties score is generated by summing the scores from all the scales except the prosocial scale. The resultant score can range from 0 to 40 (and is counted as missing if one of the component scores is missing).

Teacher completed	Normal	Borderline	Abnormal
Total difficulties score	0-11	12-15	16-40
Emotional symptoms score	0-4	5	6-10
Conduct problems score	0-2	3	4-10
Hyperactivity score	0-5	6	7-10
Peer problems score	0-3	4	5-10
Prosocial behavior score	6-10	5	0-4

Note. Bandings used to classify total scores as normal, borderline and abnormal.

Appendix B

Children observation in Preschool (COP). Original version

Variable	Definition	Coding options
Verbal	The Verbal and To Whom variables capture whether children are talking or listening, and to whom they are speaking or listening.	0 = No 1 = Yes 2 = Listen 3 = Fussing/Crying
To Whom	See above	0 = Teacher 1 = Child 2 = Small Group 3 = Small Group Teacher 4 = Whole Group 5 = Whole Group Teacher 6 = Self Talk/ Self-Noise 7 = No Talk/Listen
Schedule & Secondary schedule	The Schedule category refers to how the children are organized in different learning settings, rather than any official daily schedule that may be posted.	0 = Whole Group 1 = Small Group 2 = Centers 3 = Small Group Centers 4 = Transition /(with Instruction) 5 = Mealtime 6 = Other 7 = Nap 8= Special
Proximity	The proximity category is different from the schedule category in that it records who is within a three-foot radius of the target child, regardless of classroom schedule or organization.	0 = Teacher 1 = Child 2 = Small Group 3 = Small Group Teacher 4 = Whole Group 5 = Whole Group Teacher 6 = Alone
Interaction	The codes in the Interaction category capture the social parameters of the child's learning experience and are an adaption of Parten's categories of play (1932).	0 = Non-Academic 1 = Parallel 2 = Associative 3 = Cooperative 4 = Alone 5 = Onlooker 6 = Social 7 = Unoccupied 8 = Timeout
Involvement	Determines how involved/engaged children are in the classroom learning environment.	1 = Low 2 = Medium – Low 3 = Medium 4 = Medium – High 5 = High
Type of task	This category captures the task demands of the learning material with which the child is engaged,	0 = Passive Instructions 1 = Non-sequential 2 = Sequential 3 = Fantasy/drama

	as well as the type of learning engagement the child is displaying.	4 = None 5 = Other 6 = Social 7 = Disruptive 8 = DisruptiveX 9 = Time out
Material	Captures the type of materials being used.	0 = None* 1 = Math 2 = Literacy 3 = Science 4 = Social studies 5 = Toy and games 6 = Art 7 = Music and movement 8 = Drama 9 = Gross motor 10 = Worksheet 11 = Media 12 = Cannot code
Focus	Captures what the learning focus is.	0 = Literacy 1 = Language arts 2 = Literacy writing 3 = Language arts writing 4 = Reading 5 = Math naming 6 = Math concepts 7 = Science 8 = Social studies 9 = Drama 10 = Gross motor 11 = Other 12 = None**

*Automatically coded when interaction state is coded 'Routine-based activity', 'Social', 'Unoccupied', or 'Time Out'.
**As above and when interaction state is coded 'Onlooker'.

Appendix C

Children observation in Preschool (COP). Adaptations for Swedish preschool context

Variable	Definition	Coding options
Verbal	The Verbal and To Whom variables capture whether children are talking or listening, and to whom they are speaking or listening.	0 = No 1 = Yes 2 = Listen 3 = Fussing/Crying
To Whom	See above	0 = Teacher 1 = Child 2 = Small Group 3 = Small Group Teacher 4 = Whole Group 5 = Whole Group Teacher ***6 = Self Talk/ Self-Sound***

		7 = Listen/No Talk
Schedule & Secondary schedule	The Schedule category refers to how the children are organized in different learning settings, rather than any official daily schedule that may be posted.	0 = Whole Group 1 = Small Group 2 = Centers 3 = Small Group Centers 4 = Transition /(with Instruction) 5 = Mealtime ***6 = Other (incl. Gym, Special, Nap)***
Proximity	The proximity category is different from the schedule category in that it records who is within a three-foot radius of the target child, regardless of classroom schedule or organization. ***When children are outdoors, the definition of proximity has been more generous, specifically, the radius of proximity is 1,5 meters (TUTI) and 3 meters (PEPI) for Swedish preschools.***	0 = Teacher 1 = Child 2 = Small Group 3 = Small Group Teacher 4 = Whole Group 5 = Whole Group Teacher 6 = Alone
Interaction	The codes in the Interaction category capture the social parameters of the child's learning experience and are an adaption of Parten's categories of play (1932).	0 = Non-Academic 1 = Parallel 2 = Associative 3 = Cooperative 4 = Alone 5 = Onlooker 6 = Social 7 = Unoccupied 8 = Timeout
Involvement	Determines how involved/engaged children are in the classroom learning environment.	1 = Low 2 = Medium – Low 3 = Medium 4 = Medium – High 5 = High
Type of task	This category captures the task demands of the learning material with which the child is engaged, as well as the type of learning engagement the child is displaying.	0 = Passive Instructions 1 = Non-sequential 2 = Sequential 3 = Fantasy/drama 4 = None 5 = Other 6 = Social 7 = Disruptive 8 = Disruptivex 9 = Time out
Material	Captures the type of materials being used.	0 = None 1 = Math 2 = Literacy 3 = Science 4 = Social studies 5 = Toy 6 = Art 7 = Music and movement 8 = Drama 9 = Computer 10 = Worksheet

		11 = TV or Video 12 = Cannot code
Focus	Captures what the learning focus is.	0 = Literacy 1 = Language arts 2 = Reading 3 = Math 4 = Science 5 = Social Studies 6 = Drama 7 = Gross motor 8 = Fine motor 9 = Other, art or music 10 = None
Location	***New category for Swedish preschools that captures children's physical locations in preschool***.	***0 = Play hall*** ***1 = Group room*** ***2 = Dining room*** ***3 = Hallway*** ***4 = Outdoor***

Note. The main adaptations are countersigned with italics and bolded.