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# **I Introduction**

Children's behaviors exist on a continuum, and there is no specific line that separates troubling behavior from a serious emotional problem. A child can get a specific "diagnosis" or "disorder" when his/ her behaviors occur frequently and are severe. However, many children in preschool are not diagnosed and are not getting the support they need. During the early childhood years, children learn to interact with one another in ways that are positive and successful. Researchers stress the importance of positive peer relationships in childhood. The absence of positive social interactions in childhood may be linked to negative consequences later in life. Peer acceptance in early childhood could be a predictor of later peer relations. Peer rejection has been linked to school drop-out, school avoidance, poorer academic performance, school adjustment problems and grade retention. Children with behavior problems are often excluded by peers, so it is important to find out about special support in preschool which promote peer interaction of children with behavior problems. There are many studies about special support for diagnosed children with emotional and behavioral disorders, but much less of undiagnosed children who display behavior problems. Therefore, it is important to see what kind of special support is available and can be implemented in the mainstream preschool setting.

## **I.1 Emotional and behavioral disorders**

Children with emotional and behavioral disorders present big challenge to families, schools and communities. Providing appropriate services to them challenges the capacity of both schools and communities, that's why involving many different service providers and agencies are often necessary to meet their typically, often complex needs. The behavior characteristics of children with EBD (emotional and behavioral disorders) often make them rejected in social groups, unpopular among peers, and unwanted in classrooms where their behaviors can be disruptive, disrespectful, unpleasant and extraordinary difficult for teachers to manage. Approximal 1% of the population in school age have been identified as students with EBD and in need of special support. But professionals estimate that the true prevalence would be from 3% to 6 % of the school-aged population probably have emotional or behavioral disorders that require intervention (Landrum, 2011).

It is important to identify students with emotional and behavioral disorders, because that way children can receive special education services they need to promote their development and learning (Landrum, 2011).

### **I.1.1 Behavior problems**

A high number of children between birth and the age of five, experience social and emotional behavior problems due to various environmental and family risk factors (Bratton, Ray, Rhine, & Jones, 2005). Behavior problems in young children are fairly common. It has been suggested that approximately 5–14% of

preschool children exhibit problem behavior. There are many reasons for behavior problems in preschool-aged period children (Yoleri, 2013).

In general, behavioral disorders are grouped into two groups, namely internalizing problems and externalizing behavior problems. Externalizing behavior patterns are directed towards the social environment and can be characterized as out-directed mode of responding. Examples of such behaviors include aggression, disruption, opposition/defiance, and impulsivity/hyperactivity. Internalizing behavior patterns are behaviors directed towards the individual and represents an overcontrolled and inner-directed pattern of behavior. Example of such behavior include social withdrawal, depression/dysthymia, anxiety, somatization problems, obsessive-compulsive behaviors and selective mutism (Gresham & Kern, 2004). According to Algozine (1997) external behavior problems are characterized as “disturbing” to others in the social environment and internalizing behaviors as “disturbing” to the individual.

Challenging behaviour has been defined as culturally abnormal behaviour of such intensity, frequency or duration that the physical safety of the person or others is likely to be placed in serious jeopardy or behaviour which is likely to seriously limit or deny access to and use of ordinary community facilities. (Emerson, 1995). The main forms of challenging behaviour have been identified as aggressive/destructive behaviour, self-injurious behaviour, stereotypy, and other socially or sexually unacceptable behaviours. Timid and withdrawn behaviors, certainly also qualify as challenging (Hastings & Remington, 1994). Challenging is one of the labels that adults have affixed to problem behaviors or children. These has been defined as any behavior that interferences with children’s learning and development or that is harmful to children and to others (Bailey & Wolery, 1992). Challenging behaviors in classrooms require unordinary amount of educators’ time and effort, which decrease the amount of time available for promoting appropriate behavior. Student’s behavior might be considered deviant when they display too much of certain behaviors (e.g. physical or verbal aggression, disruption), or not enough of certain behaviors such as social interactions (Chandler et al., 1999). Ladd and Coleman (1997) expressed that the children who are exposed to negative behaviors by their peers had feelings of fear, distrust, and loneliness.

## **1.2 Peer interaction**

Play with peers are important for children's lives from the very early age. Most infants and toddlers meet peers on a regular basis, and some experience long-lasting relationships with particular peers from a very early age (Hay et al., 1999). At the age of 6 months infants can communicate with other infants by smiling, touching and babbling. At the age of two, they can show both prosocial and aggressive behavior towards peers (Hay, Castle & Davies, 2000; Rubin, Burgess, Dwyer & Hastings, 2003). Experiences in the first two or three years of life have implications for children’s acceptance by their classmates in nursery school and the later school years. It is clear that peer relations pose special challenges to children with disorders and

others who lack the emotional, cognitive and behavioural skills that underlie harmonious interaction (Hay, 2005).

Children with conduct problems have particular difficulty in forming and maintaining friendships. Some studies have indicated that these children have significantly delayed play skills, including difficulties waiting for a turn, accepting peers' suggestions, offering an idea rather than demanding something, or collaborating in play with peers (Webster-Stratton & Lindsay, 1999).

### **1.2.1 Peer acceptance**

Peer acceptance in early childhood is a predictor of later peer relations. Children who were without friends in kindergarten were still having difficulties dealing with peers at the age of 10 (Woodward & Fergusson, 2000). Peer acceptance is related to many factors in a child's life, such as their relationships at home with parents and siblings, the parents' own relationship and the family's levels of social support (Hay, Payne & Chadwick, 2004). However, peer acceptance is most directly affected by children's own behavior. Studies show that highly aggressive children are not accepted by their peers (Crick, Casas & Moshe, 1997). Aggressive children are often rejected by their peers, but aggression does not always preclude peer acceptance (Hay, 2005).

If the child displays aggressive behavior, peer interaction in preschool can be affected. It can eventually lead to rejection by the peer group (Buhs, Ladd, & Herald, 2006; Lillvist, 2010). Children who experience peer rejection are potentially at risk for problems later in life. Peer rejection has been linked to school drop-out, (Kumpersmidt, Coie, & Dodge, 1990), school avoidance (Ladd, 1990), poorer academic performance (Ladd, 1990), school adjustment problems (Coie, Lochman, Terry, & Hyman, 1992), and grade retention (Coie et al., 1992). Peer rejection has been reported as a dominant predictor of later life adjustments, leading to maladjustment (Pedersen et al., 2007) It has been noted that the reputation of being rejected once acquired also tends to persist (Johnson et al., 2002).

### **1.2.2 Prosocial behaviors**

Children who are competent with peers at an early age, and those who show prosocial behavior, are particularly likely to be accepted by their peers (Hay, 2005). Children who are hyperactive, impulsive, inattentive, and aggressive have been shown to have cognitive deficits in key aspects of social problem solving (Dodge & Crick, 1990). Preschoolers who engage in aggression and antisocial behavior generate fewer solutions than their typically developing peers. These children may in fact have a prosocial solution in their repertoire but tend to have only one, whereas the other solution they have is aggression, which in the short run is often more effective and efficient at getting their needs met. Their typically developing peers have far more solutions from which to choose when one does not work (Joseph & Strain, 2010).

Children's use of prosocial behaviors with their peers serves to enhance their social status within the group, and this may in turn operate as a protective factor against future peer rejection. In addition, children with higher levels of prosocial behaviors typically engage in lower levels of aggression and will experience less peer rejection overall (Crick, Casas, & Mosher, 1997). Thus, the long-term use of prosocial behaviors may facilitate positive peer interactions, greater peer acceptance, and higher social status in the peer group (Crick, Casas & Moshe, 1997; Ladd, Price & Hart., 1988).

### **1.3 Interventions**

The aim of interventions, regarding children in need, is helping them and their families to prosper. It is important to support them and provide assistance in order to tackle their adversities in the best possible way (Lollar et al., 2012; Meisels & Shonkoff, 2000). Interventions can focus either to promote positive functioning of a child or to reduce risks which might have negative impact on the child's development. Interventions should generally provide as a holistic view on the child, taking into account the different risks and strengths, on individual and environmental level (Masten, 2001). Child's development depends on characteristics and behavior of the child and interactions within the environment. Bronfenbrenner's bio-ecological model (Bronfenbrenner, 1994) can be used as one of the examples to look at the different systems that exists, from microsystem to macrosystem, which have direct and indirect influence on the child's development. Intervention can be done at different systems level in order to promote the child's development and learning.

Schools are the most likely venue for interventions for aggressive or violent behavior (Furlong, Morrison & Jimerson, 2011). However, children's sustained use of aggressive behaviors during early childhood increases the risk that these negative behaviors may stabilize across time if no interventions are implemented trying to reduce behavior difficulties which in turn promote development and learning for the child (Persson, 2005).

### **1.4 Bronfenbrenner's bio-ecological model**

Bio-ecological theory of development focuses on the impact that environment, in addition to biology, has on an individual development (Burkhard & Weiß, 2008). The center of development is proximal processes. These can be resumed as all kind of interactions of a human being with persons, objects and symbols. The quality and effectiveness of these processes on the development are related to the regularity of this interactions and the amount of time they occupy (Bronfenbrenner, 2001). According to the bio-ecological theory (Bronfenbrenner & Morris, 2006), peer interaction is a proximal process, defined as "progress of progressively more complex reciprocal interaction" that "takes place on a regular basis over extended periods of time" (p. 797), that drives human development.

Bronfenbrenner (1994) describes four layers of relationships that influence a child's development. Microsystem includes interpersonal relation of the person in the center and people from his/her immediate environment (Bronfenbrenner, 1994). These relations can have the biggest effect on a child's behavior and include bi-directional influences. Bi-directional influences can be the shaping of the child's development by parents and shaping of environment by the child itself through personal attributes. These relationships are significant for a child's cognitive and emotional growth (Swick & Williams, 2006). Mesosystem includes relations between Microsystems. As an example, the interconnection between parents and teachers or the interrelation between therapists and parents (Bronfenbrenner, 1994; Swick & Williams, 2006). Exosystem includes important indirect influences, which are not directly situated in the person's closest environment (Tudge et al., 2009). Macrosystem describes culture, laws, beliefs and values in which a person/child develops. It defines the resources, which are important for the developing environment of a child (Bronfenbrenner, 1994). Another element that is influencing development is chronosystem. A chronosystem encompasses change or consistency over time not only in characteristics of the person but also of the environment in which that person lives (Bronfenbrenner, 1994).

## **1.5 Aim**

The aim of this systematic literature review is to identify, and critically analyze, special support in preschool which promote peer interaction of children with behavior problems

## **1.6 Research Questions**

- What kind of behavior problems are observed in the found studies?
- What kind of special support has been found to promote peer interaction of preschool children with behavior problems?
- What are the outcomes on behavior problems and peer interactions in the found studies?

## **2 Method**

A systematic literature review was performed. In this section the search procedure, inclusion and exclusion criteria, selection process, data extraction and quality assessment will be described.

### **2.1 Search procedure**

The search for this systematic literature review was made in March 2017, using online databases. The search was conducted on the database ERIC, PsycINFO and Web of Science. The search included the same search words, with some minor changes depending on the database to get a maximum result of relevant articles for this study. The search was conducted using following terms: Early childhood education, preschool, kindergarten, behavior problems, challenging behaviors, behavior difficulties, aggressive behaviors, interventions, methods, program, educational strategies, support, peer acceptance, friendship, peer relations and peer interactions. See Appendix A for a more detailed information about the search terms in each database.

A hand search was performed while doing the full text screening, looking into the literature lists of the articles. That was made to cover all the relatable articles, but no articles were relevant for this research and had to be excluded based on inclusion and exclusion criteria.



## 2.2 Inclusion and exclusion criteria

The literature search results were selected according to inclusion and exclusion criteria which were determined in advance.

*Table 1: Inclusion and exclusion criteria*

Inclusion criteria	Exclusion criteria
<b>Population</b>	
Preschool children aged 2-6 years with behavior problems	Children younger than 2 and older than 6, adolescents, adults
<b>Focus</b>	
Behavior problems, Challenging behavior, Misbehavior	Diagnosed emotional and behavior disabilities, children with other disabilities
Support in preschool setting, such as: Interventions, therapies, special support, preschool activities, training programs, educational strategies, methods	Support implemented outside the preschool setting
<b>Publication type</b>	
Peer reviewed article	Abstracts, study protocols, books, book chapters, conference papers, thesis and others
Published in English, between 1990 and February 2017	Articles older than from 1990, articles to pay
Full-text available for free	
<b>Design</b>	
Empirical studies	Systematic literature reviews
Qualitative	
Quantitative	
Mixed	

For this literature review articles written in English, published between January 1990 – February 2017 were included. Articles had to have free accessibility and had to be peer reviewed journals. Other literature such as books, chapters, thesis, papers, protocols, literature reviews were excluded. Articles need to be focused on the preschool children between 2 and 6 years with behavior problems. The age of two was chosen, because children at that age can already show both prosocial and aggressive behavior with peers (Hay et al.,

2000; Rubin, Burgess, Dwyer & Hastings, 2003). According to the Institute for Statistics of UNESCO (2010), children attend to elementary school at the age of six in 61.8% of all countries. Thus, there is a great number of countries where children are still in the last year of kindergarten, before school cycle begins, so those children were included. All the other articles concerning the other age groups were excluded. If the target group is children with diagnosed behavior disability (ADS, ADHD or any other disability...), they were excluded, because this group is not relevant to the aim of this study. Intervention studies including special support provided within preschool context with purpose to improve peer interaction for children in preschool setting, were included. Research focusing on support outside the preschool setting were excluded (e.g. child has to attend other facility such as hospital or therapy center to get special support). Focus was on behavior problems (internalized and externalized), challenging behavior and misbehavior. The terms “internalized behavior problems” and “externalized behavior problems”, were not included, because the term “behavior problems” includes both.

### 2.3 Selection process

The selection process of the search can be seen on the flowchart below:

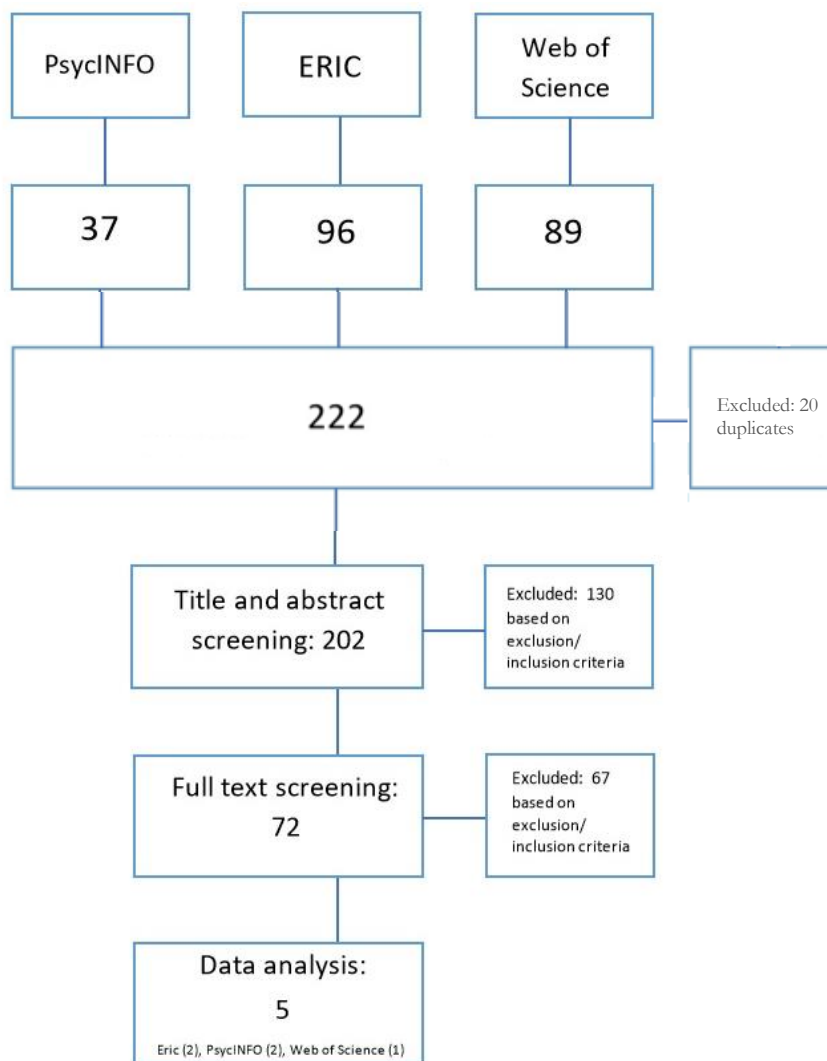


Figure 1: Selection process

In total 222 articles were found, 22 articles were excluded, because they were duplicates. The remaining 202 articles were screened on title and abstract level according to the inclusion and exclusion criteria. The remaining 72 articles were screened on full text level, considering inclusion and exclusion criteria. Total of five articles were matching all the criteria and were chosen for data analysis.

### **2.3.1 Title and abstract screening**

For the screening process the online tool Zotero was used. All the 222 articles were imported in Zotero and checked for duplicates. Afterwards, the other 202 articles were screened on title and abstract level, using inclusion and exclusion criteria (see Table 1).

Most of the articles were excluded, because they did not include interventions, therapies, special support, preschool activities, training programs, educational strategies or methods for supporting peer interaction. The main result of the excluded articles was focusing on the relation between behavior problems and peer interaction. However, many of the researchers discussed suggestions for implementation of interventions based on their results, but did not include specific interventions in the design of the empirical study. During the screening of the abstracts and titles, it was clear that few articles are targeting children with diagnosed disabilities, that is why they were excluded. From some abstract it was unclear whether the research was conducted in kindergarten or research center, at home or in multiple settings. Some articles had support implemented in other settings like therapy centers, home or experimental classroom in the hospital. However, if therapies were implemented in preschool setting, the article was included. One article was excluded because it was not empirical study, but was theoretical research. After this process, there were 72 articles left for full text screening.

### **2.3.2 Full text screening**

Full text screening was based on exclusion and inclusion criteria. While doing the full text screening the focus was on the method part, especially on the participants and the setting information. Because the studies were conducted in different countries, the age of children was unclear, so the full text screening was necessary. Three articles were excluded because the target group was within elementary school. Nine articles were excluded, because they were longitudinal studies about the children from the age of three to age of seven or eight. More than half articles were excluded because they involved children with diagnosis. Some articles that were screened had only few participants within the required age range, therefore were excluded. Small number of articles were excluded because the support was partly implemented in preschool setting and partly at home or other institution. The rest of the articles were excluded, because they did not include peer interactions.

The found articles were meeting all the criteria according to age span and interventions within preschool context, with focus on the support and the outcomes of the research. While doing the full text screening, the aim and research questions were considered. Selection process resulted in five articles. A full test screening was conducted once again on the five articles, to assure that any information was not overlooked.

### **2.3.3 Quality assessment**

The Quantitative Quality Assessment Tool (CCEERC, 2013) was used to assess the quality of the articles (See Appendix B). The tool originally had 11 items and a ranking scale from 1, 0, -1 points and a Not applicable (NA) option. An adaptation of the tool was made, adding peer review, aim and research questions/hypothesis, information about interventions, study design, follow up and control group. The changes were made to address the interventions and important aspects that quantitative studies should have. Some changes concerning measures were made. The adapted tool used scale of 0, 1 and 2 points, non-applicable option was removed. The tool measured 17 items, which were categorized into four main themes: article publication and background, the method, the measurement and the analysis.

The ranking scale consists of a total of 24-31 points for high quality, 16-23 points for medium high quality, 8-15 points for medium quality and 0-7 points as low quality. Two articles were identified as high quality and three articles had medium high quality. No articles were excluded, because of the quality.

### **2.3.4 Data extraction**

Data extraction protocol was designed in Excel, to have a clear overview on the chosen articles (n=5). The extraction protocol was used to extract the general information such as author's name, year, title, journal, study aim, research questions/ hypothesis, country where the study was made, rationale and ethical considerations. It also collected information about participants (sample size, gender, age) and symptoms of behavior problems, and details about the special supports such as support type, setting, control group, involvement of teachers/parents/peers/others. The information about the outcomes of supports was gathered. That section included outcomes on behavior problems and peer interaction, and the measurement of outcomes. The protocol also includes study design, data collection and the results with conclusion and limitations (see Appendix C).

### 3 Results

The systematic literature search, abstract screening process and full text screening process resulted in five articles. The search was oriented to find all kinds of special support in preschool setting, but only interventions were found. The term “special support” further in the text refers to interventions in the found studies.

#### 3.1 Description of the included articles

The included articles were published between 1999 and 2011. All included articles consist special support for preschool children with behavior problems. The studies were conducted in three different countries, three articles were conducted in USA, one in Canada and one in Luxembourg. See Table 2 below for more information.

*Table 2: Background information about articles: author, year, country and title of included articles*

SIN	Author & year	Country	Title	Age of children	Number of participants
I	Koglin & Petermann (2011)	Luxembourg	The effectiveness of the behavioural training for preschool children	3-6 years	90 children, 48 in intervention group
II	Snyder et al. (2011)	USA	The impact of brief teacher training on classroom management and child behavior in at-risk preschool settings: Mediators and treatment utility	3-6 years	136 targeted children, 250 as peers
III	Smith et al. (2009)	USA	Effects of Positive Peer Reporting (PPR) on Social Acceptance and Negative Behaviors Among Peer Rejected Preschool Children	4-5 years	60 children, 3 targeted children
IV	Chandler et al. (1999)	USA	The effects of team-based functional assessment on the behavior of students in classroom settings	3-6 years	210 children, 60 targeted children at risk
V	Girard et al. (2011)	Canada	Training Early Childhood Educators to Promote Peer Interactions: Effects on Children's Aggressive and Prosocial Behaviors	2-5 years	68 children, 32 in experimental group

*Note.* SIN = Study Identification Number

##### 3.1.1 Providers for intervention, settings and target group

Implemented interventions were carried out by educators (preschool teachers and assistants) (Studies I, II, III, V) and other internal professionals from preschool setting (Study IV). All the interventions were implemented in the preschool settings, which are in the studies named differently. Study IV was conducted in three different settings: Early education classrooms, Classrooms for children with special needs and Classrooms for Children in risk. I focused on analyses of results for children in risk classrooms, because part of

my exclusion criteria were children with diagnosis (see Table 1). All the studies include children between two and six years of age. Study I, II and IV focused on the children from three to six years, Study III focused on children from four to five years and Study V focused on children from two to five years (See Table 2).

### 3.2 Outcomes on behavior problems and peer interaction

The outcomes of the interventions in each study were evaluated by using different measurement tools. However, all the studies used pre-test, post-test or follow-up, maintenance measurement. Study IV was the only study which included additional test during intervention. All the studies, except Study III, used control groups.

*Table 3: Test design and outcome measurement*

Test design & outcome measurement	SIN				
	I	II	III	IV	V
Pre-test	X	X	X	X	X
Mid-test				X	
Post-test	X	X	X	X	X
Control group	X	X		X	X
Outcome measurement	Comparing total difficulties score	Frequency count	Frequency count	Frequency count	Frequency count
Effect size	Small	Small	Moderate	n/a	n/a

*Note.* SIN= Study Identification Number. See Table 2 for author information

According to the Table 3, the overall effect size was reported for three studies. Study I and II reported small effect size, whereas, the Study III reported moderate effect size. The other studies did not report overall effect size of the interventions.

Aims of all five studies were to assess, evaluate or explore the effectiveness of the implemented support. All the studies reported outcomes of the whole peer group, children with and without behavior problems, whereas Study III only reported the outcome of the three particular peers.

### **3.2.1 Improving social-emotional competences**

Study I was evaluating improvements in social skills and reduced problem behavior after child participation in the study. They found that children in the intervention group teased or bullied less frequently and played more cooperatively with each other more often. The intervention had higher effect on children with severe behavior problems which showed decrease in behavior problems. However, the intervention had overall a small effect size.

### **3.2.2 Promoting positive social behavior**

Study II evaluated if the support reduced conduct problems and promoted positive social behavior. They revealed that the observed children increase rates of positive behavior and constructive social engagement, and reduce rates of negative behavior towards peers. Incredible Years (IY) training reduced peers' negative social behavior such as dislike/avoidance and ignoring of target children displaying high levels of conduct problems. IY training reduced peers' negative social behavior towards the target children low levels of conduct problems. Peer ignoring decreased over time, regardless level of conduct problem. The intervention had overall small effect size.

The aim of Study IV was to prevent and remediate challenging behavior and facilitate the development of appropriate social behaviors. The study reports decrease in challenging behaviors within the at-risk classroom during intervention. Challenging behaviors also maintained at low levels during a maintenance condition. Decrease in nonengagement and increase in active engagement and peer interaction was found during the intervention (from 9% to 31%) and was maintained with the mean 24% after the intervention.

### **3.2.3 Improving social acceptance**

The aim of Study III was to evaluate effectiveness of the intervention in improving social acceptance and decreasing negative behaviors. The results of the third study (Smith et al., 2009) indicated that one of the three target students experienced increase in social acceptance and two of three target students demonstrated fewer negative behaviors.

### **3.2.4 Facilitating positive peer interaction**

Study V was trying to find out whether facilitating positive peer interactions would reduce the aggressive behaviors and increase the prosocial behaviors of preschool children during small-group play interactions revealed decrease in aggressive behaviors for boys but not for girls. Compared to the control group, the children in the experimental group used significantly more prosocial behaviors following the in-service training. Pretest means of 2.41 and 2.56 for the experimental and control groups, respectively, indicated that the frequency of prosocial behaviors was low overall prior to intervention. At posttest, the means for prosocial behaviors increased to 5.78 and 3.86 for the experimental and control groups.

### 3.3 Observed behavior problems

#### 3.3.1 Measures

The studies used different methods and tools for observing and measuring behavior problems. Study I used the questionnaire, Strength and Difficulties Questionnaire (SDQ) of Goodman (1997). The other studies used direct observations (Studies II, III, IV), except Study V which used direct observations by video recordings. Study II used the Classroom Interaction Coding system (CIC) of Snyder (2006). For other studies, additional measurement tools weren't mentioned.

Study II was significantly different from the others. It takes into account bi-directional influences, by measuring target children's behavior, peer's behavior towards the target child, and teacher behaviors towards target children and peers. Other studies measured only behaviors of target children (Studies I, III, IV, V).

#### 3.3.2 Categories of behavior problems

The behavior problems of children, which were observed and measured in the studies, were categorized into four subcategories: aggression, asocial behaviors, inattention and internalizing behavior problems (see Table 4). All the studies involved aggressive behaviors, particularly aggression toward others (see Table 4 below). Studies II and III observed aggression toward materials or activities, but only Study IV observed self-aggressive behaviors. The category of Asocial behaviors includes behaviors, such as: not considerate of other people's feelings, doesn't share readily with other children and no or poor peer interaction. The category of inattention includes behaviors, such as: cannot stay still very long, wandering and restless. The category of internalizing behavior problems includes behaviors, such as: hiding under the desk, constant crying and elective mutism. Appendix E provide more information about kind of behaviors the researchers observed in the found studies.

Table 4: Categories of behavior problems found in the studies

Behavior problems	SIN				
	I	II	III	IV	V
<b>Aggression towards:</b>					
Self				X	
Others	X	X	X	X	X
Materials or activities		X		X	
<b>Asocial behavior</b>	X			X	
<b>Inattention</b>	X			X	
<b>Internalizing behavior problems</b>	X			X	

Note. SIN= Study Identification Number. See Table 2 for author information



### 3.4 Types of special support

These studies have implemented different kinds of special support in the preschool classrooms. In addition, the studies were focused on different participants in order to reduce behavior problems and improve peer interaction. Special support targeted different target group: teachers, peers, whole professional team or target children in the preschool setting.

Table 5: Special support orientation

Support orientation	SIN				
	I	II	III	IV	V
Teacher		X			X
Peer			X		
Team-based				X	
Target Children	X				
Duration of intervention	25 lessons, once/twice a week	9 months	4 months	4 months	4 months

Note. SIN = Study Identification Number. See Table 2 for author information

Four major groups of special support orientations were identified: Teacher oriented support, Peer oriented support, Team-based oriented support and Support oriented toward target children. All the teachers got a training prior implementation of the intervention (Studies I-V) (See Table 5). The studies included five different programs: The behavior training program for preschool children, Incredible Years teacher training program, Positive peer reporting, Team-based functional assessment training and Fostering Peer interaction teacher training program. See Table 6 below for more information. The interventions were implemented, trying to change behavior problems and promote peer interactions.

Table 6: Special support in preschool setting

Special support	SIN				
	I	II	III	IV	V
Name of support	The behavioural training for pre-school children	Incredible Years (IY) teacher training program - adapted version	Positive peer reporting (PPR)	Team-based functional assessment	Fostering Peer Interaction in Early Childhood Settings (Greenberg, 2005)
Type of special support	Universal prevention programme for children, intervention	Teacher training program	Peer-mediated intervention	Team-based training	In-Service teacher training program

Note. SIN = Study Identification Number. See Table 2 for author information

### 3.4.1 Teacher oriented support

The Study IV and V reported teacher oriented type of support, focusing on teacher's skill training and effectiveness of it.

The training program Incredible Years (IY) trained teacher's management skills in the classroom, such as positive attention, praise and tangible reinforcement, proactive prevention of behavior problems, coaching, limit settings and time out. Teachers received 5 sessions of training, 3 hours in length (Snyder et al., 2011). In Study V the teachers received in-service education program titled Fostering Peer Interaction in Early Childhood Settings (Greenberg, 2005). The teachers learned how to observe play and make suggestions that facilitate peer interactions such as manipulating the environment, redirecting conversations, suggesting roles for children, modeling interactions and then fading participation.

### 3.4.2 Peer oriented support

Peers have a key role in a peer-oriented intervention process. Through public acknowledgement of positive behaviors from peers, the peer-rejected child receive reinforcement to continue positive behaviors (Smith et al., 2009). In Study III the teachers received Positive Peer Reporting (PPR) intervention instructions on the procedures, then tried to implement the group reward system "Feed the honey bee" of Ervin et al. (1996). During daily structured PPR sessions, the students earned a token each time the student showed positive attitude towards the target child - "star student." Once the jar was completely full, the class was rewarded. The intervention tried to increase social acceptance for students experiencing rejection by their peers (Smith et al., 2009). This study was the only study with the focus on peer-rejected children.

### **3.4.3 Team-based oriented support**

The team-based oriented support was implemented in Study IV. It is the only study that includes other workers from the kindergarten in the intervention process. Professionals in the kindergarten received training on team-based functional assessment. It consists of two 8-hour workshops. The support was focused on conducting functional assessment and selecting and applying positive intervention strategies related to the function of behavior. During the training, the team members also get the knowledge about the strategies to do environmental arrangements and schedules within classrooms in order to prevent and remediate challenging behavior. After the training, these teams implemented intervention strategies. The team was composed of teachers, assistants, administrators, psychologists, social workers, and therapists. The special support was targeting teams of professionals to educate them how to implement non-punitive interventions for children (Chandler et al., 1999).

### **3.4.4 Support oriented toward target children**

Compared to the other studies, Study I was primarily oriented towards target children. The behavioral training for preschool children was focused on promoting emotional competencies, problem-solving skills, and social skills of the children. Educators used stories and hand puppets to introduce typical social problems. In addition, they used discussions, role play, and games in their intervention. Teachers participated in a four-day workshop on classroom and crisis management and were introduced to the social skills training (Koglin & Petermann, 2011).

### **3.4.5 Duration of interventions**

The durations of interventions were different for most of the studies. The behavioral training for preschool children (Study I) involved 25 lessons, 35 minutes long on average, once or twice a week. Intervention, after adapting the Incredible Years teacher training program in Study II, lasted for 9 months. Special support in Study III and V was implemented for 4 months. Professionals in the preschool setting of Study IV received training on team-based functional assessment. It consisted of two 8-hour workshops, but the implemented intervention lasted 4 months.

## 4 Discussion

The purpose of this systematic literature review was to identify, and critically analyze, special support in preschool which promote peer interaction of children with behavior problems. Five studies were found relevant. The focus was on children aged between two and six years. Furthermore, the interventions had to take place in preschool setting. The results of the 5 studies will be discussed in relation to the three research questions<sup>1</sup>: (1) What are the outcomes on behavior problems and peer interactions in the found studies, (2) What kind of behavior problems are observed in the found studies? and (3) What kind of special support has been found to promote peer interaction of preschool children with behavior problems?

### 4.1 Outcomes of the interventions

Aims of all five studies were to assess, evaluate or explore the effectiveness of the implemented support. All the studies, except Study III, reported the outcomes of the whole peer group, children with and without behavior problems. Study III only reported the outcome of the three particular peers. All the studies reported that their intervention was successful. But not all the studies included overall size effect (Study IV and V). Study III focused on peer acceptance, which is highly related to peer interactions. If the child displays behavior problems, peer interaction in preschool can be affected. It can eventually lead to rejection by the peer group (Buhs, Ladd, & Herald, 2006; Lillvist, 2010). Study I, II and IV looked at the outcome on children's social-emotional competences and positive social behavior, because children who are competent with peers at an early age, and those who show prosocial behavior, are particularly likely to be accepted by their peers (Hay, 2005).

Study I and II reported small effect size and Study III reported moderate effect size. Other studies did not report overall effect of the intervention. The effect size cannot be compared, and it doesn't depend on duration or country where the intervention was implemented.

### 4.2 Observed behavior problems

The term "behavior problems" is very broad. It involves externalizing and internalizing behavior problems. The chosen studies involved both types of behavior problems. Not surprisingly, all the studies involved aggression which is an overt behavior and can be observed in behaviors as hitting, name-calling, or disruption of group activities which is correlated with peer rejection (Coie, 1990). In contrast, internalizing behavior problems are subtle and are often unnoticed by others in child's social environment, particularly classrooms (Gresham & Kern, 2004). Only two studies (Study I and IV) involved internalizing problem behaviors, but none were measuring only this type of behavior. The description of what kind of tool the researchers used to observe behaviors in some studies were not clearly described. Some of the studies did not mention why did they observe exactly those behaviors.

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<sup>1</sup> Some discussion part might be related to the preschool teacher's situation in Slovenia.

Emotional or behavior problems cover a wide range of specific problems (Evans, Harden, Thomas & Benefield, 2003) such as, the child's behavior disturbing the own learning or peers learning, negative emotional responses such as unusual crying, withdrawal from social situations, or difficulties to establish and maintain interactions with peers or others in the microsystem (i.e. preschool).

What is considered to be a behavior problem and what is not, is important for teachers, parents and other professionals in education. For some culture one behavior could be labeled as disruptive/challenging, and for the others is considered as “normal”. It is possible that cultures view behavior problems differently (Chung, 2011), and so these studies focused on different kinds of behavior problems and might be the reason why they did not include different types of behaviors.

### **4.3 Discussion of interventions**

Attendance to kindergarten is an important step for a child, because it expands the child's physical, cognitive and social environment (Papalia, Wendkos Olds & Duskin Feldman, 2003). It is also important that people from the child's closest environment are the ones who should provide different types of interventions to improve the child's development and learning (Keen et. al, 2007). Interventions from all studies were implemented in the natural context, preschool classrooms. Microsystem is the immediate environment of the developing person, within which direct manipulation and face-to-face communication are possible. Microsystem includes interpersonal relation of the child in the center (Bronfenbrenner, 1994). One of the child's' microsysteams is preschool setting in which we can find peers, teachers and other workers. Different special supports in this systematic literature review targeted different groups of people in the interventions to decrease behavior problems and increase peer interactions of children with behavior problems (See table 5). The studies were focused on different target groups in order to influence behaviors and peer interactions. Four major groups of special support orientations were found: Teacher oriented support, Team-based oriented support, Peer oriented support and Support oriented toward target children.

Preschool teachers have a leading role in preschool. They are in charge of creating suitable physical environment, didactic strategies and accommodations of assessments and tasks (Gal, Schreur, & Engel Yeger, 2010). Thus, it is mostly important that teachers react appropriately on different types of behavior problems. They have to know what kind of interaction strategies they can use, how can they manipulate environment to improve social skills and reduce behavior problems, and provide appropriate support to improve peer interactions in the classroom (Snyder et al., 2011 & Girard et al., 2011). The teacher oriented interventions can influence the teacher skills, which in turn have an indirectly influence on the development of the target children displaying behavior problems.

Studies II and V were directed toward teachers' skills with the purpose to reduce behavior problems and to increase peer relationship with the implemented intervention.

Teachers report the issue to handle challenging student behavior in the classroom, which are the most stressful part of their professional lives (Lambert, McCarthy, O'Donnell, & Wang, 2009; Scott, Park, Sawain-Bradway, & Landers, 2007). Furthermore, teachers often request assistance related to behavior management (Coalition for Psychology in Schools and Education, 2006) due to the feeling of lack of skills to manage misbehavior effectively (Clunies-Ross, Little, & Kienhuis, 2008). Students who are at risk for Emotional and Behavioral Disabilities (EBD) are usually included in the general education classroom, where the ordinary teachers usually have little training to handle behavior problems and may be unfamiliar to interventions that improve children's social skills and reduce behavior problems (Allday et al., 2010).

Preschoolers express their mental health, distress and unresolved conflicts indirectly by their behaviors. Perhaps many behavioral characteristics and behavior problems by themselves may not have a significance negative impact on the child's development. However, negative behavior of the child may result in an inadequate response of adults towards the child's behavior (Šetor, 2013). In the found studies, all the teacher got some kind of training, but Teacher orientated support focused more on the teacher's skills. This intervention is good especially for professionals, who need more knowledge on how to address behavior problems. As a part of the professional development of Slovenian preschool teachers, in-service training has an important role (e.g. obligatory seminars, lectures, workshops). Teacher oriented programs could be implemented on the teacher's initiative, as teachers in Slovenia can, in some cases, choose in-service program which they want to attend.

Study IV involved the whole professional kindergarten team, which got training in functional assessment. Many professionals do not have adequate training in order to prevent and reduce challenging behaviors (Nelson et al., 1998). Thus, these interventions are usually ineffective due to the fail to address challenging behaviors or create applicable techniques and strategies in order to decrease behavior problems (Arndorfer et al., 1994). In Study IV, the team learned to assess the environmental conditions and develop individual interventions (changing environmental variables and providing support for appropriate behaviors) based on the results of their assessments of the environmental conditions. For instances, Collin (2009) defined interdisciplinary collaboration as the work of professionals grounded in their own separate disciplines coming together to work, which will represent a coordinated and coherent whole. Collaboration between disciplines has been described as being key to the effective delivery of services (McNair, 2005; Morphet et al., 2014).

Peer interactions have a great value for the learning process. Children learn to communicate and cooperate with each other, they learn about themselves and others (Neitzel, 2009). They can support each other to go through stressful events (e.g. entering school). Conflicts are unavoidable and develop children's skills in

problem solving (Furman, 1982; Hartup 1992; Hartup & Stevens, 1999; Newcomb & Bagwell, 1995; in Papalia, Wendkos Olds & Duskin Feldman, 2003). Peer oriented interactions in interventions may be more successful than teacher-child interactions due to children's unique positioning to understand misunderstandings, problem sources and cognitive needs of their peers (Neitzel, 2009). Study III revealed that peers had an important role in the intervention, because positive behaviors from peers reinforced positive behaviors of peer-rejected children. Many teachers forget how strong influence peers have on the children with behavior problems.

The intervention Study I, was oriented towards the target children. With the different preschool activities, teachers tried to promote children's social skills. In conceptualizing a universal child-based intervention, it is useful to conceive measures addressing both risks and protective factors, which have been identified in some studies to be significantly and causally related with the problem behavior to be prevented (Scheithauer & Petermann, 2010). Early problem behavior have been found to be related to different risk factors such as slow intelligence, gender (male), difficult temperament (e.g. negative affectivity, impulsivity), emotional skills (e.g. low empathy), low social-cognitive abilities and few social skills (Eisenberg et al. 2005; Snyder, Reid & Patterson 2003). Starting points for preventive measures could be those risk factors, which can be influenced (e.g. social skills) as opposed to fixed risk factors (e.g. gender) (Farrington & Welsh, 2007). For instance, it has been reported that boys tend to demonstrate a significantly higher propensity to manifest externalizing problems than girls (Prior, Smart, Sanson, & Oberklaid, 1993). According to Webster-Stratton & Taylor (2001), improvement of children's social skills such as social, emotional, and cognitive competencies, have been found to be effective for children at risk for emotional or behavioral disorders.

#### **4.4 Methodological issues and limitations**

Systematic literature review method is a complex method which consists several steps in order to find enough numbers of articles meeting the inclusion criteria. The database search is challenging, it is important to use different search words for different data bases in order to get relevant articles for the present study. By adding more search words, which could be missed, might result in bigger number of relevant articles. For the present study, searching was done in three relevant databases, because of the lack of time, which might explain the low numbers (n=5) of found articles. The found articles were in English language which might count as one of the limitations for the present study. studies in other languages might have contributed to more included articles. This literature review was conducted only by one person and did not have another researcher involved. Involving another researcher would ensure a maximum inclusion of the articles related to the aim of this review. The protocol was designed by author and the quality assessment tool was adapted for the purpose of this research, and could have been more objective if it was designed with a colleague. Because the studies focused on children with different symptoms of behavior problems it was difficult to compare and generalize the results. However, this systematic literature review can help teachers and other professionals in the field of education to see what kind of existing interventions there are for

children without diagnosis for specific behavior problems. It is clear that more research is needed as almost every teacher in their career meets a child with behavior problems.

#### **4.5 Future research and implications**

This systematic literature review search resulted in five articles in total which address how to improve peer interaction for students with behavior problems. In the searching process, many studies were focusing on children with diagnosis and their behavior problems, and much less addressing the children without diagnosis. However, many of those studies did not address peer relations. Only five articles met inclusion/exclusion criteria and there was even fewer articles using each of the identified support type, which doesn't give much options to teachers or other professionals. Those programs might not be available in all countries and in different languages, therefore it would be impossible to use them. Future research should conduct more interventions for each support type and that way give professionals wider possibility to choose the right special support. All the studies used different measures to identify behavior problems and used different tools to measure the outcomes. Therefore, it is important for the future research to use the same/similar measurement tools to identify behavior problems and to be able to compare the effectiveness of the implemented interventions. Additional, more research is needed according to internalize behavior problems, which often stay unrecognized among preschoolers.

#### **4.6 Conclusion**

Behavior problems are quite common in preschool. Without effective intervention, children with behavior problems are at risk for rejection by teachers, peers and academic failure. However, many children in preschool are not diagnosed, and appropriate support is lacking in natural contexts such as preschool. During the early childhood years, through interactions children learn to take the perspectives of others and develop prosocial skills. Researchers stress the importance of positive peer relationships in childhood. The absence of positive social interactions in childhood might be linked to negative consequences later in life.

The aim of this systematic literature review was to identify, and critically analyze, special support in preschool which promote peer interaction of children with behavior problems.

The researchers reported positive effects of their interventions, but using different tools and looking into different behaviors, it is impossible to report which study was the most effective. Results show that found studies focused on different behavior problems (aggression, asocial behaviors, inattention and internalizing behavior problems). All the studies addressed aggressive behavior, but only two included internalizing behavior problems. What is considered to be a behavior problem and what is not, depends on the culture. For some culture one behavior could be labeled as disruptive/challenging, and for the others is considered as "normal". It is clear that other types of behavior problems should be studied more often, especially internalizing behavior problems.



Four major groups of special support orientations were identified: Teacher oriented support, Team-based oriented support, Peer oriented support and Support oriented toward target children. Only five articles met inclusion/exclusion criteria and there was even fewer articles using each of the identified support type, which doesn't give much options to teachers or other professionals when choosing the right intervention. It is clear that more research is needed as almost every teacher in their career meets a child with behavior problems. Hence, future research should focus on one type of behavior problems, which gets addressed by different types of interventions to get an insight on which intervention seems to be the most successful one (taking into account the child's individuality).

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*Note. \* in the literature list indicates the found articles that were used in this systematic literature review.*

## Appendix

### APPENDIX A – Search words

The first search was conducted using ERIC and included free search terms and search terms found through Thesaurus. The following search terms were included: (SU.EXACT("Kindergarten") OR SU.EXACT("Early Childhood Education") OR SU.EXACT("Preschool Children") OR SU.EXACT("Preschool Education") OR "Head start") AND (SU.EXACT("Behavior Problems") OR "Behavior difficulties" OR "Challenging behavior" OR "Aggressive behavior" OR "Conduct behavior" OR "anti-social behavior" OR "antisocial behavior" OR misbehavior OR "Behaviour problems") AND (SU.EXACT("Methods") OR SU.EXACT("Educational Practices") OR SU.EXACT("Early Intervention") OR SU.EXACT("Intervention") OR SU.EXACT("Educational Strategies") OR program\* OR strateg\* OR activit\* OR approach OR practice OR support) AND (SU.EXACT("Peer Acceptance") OR SU.EXACT("Friendship") OR SU.EXACT("Peer Relationship") OR "peer interaction" OR "peer participation"). A total of 96 articles were found.

Second search was conducted using PsycINFO database and included free terms and terms found through Thesaurus. The following search terms were included: (SU.EXACT("Preschool Students") OR SU.EXACT("Preschool Education") OR SU.EXACT("kindergardens") OR "Early childhood education" OR "Preschool children" OR "Head start") AND (SU.EXACT("Behavior Problems") OR SU.EXACT("Antisocial Behavior") OR SU.EXACT("Aggressive Behavior") OR "Challenging behavior" OR "Conduct problems" OR "behaviour problems" OR "antisocial behavior") AND (SU.EXACT("Early Intervention") OR SU.EXACT("Intervention") OR SU.EXACT("Strategies") OR SU.EXACT("Teaching Methods") OR activit\* OR practice OR program\* OR approach OR support) AND (SU.EXACT("Friendship") OR SU.EXACT("Peer Relations") OR SU.EXACT("Peers") OR "peer interaction" OR "peer participation" OR "peer acceptance"). A total of 37 articles were found.

The third and the last database used was Web of Science, the search included following free terms in topics selection and the language: TOPIC: (Kindergarten OR "Early Childhood Education" OR "Preschool Children" OR "Preschool Education" OR "head start") AND TOPIC: ("behavior problems" OR "Challenging behavior" OR "conduct behavior" OR "anti-social behavior" OR misbehavior OR "Behavior difficulties" OR "Aggressive Behavior") AND TOPIC: ("Friendship" OR "Peer Relations" OR "Peers" OR "peer interaction" OR "peer participation" OR "peer acceptance") AND TOPIC: ("Early Intervention" OR "Intervention" OR "Strategies" OR "Teaching Methods" OR activit\* OR practice OR program\* OR approach OR support) AND LANGUAGE: (English). With those search terms, there was a result of total 89 articles.



## APPENDIX B – Data extraction protocol

General information	<ul style="list-style-type: none"> <li>- Title of the study</li> <li>- Authors</li> <li>- Journal and year of publication</li> <li>- Country where research took place</li> <li>- Aim</li> <li>- Research questions</li> <li>- Ethical considerations</li> </ul>
Population/participants	<ul style="list-style-type: none"> <li>- Number of participants</li> <li>- Age</li> <li>- Gender</li> <li>- Diagnosis/ no diagnosis</li> <li>- Symptoms of behavior problems</li> </ul>
Interventions	<ul style="list-style-type: none"> <li>- Name and support type</li> <li>- Setting in which the intervention is implemented</li> <li>- Involvement of parents / others</li> <li>- Control group</li> <li>- Main purpose of the support</li> <li>- Outcome on peer interactions and behavior problems</li> <li>- Other outcomes</li> <li>- Data collection</li> <li>- Duration of the intervention</li> <li>- Measurement of outcomes</li> </ul>
Summary	<ul style="list-style-type: none"> <li>- Conclusion of the article</li> <li>- Limitations</li> </ul>

## APPENDIX C – Quality assessment tool with results

SIN	1	2	3	4	5
High <b>(24 to 31 points)</b>	X	X			
Medium High <b>(16 to 23 points)</b>			X	X	X
Medium <b>(8 to 15 points)</b>					
Low <b>(0 to 7 points)</b>					
1. Peer reviewed	1	1	1	1	1
2. Aim and research questions	2	2	2	1	2
Method					
3. Information about the intervention	2	2	2	2	2
4. Study design	1	1	1	1	1
5. Control group	1	1	0	1	1
6. Follow-up study	0	1	1	1	0
7. Population	2	2	1	2	2
8. Randomized selection of participants	1	1	0	0	1
9. Sample size	1	2	0	2	1
10. Response and attrition rate	2	2	2	0	0
Measurement					
11. Main variables or concepts	2	1	1	2	2
12. Operationalization of concepts	2	2	1	2	1
Analysis					
13. Numeric tables	2	2	1	2	2
14. Missing data	0	2	2	0	0
15. Appropriateness of statistical techniques	2	2	1	2	2
16. Omitted variable bias	2	2	2	2	2
17. Analysis of main effect variables	2	2	0	2	2
<b>Total points</b>	<b>25</b>	<b>27</b>	<b>18</b>	<b>23</b>	<b>22</b>

<b>Assessment tool used for the rating of the articles quality</b>	
Publication and background	
1. Peer review. Was the article published in a peer-reviewed journal?	<p>[ 1 ] Yes</p> <p>[ 0 ] No</p>
2. Aim and research question(s). Where the aim and research question(s)/hypothesis stated in the study?	<p>[ 2 ] Both the aim and research question(s) are stated clearly.</p> <p>[ 1 ] The aim is stated clearly but there are no research question(s)/ hypothesis stated.</p> <p>[ 0 ] There is no aim or research question(s) stated.</p>
Method	
3. Information about the intervention. Did the article contain sufficient information about the intervention? If so, was that intervention stated clearly? Was it enough information to understand the intervention?	<p>[ 2 ] The information about the intervention was sufficient and clear.</p> <p>[ 1 ] The article contain some information about the intervention but was not sufficient enough.</p> <p>[ 0 ] The article did not include any information regarding the intervention.</p>
4. Study design. Was the study a randomized controlled trial (RCT)? Or was it a quasi-experimental design?	<p>[ 2 ] The study was a RCT.</p> <p>[ 1 ] The study was a quasi-experimental design.</p> <p>[ 0 ] No information was given about the design of the study.</p>
5. Control group. Did the study have a control group?	<p>[ 1 ] Yes</p> <p>[ 0 ] No</p>
6. Follow-up. Did the study do a follow-up after the post test to see if there had been any changes since the intervention took place?	<p>[ 1 ] Yes</p> <p>[ 0 ] No</p>
7. Population. Does the population that was eligible to be selected for the study include the entire population of interest? Or, is the eligible population a selective subgroup of the population of interest?	<p>[ 2 ] Eligible population includes entire population of interest or substantial portion of it.</p> <p>[ 1 ] Population represents a limited, atypical, or selective subgroup of the population of interest.</p> <p>[ 0 ] No description of the population</p>

<p>8. Randomized selection of participants. Were study participants randomly selected for the study? Or, did study participants volunteer (nonrandom)? Or, were they located through specific organizations (nonrandom) or through acquaintances of the researchers (nonrandom)?</p> <p>[ 2 ] Random selection.</p> <p>[ 1 ] Nonrandom selection.</p> <p>[ 0 ] No description of the sample selection process.</p> <p>9. Sample size. How many participants were selected for the study? Does the sample include enough participants from key subgroups to accurately assess subgroup differences? – compared to other studies.</p> <p>[ 2 ] Sample size larger than similar studies.</p> <p>[ 1 ] Sample size the same as similar studies.</p> <p>[ 0 ] Sample size smaller than similar studies or sample size not given</p> <p>10. Response and attrition rate. What proportion of the selected sample completed the study?</p> <p>[ 2 ] High response or participation rate [over 65% response rate, over 90% participated in follow-up studies).</p> <p>[ 1 ] Moderate to low response rate (response rates of less than 65%).</p> <p>[ 0 ] No information on response rate or participation rate.</p>
Measurement
<p>11. Main variables or concepts. Are each of the main variables or concepts of interest described fully? Can the main variables or concepts be matched to the variables in the tables?</p> <p>[ 2 ] Accurately described and can be matched.</p> <p>[ 1 ] Vague definition or cannot be matched.</p> <p>[ 0 ] No definition of main variables or concepts.</p> <p>12. Operationalization of concepts. Did the authors choose variables that make sense as good measures of the main concepts in the study? Have these variables been used in previous studies or are they an improvement over previous studies?</p> <p>[ 2 ] Key concepts are measured with variables that make sense. Or, variables have either been previously used in research or are improvements over previous measures.</p> <p>[ 1 ] Key concepts are measured with variables that do not make sense, and variables have not been used in previous research studies.</p> <p>[ 0 ] Variable operationalization is not discussed.</p>
Analysis
<p>13. Numeric tables. Are the means and standard deviations/standard errors for all the numeric variables presented?</p> <p>[ 2 ] Means and standard deviations/standard errors are presented.</p> <p>[ 1 ] Means, but no standard deviations/standard errors are presented.</p>

- [ 0 ] Neither means or standard deviations/standard errors are presented.
14. Missing data. Is the number of cases with missing data specified? Is the statistical procedure(s) for handling missing data described?
- [ 2 ] Number of cases with missing data are specified and the strategy for handling missing data is described.
- [ 1 ] Number of cases with missing data specified, but these cases are removed from the analysis.
- [ 0 ] Missing data issues are not discussed.
15. Appropriateness of statistical techniques. Does the study describe the statistical technique used? Does the study explain why the statistical technique was chosen? Does the study include caveats about the conclusions that are based on the statistical technique?
- [ 2 ] Statistical techniques, reasons for choosing technique and caveats are fully explained.
- [ 1 ] Statistical technique is explained, but reasons for choosing technique or the caveats are not included
- [ 0 ] Statistical technique, reasons for choosing and caveats are not explained.
16. Omitted variable bias. Could the results of the study be due to alternative explanations that are not addressed in the study?
- [ 2 ] All important explanations are included in the analysis.
- [ 1 ] Important explanations are omitted from the analysis.
- [ 0 ] Variables and concepts included in the analysis are not described in sufficient detail to determine whether key alternative explanations have been omitted.
17. Analysis of main effect variables. Are coefficients for the main effect variables in the statistical models presented? Are the standard errors of these coefficients presented? Are significance levels or the results of statistical tests presented?
- [ 2 ] Model coefficients and standard errors or hypothesis tests for the main effects variables are presented.
- [ 1 ] Either model coefficients or hypothesis tests for the main effects variables are presented.
- [ 0 ] Neither estimated coefficients or standard errors for the main effects variables are presented.

*Note.* Adapted from the Quantitative Research Assessment Tool (CCEERC, 2013)

## APPENDIX D - Behaviors researchers observed in the found studies

*Note. SIN = Study Identification Number*

SIN	Behavior problems
1	Lack of pro-social behavior (not considerate of other people's feelings, doesn't share readily with other children); emotional symptoms (rather solitary, tends to play alone); hyperactivity/inattention (restless, over-active, cannot stay still for long); conduct problems (often fights with other children or bullies them) and peer relationship problems (doesn't have one good friend).
2	Conduct problems: Negative social (Disrupt/aggressive behavior), disengagement, lack of positive social behaviors
3	Negative behaviors: kicking a peer, hitting a peer, throwing an object at another peer, destroying a peer's personal property, or calling a peer an inappropriate name such as a curse word or "stupid."
4	Challenging behaviors: poor attending, excess movement; wandering; elective mutism; noncompliance; tantrums; constant crying; swearing, barking; spitting; running from the classroom; shouting; disruption during group activities; isolation, no interaction with peers; poor, negative peer interaction; closing eyes; off task, refusal to sit, out of seat; destructive behavior directed to materials, continuous inappropriate initiations to adults; self-abuse (e.g. pinching, hitting, head butting, hand biting); self-stimulation (e.g. mouthing toys and hands, rocking, hair twirling); aggression (e.g. hitting, pushing, biting); bothering peers, inappropriate touching; refusal to participate, nonparticipation; hiding under teacher's desk.
5	Physically aggressive behaviors - hitting, kicking, shoving/pushing, grabbing, throwing, tripping, and pulling. Verbally aggressive behaviors - yelling, arguing, insulting, name calling, and teasing.