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**COMPONENTS OF SPEECH AND LANGUAGE  
THERAPY AIMING TO IMPROVE THE SOCIAL  
INTERACTION SKILLS OF CHILDREN WITH  
AUTISM SPECTRUM DISORDER**

Integrative literature review

Faculty of Social Sciences  
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## **ABSTRACT**

Anniina Ruuska: Components of speech and language therapy aiming to improve the social interaction skills of children with autism spectrum disorder – Integrative literature review

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Autism spectrum disorder is a neurobiological syndrome that affects social interaction and communication. The presentation of the disorder differs between individuals and the characteristics are different depending on the age, language and cognitive abilities. Difficulties with social interaction affect daily life because interacting with other people is a central part of life.

The aim of this thesis was to describe and discuss the components of speech and language therapy aiming to improve the social interaction skills of children with autism spectrum disorder. The thesis was conducted as an integrative literature review. Peer-reviewed articles were searched and according to the inclusion and exclusion criteria, eight articles were included in this thesis. Content analysis was used for the analysis. Similarities and differences were found between the articles, and these were categorized and reduced for further categorization.

The main themes that emerged from the material were utilizing augmentative and alternative communication methods, peer-mediated approaches, participation of caregivers and collaboration with other professionals. The rehabilitation of social interaction skills happens in collaboration with many different people, and it should be integrated into the natural environments of the child. In the material parents, peers, speech and language pathologists, occupational therapists, special education teachers, early childhood teachers and other daycare staff participated in the interventions. Most of the interventions were conducted either at the children's homes, daycare or school. The use of augmentative and alternative communication methods is common and useful for many children with autism spectrum disorder.

Keywords: autism spectrum disorder, social interaction skills, speech and language therapy

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# TIIVISTELMÄ

Anniina Ruuska: Autismikirjolla olevien lasten vuorovaikutustaitojen puheterapeuttisen kuntoutuksen osa-alueita – Integroiva kirjallisuuskatsaus

Kandidaatintutkielma

Tampereen yliopisto

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Autismikirjon häiriö on neurobiologinen häiriö, joka vaikuttaa vuorovaikutukseen ja kommunikointiin. Häiriö ilmenee eri tavoilla yksilöiden välillä ja autismikirjoon liittyvät ominaisuudet riippuvat iästä, kielellisestä kehityksestä ja kognitiivisista kyvyistä. Vaikeudet vuorovaikutuksessa vaikuttavat jokapäiväiseen elämään, koska vuorovaikuttaminen muiden ihmisten kanssa on keskeinen osa elämää.

Tämän kandidaatintutkielman tavoite oli kuvata autismikirjolla olevien lasten vuorovaikutustaitojen puheterapeuttisen kuntoutuksen osa-alueita. Tutkielma toteutettiin integroivana kirjallisuuskatsauksena. Kirjallisuushaussa etsittiin vertaisarvioituja artikkeleita, ja sisäänotto- ja poissulkukriteerien mukaisesti kahdeksan artikkelia sisällytettiin tutkielmaan. Sisällönanalyysiä hyödynnettiin aineiston analysoinnissa. Artikkeleiden väliltä etsittiin samankaltaisuuksia ja erilaisuuksia, ja ne luokiteltiin. Luokitellut osiot pelkistettiin ja luokiteltiin pienempiin ryhmiin.

Aineistosta nousseet teemat olivat puhetta tukevien ja korvaavien kommunikaatiokeinojen käyttö, ikätoverivälitteiset menetelmät, vanhempien osallisuus ja yhteistyö muiden alojen ammattilaisten kanssa. Vuorovaikutustaitojen kuntoutus tapahtuu yhteistyössä monien eri ihmisten kanssa, ja kuntoutus pitäisi integroida lapsen luonnollisiin ympäristöihin. Aineistossa kuntoutukseen osallistuivat vanhemmat, ikätoverit, puheterapeutit, toimintaterapeutit, erityisopettajat, varhaiskasvatuksen opettajat ja muu päiväkodin henkilökunta. Suurin osa interventioista toteutettiin lasten kodeissa, päiväkodeissa tai koulussa. Puhetta tukevien ja korvaavien kommunikaatiokeinojen käyttö on yleistä ja hyödyllistä monelle autismikirjolla olevalle lapselle.

Avainsanat: autismikirjon häiriö, vuorovaikutustaidot, puheterapia

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# 1 INTRODUCTION

Autism spectrum disorder (ASD) is a neurobiological syndrome that has a great impact on social interaction and communication (Moilanen et al., 2012; Moilanen & Rintahaka, 2025). The characteristics and presentation of ASD differ between individuals (Hyman et al., 2020; Moilanen et al., 2012). Social interaction skills, for example joint attention, eye contact and interactional smiling are skills that are usually difficult to learn for children with ASD (Moilanen & Rintahaka, 2025). Communication situations and forming meaningful relationships can also be difficult (Boucher, 2017; Moilanen & Rintahaka, 2025). Social interaction and social language are usually difficult for people with ASD to understand and produce, because they struggle with understanding other people's feelings and intentions. (Boucher, 2017; Sumia et al., 2016).

Rehabilitation of the social interaction skills of children with ASD is often a long process, and collaboration is needed (Moilanen & Rintahaka, 2025; Vanhala, 2014). In addition to speech-language pathologists (SLPs), occupational therapists, special education teachers, daycare staff, school personnel and parents have a role in the rehabilitation process. The view of rehabilitating social interaction skills has started to shift, and more often it is integrated into the children's daily life which increases the possibility of the generalization of skills (Hyman et al., 2020; Launonen, 2023; Moilanen & Rintahaka, 2025). Peers and augmentative and alternative communication (AAC) are also possible components of the rehabilitation (Odom & Strain, 1984; Vanhala, 2014).

Research has been done on different intervention methods aiming to improve the social interaction skills, and the effectivity of different interventions is already well known (see for example Bauminger, 2002; Hirvikoski et al., 2015; Watkins et al., 2015). However, there is not much research done on the extent and different components that form speech and language therapy aiming to improve the social interaction skills. This thesis aims to discuss and describe these different components by the means of integrative literature review. The topic is important, because social interaction is an essential part of life and a significant area of impairment in ASD (Launonen, 2023; Loukusa et al., 2011; Moilanen & Rintahaka, 2025).

## 2 THEORETICAL BACKGROUND

### 2.1 Autism spectrum disorder

ASD is a neurobiological syndrome, and the presentation differs greatly between individuals (Moilanen et al., 2012). According to different research done, 1–1,2 % of the population has ASD; therefore, in Finland there would be 55 000-65 000 individuals with ASD (Autismiliitto, 2025). ASD is a complex condition and the causes behind it are not fully understood, however, genetics may have a role in its development (Bourcher, 2017; Hyman et al., 2020). ASD is heritable and the possibility for a sibling of a child with diagnosis of ASD is much higher when compared to children with siblings who do not have ASD (Hyman et al., 2020; Moilanen & Rintahaka, 2025). It is common for an individual to have psychiatric, neuropsychiatric, neurological and somatic comorbidities with ASD, and recognizing them is essential when planning rehabilitation (Moilanen & Rintahaka, 2025). Some common comorbidities are anxiety disorders, attention deficit hyperactivity disorder, depression, disturbances in processing data coming from senses, intellectual disability, learning difficulties, eating disorders and sleep disorders.

The International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10) is a coding system for diseases and medical conditions that is used to diagnose patients and record morbidity and mortality data (Harrington, 2014). In ICD-10, ASD is divided into subgroups of which the most common ones are childhood autism, atypical autism and Asperger syndrome (ICD-10, 2019; Moilanen & Rintahaka, 2025). In ICD-10 the main symptoms form a triad: 1) deficits in social interaction, 2) deficits in communication, and 3) stereotypical, restrictive and repetitive behaviors (Moilanen & Rintahaka, 2025). Diagnosing ASD will change in Finland with the ICD-11 classification of diseases, in which there will not be subgroups; instead, the classification will use the term “autism spectrum disorder” to refer to all the subgroups (ICD-11, 2025; Moilanen & Rintahaka, 2025). American Psychiatric Association has developed their own classification for mental health disorders and the newest edition of Diagnostic and statistical manual of mental disorders (DSM-5) was published in 2013 (Marttunen & Luoma, 2025). The DSM-5 has been developed in collaboration with the new version of ICD classification, ICD-11, and for the most part, the ICD-11 will follow the DSM-5 classification (Hyman et al., 2020; Moilanen & Rintahaka, 2025). In DSM-5 there are two main symptom groups: difficulties in social communication and social interaction, and restricted and repetitive behaviors (Boucher, 2017). These symptoms must be present already in early childhood

and impair functioning in everyday life for ASD diagnosis to be made. However, the symptoms may not manifest until later in life when social demands become greater than social capacities.

The characteristics of ASD differ between individuals depending on age, language and cognitive abilities (Hyman et al., 2020). Some of the first signs that can be detected when a child is under two years old are deficits in social interaction or communication, for example lack of joint attention, eye contact and interactional smiling (Moilanen & Rintahaka, 2025). Playing with toys may also be atypical and language and cognition may not develop normally. It is also common for children with ASD to not react to their name. Very strong interests like different hobbies are a common characteristic, and they are often deviant either by the target or intensity (Loukusa, 2011; Moilanen & Rintahaka, 2025). Repetitive sensory-motor stereotypies are also common, and these usually change over time; for example, hand flapping is common when children are young, however it is not nearly as common among adults (Boucher, 2017; Moilanen & Rintahaka, 2025). Problems with executive functioning are common among people with autism, and can present as difficulty starting, ending, planning and structuring activities (Sumia et al., 2016).

## **2.2 Social interaction**

Social interaction is something that happens all the time when at least two persons are interacting with each other and influence each other (Eickers, 2024; Loukusa et al., 2011). Interaction could also be understood in the concept of interacting with the environment (Launonen, 2023). Social interaction is not always conscious; for example, newborns are interacting with the environment and people around them even though they are not yet doing it consciously (Launonen, 2023; Loukusa et al. 2011). A part of social interaction is communication which can be either verbal or nonverbal. Language is not the only way of interacting, and people who are unable to talk, can still interact nonverbally and by using AAC methods (Launonen, 2023). Communication is a way of sharing thoughts, information, needs and feelings to other people, and to receive these things.

Typically developing children usually acquire social interaction skills naturally, and this development is closely related to the development of language and sensory systems (Haataja, 2014; Launonen, 2023). Interacting with a baby is important, because these experiences form a base for later development of social interaction, communication and language (Launonen, 2023; Loukusa et al., 2011). An important part of social interaction that children usually learn before they learn language,

is taking turns in the interaction situation (Loukusa et al., 2011). Children will also learn quite early to make initiations by making sounds. Another important aspect of social interaction skills is the development of joint attention (Launonen, 2023). This means that children start to acknowledge that they can share things with other people. Other gestures mentioned in Launonen (2023) that are important in the development of social interaction skills are seeking, showing, giving and pointing. These skills spread to language as well when it develops. According to Launonen (2023), playing with adults and especially with peers is an important way to develop better language and interaction skills. This is important, because social interaction skills need to develop for children to interact with their peers through play, and interacting with peers is a central aspect of children's life.

### **2.3 Social interaction skills and ASD**

A central part of ASD are deficits in social interaction skills and using and understanding language appropriately (Loukusa, 2011). People with ASD have difficulty in being reciprocal socially and emotionally; there may be deficits in how they approach others or initiate and respond to interactions (Boucher, 2017). There are also deficits in nonverbal communication, and in the skills needed to form relationships. People with ASD may have difficulties forming meaningful relationships with peers, and they lack socioemotional reciprocity (Moilanen & Rintahaka, 2025). Children with ASD may not answer when they are addressed, even when using their name (Haataja, 2014). Deficits in social interaction skills are often the first signs of ASD in young children; parents usually first notice the lack of eye contact, difficulty with imitation and difficulty with joint attention (Loukusa, 2011). Understanding contextual cues in different social situations is often impaired which leads to feelings of failure, especially with peers. However, there are differences between children as to how much ASD affects their social interaction skills: in general, children with language impairment have more difficulties socially than do children with no language impairment (Hyman et al., 2020).

For some children the impairment may be in language, whether it be spoken, written, sign language or some other way of using language, (Boucher, 2017). For some the impairment could show up in nonverbal communication including expressions, gestures, body orientation, movement and different types of vocalizations. The prosody of speech could also be impaired which affects understanding meanings in speech. Some children with ASD do not develop speech at all, and for some the difficulty is understanding and using language in interactional situations (Moilanen & Rintahaka, 2025). People with ASD also have difficulty with theory of mind; according to it, people with ASD have difficulty

understanding other people's intentions and feelings (Boycher, 2017; Sumia et al., 2016). This may present itself with difficulty of understanding social interaction and social language.

## **2.4 Rehabilitating social interaction skills**

The view of rehabilitating the social interaction skills of people with ASD has started to change: before the focus was on the problems and now the aim is to support their own ways of being interactive (Launonen, 2023). Even though people with ASD may not be able to have social interactions in the conventional way, having them is still possible when the conversational partner changes their interaction style. ASD cannot be cured but since it is a developmental disorder, it is possible to minimize the deficits it causes to individuals with rehabilitation (Launonen, 2023). Rehabilitation is often a long process, and it is planned individually according to the child's needs (Moilanen & Rintahaka, 2025; Vanhala, 2014). Rehabilitation happens in collaboration with parents, daycare, school and different therapists, and it can happen individually or in a group setting. Therapies are usually implemented by SLPs and occupational therapists. Integrating interventions into the child's natural environments forms the most efficient learning environments and by doing that it is possible to tackle the difficulties in the daily life and promote the generalization of skills (Hyman et al., 2020; Launonen, 2023; Moilanen & Rintahaka, 2025). Because of the developmental aspect, it is essential to start the interventions as early as possible and involve the parents (Launonen, 2023; Moilanen & Rintahaka, 2025). Rehabilitating social interaction skills as early as possible is especially important because those skills have a tremendous effect on the prognosis and quality of life (Moilanen & Rintahaka, 2025).

Peer-mediated approaches are used in interventions aiming to train social skills with children (Odom & Strain, 1984). In these interventions peers are a part of the intervention by modeling and reinforcing behaviors and by implementing the whole or part of the intervention (Chan et al., 2009; Odom & Strain, 1984). According to Odom & Strain (1984), peer-mediated approaches can be divided into three subgroups: proximity interventions, prompting and reinforcing, and peer-initiation interventions. With proximity interventions, typically developing peer play with the target child and the aim is for the target child to learn social skills in a natural setting from the peer. Peer-mediated intervention can also include training peers to prompt and reinforce the target children to interact with them. The third type of peer-mediated approaches is instructing the peers to make initiations to social interaction to the target children.

The peers are usually chosen by teachers, and the selection criteria includes regular attendance at school, good social, language and play skills, appropriate interaction with peers, no trouble following directions, good concentration and willingness to participate and interact with the participants (Odom & Strain, 1984; Sperry et al., 2010; Watkins et al., 2015). A part of peer-mediated approaches is peer training which usually involves teaching peers social interaction strategies that they can use with the children, who are receiving the intervention (Goldstein et al., 2007). Strategies can be introduced one at a time and the peers will practice them with an adult (Sperry et al., 2010).

Many children with ASD benefit from the use of pictures for structure (Vanhala, 2014). For some children it is useful to include AAC methods. These can include communication boards, picture boards, and different softwares (Vanhala, 2014). For children who do not develop functional speech, AAC methods are necessary means to enable interaction (Moilanen & Rintahaka, 2025; Muharib et al., 2024). Electronic tablets can be used as speech-generating devices (SGDs) which makes communicating easy since tablets are easy to carry around and customize over time (Lorah et al., 2024; Muharib et al., 2024). SGDs can promote the use of different social interaction skills, like expressing opinions, requesting and answering questions (Schlosser, 2003).

### **3 AIM OF THE THESIS AND RESEARCH QUESTION**

The aim of this thesis is to study the components in speech and language therapy aiming to improve the social interaction skills of children with ASD. Social interaction skills are a main area of impairment in ASD, therefore making it a necessary part of intervention (Loukusa, 2011). Social interaction is an essential part of life and poor social interaction skills affect the quality of life (Launonen, 2023; Moilanen & Rintahaka, 2025). Rehabilitation of social interaction has not been studied much; therefore, this thesis aims to discuss and describe the components of speech and language therapy aiming to improve social interaction (Launonen, 2023).

The research question in this study is

1. What components are in speech therapy aiming to improve the social interaction skills of children with ASD?

## 4 RESEARCH METHODS

### 4.1 Literature review as a method

Literature review is a method of research that studies other research by recognizing, evaluating, interpreting and combining already existing knowledge (Vilkka, 2023). It is a mixed method combining qualitative and quantitative research methods and the aim is to get new results out of already conducted research (Salminen, 2011). According to Salminen (2011), literature review can be divided into three categories: descriptive literature review, systematic literature review and meta-analysis. Descriptive literature review does not have strict and precise rules that need to be followed, and it allows a wide description of the phenomenon under study.

According to Kangasniemi et al. (2013), the process of making a descriptive literature review can be divided into four phases: forming the research question, selecting the material, building up the description and examining the produced results. It is also characteristic for the method that the phases progress partly overlapping with each other. The research question guides the whole process, and the aim is to form exclusive but broad enough question (Kangasniemi et al., 2013). The research question guides the selection of the material, and the selection is done either implicitly or explicitly. The difference between these two is that when selecting the material implicitly, there is no reporting of the used databases or intake and reviewing criteria (Kangasniemi et al., 2013). On the other hand, selecting the material explicitly, the phases of the selection process are reported precisely. This study was conducted explicitly, and all the phases are clearly portrayed. In the description building and results examination phases, the research question is answered, material is combined, compared and synthesized and central results are gathered (Kangasniemi et al., 2013). The result examination phase is the last phase, and it includes discussion about the study and the methods used to conduct the study, and evaluating the ethics, reliability and validity of the study (Kangasniemi et al., 2013).

Descriptive literature review can still be divided into narrative and integrative literature review (Salminen, 2011). Integrative literature review is a good option when the aim is to describe the studied phenomenon as widely as possible (Salminen, 2011). It is a good way to produce new information of a topic that has already been studied. This study was conducted as an integrative literature review because there is a lot of research done on the topic and the aim was to gather the already studied information in one place.

## 4.2 Implementation of the literature review

In this thesis eight articles were used as data. The databases were chosen from the Tampere University library list of central databases for logopedics and other usually used databases for theses. The databases used were EBSCOhost (Academic Search Ultimate, CINAHL Ultimate, Communication & Mass Media Complete, Medline, MLA International Bibliography with Full Text), ProQuest Central, PubMed and Scopus. Database search criteria were peer-reviewed publications, publication language had to be English, and articles had to be published on 2015-2025. On PubMed and Scopus, it was not possible to filter based on peer-reviewing, so it was done afterwards if a non-peer-reviewed article was included in the full-text screening.

The search statement used was:

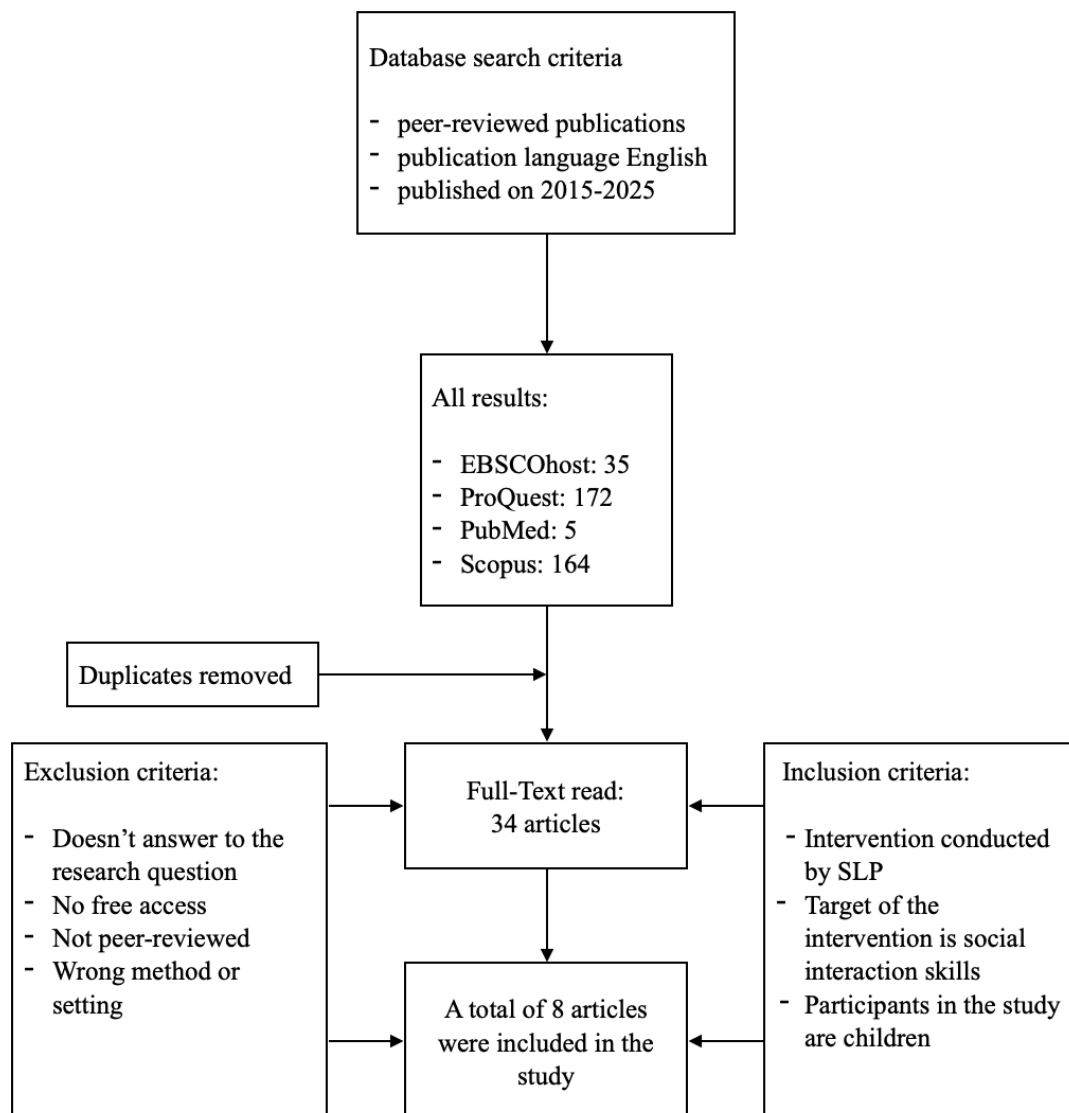
(autism OR asd OR “autism spectrum disorder” OR Aspergers) AND (“speech therapy” OR “speech language therapy” OR “speech pathology” OR “speech language pathology”) AND (“social interaction skills” OR “people skills” OR “interactional skills”) AND (intervention OR therapy OR rehabilitation OR treatment)

The terminology regarding ASD is currently changing with the change from ICD-10 to ICD-11, and with that change different subgroups will all be combined under the term autism spectrum disorders (ICD-11, 2025; Moilanen & Rintahaka, 2025). Since the change in terminology is still in process, Asperger’s syndrome was included in the search statement. Asperger’s syndrome is one of the most common subgroups in addition to childhood autism and since it is commonly used in research articles, it was included to minimize the possibility of missing appropriate articles. The term “social interaction skills” also has multiple synonyms and in this thesis the terms “social interaction skills”, “people skills”, and “interactional skills” were used. These terms were chosen based on the terms used in articles that were read before conducting the final search, and on the terms the dictionary gave when translating the term from Finnish to English. Copilot was also utilized in this phase to get other possible synonyms for the terms. Test searches were also made with different wordings. As a conclusion of all these methods for finding the best words, these three were chosen. The search results were imported to Covidence. Covidence is a platform that helps with the production of literature reviews (Veritas Health Innovation, Melbourne, Australia). Covidence automatically removed all duplicates. First, titles and abstracts were screened. Based on the titles and abstracts, 34 articles were chosen for full-text screening. Based on the exclusion and inclusion criteria, seven articles were

chosen for the thesis. The search process was conducted by going through the reference lists of the chosen articles to minimize the possibility of missing essential articles. From the reference lists one article was included in the study. Therefore, the final data consists of eight articles. The final searches were completed in January 2025. The inclusion and exclusion criteria are introduced in figure 1.

**Figure 1.**

The search process for the literature review



### 4.3 Analyzing the material

Content analysis is one of the main analysis methods (Tuomi & Sarajärvi, 2018). It can be used whether the research is studying quantitative or qualitative data (Vilkka, 2023). Content analysis

allows the phenomenon to be depicted in a summarized and generalized form (Tuomi & Sarajärvi, 2018). Important points from the material are selected and categorized into groups (Kangasniemi et al., 2013). In this thesis, the first part of the analysis was to gather main points from each article and put them into a table (appendix 2). In the table, the number of participants, age of participants, used intervention method, targeted skills and a verbal description of the implementation of the intervention is presented.

One method of content analysis is reduction and grouping into categories and subcategories (Tuomi & Sarajärvi, 2018). Reduction means acknowledging the parts in the text answering to the research question and then reducing them to smaller units. Reduction and grouping were utilized in this thesis. Each article was carefully read and parts answering the research question were highlighted. Similarities and differences between the articles were found and based on them, categories answering the research question were formed. Extracts that fit into these categories were gathered and put into tables. Inside these categories reduction was done, and extracts were categorized into subcategories. An example of this process is represented in figure 3. Based on these categorizations and reductions, a synthesis was made and results reported. From the material, four themes emerged: utilizing AAC-methods, peer-mediated approaches, parental involvement and collaboration with other professionals.

**Figure 2.**

## Description of the articles

Researchers	Participants	Age of participants	Intervention method	Implementation of the intervention	Targeted skills
Edgar et al. (2024)	4 minimally speaking children with ASD	6–9 years	An augmentative and alternative communication (AAC) intervention package consisting of systematic instruction and aided modeling	3 20–25 min sessions per week for approximately 3 months	Initiating a request Answering questions Commenting
Mohammadzaheri et al. (2021)	20 children with ASD and their caregivers	6–12 years	Pivotal Response Treatment (PRT)	3 one-hour sessions per week for 2 months	Question-asking Attention - / assistance-seeking strategies
Roberts et al. (2022)	120 children with ASD and their caregivers	24–36 months	A hybrid intervention combining Enhanced Milieu Teaching (EMT) and Joint Attention, Symbolic Play, Engagement, and Regulation (JASPER)	2 one-hour sessions per week for 6 months	Caregivers' strategy use Child language outcomes
Katz & Girolametto (2015)	3 children with ASD	4;1–5;1 years	A peer-mediated intervention on responses and initiations	3 20-minute sessions per week for 4 weeks	Responses Initiations
Nowell et al. (2019)	17 children with ASD and their caregivers	6–7 years	A blended intervention combining components of Structured TEACCHing and Social Thinking	10 90-minute sessions and in addition sessions for caregivers only	Social communication Self-regulation
Kuschke et al. (2016)	3 children with ASD	6;7–8;4 years	Using prosodically varied speech within a traditional language therapy framework	2 sessions per week for 3 weeks	Listening skills Pragmatic skills Social interaction behavior
Thiemann-Bourque et al. (2016)	4 children with ASD	3;0–5;1 years	A social intervention combining peer-mediated approaches and the Picture Exchange Communication System (PECS)	Approximately 2 10–15 min sessions per week for 16 weeks	Increasing functional communication
Hampton et al. (2020)	68 children with ASD and their caregivers	3–5 years	Multi-component communication intervention combining caregiver training, Discrete Trial Teaching, Joint Attention, Symbolic Play, Engagement, and Regulation (JASPER), Enhanced Milieu Teaching (EMT) and speech-generating device (SGD)	3 45–60 min sessions per week within 4 months, a total of 36 sessions	Social communication

### Figure 3.

An example of the categorization and reduction with the main category being collaboration with other professionals. The expressions are from the study by Thiemann-Bourque et al. (2016).

Expression from the article	Main category	Subcategory
“The daycare staff collaborated with the center staff to have the peers attend 4 days per week for 3 hours each afternoon”	Collaboration with other professionals	Collaboration
“Along with the SLP, two center staff participated in all peer training sessions: one SLP and one special education teacher”	Collaboration with other professionals	The implementer of the intervention
“Following peer-training, child-peer activities were set up and they were guided by the SLP, special education teacher and an occupational therapist”	Collaboration with other professionals	The implementer of the intervention

#### 4.4 Ethicality of the thesis

Research integrity has been followed in the process of writing this thesis (Finnish National Board on Research Integrity, 2023). The study has been conducted with accuracy, thoroughness and transparency in every phase. The work done by other researchers has been respected by citing their publications accordingly and carefully.

## 5 RESULTS

In this study the aim was to examine different components in speech and language therapy aimed at improving the social interaction skills of children with ASD. The material in this literature review consists of eight peer-reviewed articles. The articles are listed in appendix 1. A total of 239 children with ASD and 225 of their caregivers participated in the studies. The number of participants, used intervention methods, targeted skills, and a verbal description of the implementation of the interventions were presented earlier in figure 1.

### 5.1 Utilizing AAC

Different types of AAC methods were used in six of the studies, including SGDs, picture communication boards, visualization and PECS books (Edgar et al., 2024; Hampton et al., 2020; Katz & Girolametto, 2015; Kuschke et al., 2016; Nowell et al., 2019; Thiemann-Bourque et al., 2016). All the AAC methods utilize pictures in some form, whether it is a SGD or a book with pictures in it. In the studies by Edgar et al. (2024) and Hampton et al. (2020), SGD was used by the children with ASD, their caregivers, peers and the interventionists. In these studies, the device used was an iPad that had the Proloquo2Go app. The participating children in both studies had minimal functional speech and the SGD was used to enable communication. In the study by Edgar et al. (2024), the app was used only during the intervention sessions by the children with ASD and the SLP and peers, and in the study by Hampton et al. (2020), the iPad was used by the children with ASD and their caregivers in their everyday lives. The aim in the study by Hampton et al. (2020) was to increase social communication, and the caregivers were encouraged to include the SGD in all daily activities and model language use with it. In the study by Edgar et al. (2024), the aim was to promote initiating, answering and commenting by having the SGD with the child during sessions and prompting the child with ASD and the peers to use it for interaction.

In the studies by Katz & Girolametto (2015) and Thiemann-Bourque et al. (2016), picture communication boards and PECS books were used as part of the intervention. In the study by Katz & Girolametto (2015), two picture communication boards were used in the intervention sessions. One of the boards depicted strategies to use to initiate interactions, and the other depicted strategies to use to extend and maintain those interactions. The communication boards were placed in the play area

during the intervention sessions and the child with ASD and the peer were prompted to use the strategies depicted in the boards to encourage social interaction in the form of initiating and responding. The purpose of the communication boards was to remind the children of the skills learned and make it easier to have interactions. In the study by Thiemann-Bourque et al. (2016), each child with ASD had a PECS book that had individualized symbols in addition to the standard core symbols. During the intervention sessions at least three pictures were placed on top of the book, of which one or two were objects used in the activity and the rest social phrases. The PECS book was placed in between the child with ASD and their peer during the intervention sessions, and in case of no interaction in 30 seconds, the children were prompted to use the pictures to interact. The aim in the study by Thiemann-Bourque et al. (2016) was to increase functional communication of the children with ASD. PECS books allowed the children to communicate with peers using the pictures and teaching peers how to use the PECS book enabled them to understand the communication. In the study by Thiemann-Bourque et al. (2016), the PECS book was used by the children with ASD in their everyday lives and in the study by Katz & Girolametto (2015), the communication boards were utilized only during the intervention. In addition to these, pause cards, visual countdowns, checklists, schedules and visual timelines were used in the studies by Nowell et al. (2019) and Kuschke et al. (2016). All of these were meant to visualize an activity ending, transition approaching, and what was going to happen in the future. These were not an essential part of the intervention but helped with carrying out the intervention sessions.

## **5.2 Peer-mediated approaches**

A total of 21 typically developing peers were included in the three studies utilizing peer-mediated approaches (Edgar et al., 2024; Katz & Girolametto, 2015; Thiemann-Bourque et al., 2016). The studies by Katz & Girolametto (2015) and Thiemann-Bourque (2016) were implemented in the preschools that the children with ASD attended. In the study by Edgar et al. (2024), the intervention was implemented in a public elementary school in the child's classroom. The age of the peers in the studies was 3;4-9;5 (years; months). The inclusion criteria for the peers in all the studies were age-appropriate social skills. In the study by Edgar et al. (2024), the peers needed to have consistent school-attendance, ability to follow directions in a small group and the peers had to be willing to participate in the study. In the study by Katz & Girolametto (2015), the peers had to have typical language development and been interest in taking contact with the child with ASD. In two of the studies the peers attended the same school or daycare center with the children with ASD (Edgar et

al., 2024; Katz & Girolametto, 2015). In the study by Thiemann-Bourque et al. (2016), the peers were from a neighborhood daycare center. These peers attended the center, where the children with ASD attended, four days a week for three hours every afternoon. They took part in the center's activities as would the children attending that preschool and participated in all the activities in the classroom.

In all the studies that implemented peer-mediated approaches, there was some type of peer training (Edgar et al., 2024; Katz & Girolametto, 2015; Thiemann-Bourque et al., 2016). The peer training sessions varied within the contents and implementation. Duration of peer training was 3-5 days total and sessions lasted from 30 minutes to 45 minutes. In the studies by Katz & Girolametto (2015) and Thiemann-Bourque et al. (2016), the peer training was conducted in groups. In Thiemann-Bourque et al. (2016) the peers were taught responsive social skills by utilizing, for example, pictures, role play and adult feedback. They also learned how to use the PECS and communicate with pictures to enable the interactions with the children with ASD. In Katz & Girolametto (2015) both the peers and children with ASD participated in the social skills training sessions. These sessions included reading a storybook about getting new friends and re-enacting the story with puppets. They were also introduced to strategies for initiating and responding with communication boards. In the study by Edgar et al. (2024), the peer training was implemented for each peer separately. The peers learned how to use the Proloquo2Go app that was used in the intervention. In all three studies the peers were instructed to initiate interaction with the children with ASD during their interaction sessions (Edgar et al., 2024; Katz & Girolametto, 2015; Thiemann-Bourque et al., 2016).

In two of the studies the peers acted as interventionists meaning that they took part in the intervention (Katz & Girolametto, 2015; Thiemann-Bourque et al., 2016). In Katz & Girolametto (2015), the peers participated in the intervention sessions which consisted of 12 play sessions. The children played with blocks and play dough during the sessions. During the play sessions, communication boards depicting strategies for social interaction were placed on the table, and the early childhood educators supervising the sessions instructed the children to use them when there was no joint interaction. The aim was for the peer and the child with ASD to play together and interact with each other. The peers were instructed to promote initiations and responses from the children with ASD with the help of the communication boards. In the study by Thiemann-Bourque et al. (2016), the intervention sessions happened across the preschool's routines, and included for example painting, coloring, puzzles and playing with toys. The peer was paired with a child with ASD, and the PECS binder was placed within reach. The adult supervising the session instructed the peer to prompt the child with ASD to request something using a picture that was on the PECS binder. The prompts were provided in an order where

the task for the child with ASD got easier with each prompt. The aim was to get the child with ASD to initiate a request from the peer, and at the same time generalize the skills to the preschool daily life and increase the functional communication between the children with ASD and peers.

In the study by Edgar et al. (2024), the peers were not interventionists, but they took part in the generalization phase. In this phase the aim was to generalize the skills, initiating a request for a turn, answering questions and commenting, the children with ASD learned during the intervention sessions with a SLP to interactions with peers. In the study by Edgar et al. (2024), the peers played a game or some activity with a child with ASD and interacted with them with the help of the Proloquo2Go app. The peers acted the same way the SLP did in the intervention sessions and the aim was for the child with ASD to use the learned skills with the peer rather than the SLP.

### **5.3 Participation of caregivers**

Four of the studies had parents participating in the intervention as interventionists (Hampton et al., 2020; Mohammadzaheri et al., 2021; Nowell et al., 2019; Roberts et al., 2022). In three of the studies, the parent participating in the intervention delivered part of the intervention in the guidance of a clinician (Hampton et al., 2020; Mohammadzaheri et al., 2021; Roberts et al., 2022). The study by Nowell et al. (2019) utilized group intervention with the child with ASD and their caregivers.

In the studies by Hampton et al. (2020) and Roberts et al. (2022), the used intervention methods were JASPER and EMT. The aim of EMT is to enhance functional use of language in daily life interactions with important adults in the child's life. The JASPER method is aimed to increase social communication in play interactions. Both interventions together improve the social communication skills and spoken communication. In the study by Hampton et al. (2020), the aim was to increase social communication. The intervention was delivered both at home and at a clinic. The children were taught joint attention, receptive language and imitation as part of the intervention, and most of the sessions focused on the caregiver implementing the methods. Part of the sessions at home was to focus on the social interaction skills needed in home routines selected by the caregiver. In the study by Roberts et al. (2022), the target was to focus on caregivers' strategy use and improve children's language outcomes. The intervention sessions were implemented in the participants' homes. The intervention phases and structure was designed to promote the learning of the caregivers as well as the development of functional language for the children with ASD.

In the studies by Hampton et al. (2020) and Roberts et al. (2022), the parental guidance was done in a similar manner. Both studies implemented Teach-Model-Coach-Review (TMCR) method and workshops as part of the teaching the caregivers. The aim in the studies for the clinician was to teach the caregiver how to implement the intervention, the combined intervention of JASPER and EMT (JASP-EMT). The intervention was introduced in phases in both studies and each phase started with a workshop, where the intervention methods were introduced to the caregiver. The intervention sessions followed the TMCR approach. The clinician first reviewed the intervention methods introduced in the workshop and modeled them with the child. After this the caregiver implemented the methods while receiving guidance from the clinician. The session ended with the clinician reviewing and summarizing the session. In Hampton et al. (2020) caregivers also received training on programming and using the speech-generating device used in the intervention. The caregivers were encouraged to include the device in their daily routines and model using the device. In the study by Hampton et al. (2020) part of the intervention was conducted at home and part at the clinic, and in the study by Roberts et al. (2022) all the intervention sessions were conducted at participants' home.

Mohammadzaheri et al. (2021) gave the caregiver an opportunity to implement the intervention under the guidance of the clinician. The clinician gave the caregiver feedback, and if the caregiver did not manage to implement the intervention correctly, modeled it again. The intervention was conducted at a university autism center and the targets of the intervention were question-asking and strategies to ask for help or attention. The children with ASD were prompted to ask different questions for example by having preferred objects that the SLP or caregiver hid from the child. The asking for assistance portion of the intervention was conducted by the SLP or caregiver giving the child a little too difficult task and then prompting the child to ask for help. In Nowell et al. (2019), the intervention was conducted in groups utilizing the GoriLLA Group method, and the intervention sessions consisted of parent-child activities that were conducted in the dyad or in small groups of multiple dyads. The activities targeted social communication and self-regulation, and the skills were practiced with the parent while the clinician led the sessions. The methods were not explicitly described in the study. The caregivers also met weekly with each other outside of the group meetings and discussed the intervention's relevant topics with the clinician and other parents. In these sessions the caregivers had the opportunity to discuss problems that had emerged at home and discuss how to support the children and how to practice at home the things learned in group meetings. Part of the GoriLLA Group intervention presented in Nowell et al. (2019) was two sessions before the intervention began, where only the caregivers participated. The aim of these sessions was to introduce the GoriLLA Group and

the intervention elements to the caregivers and discuss about them. The intervention was provided at a center offering the GoriLLA Group intervention method.

#### **5.4 Collaboration with other professionals**

In three studies other professionals besides SLPs participated in some way in carrying out the intervention (Katz & Girolametto, 2015; Mohammadzaheri et al., 2021; Thiemann-Bourque et al., 2016). In the study by Mohammadzaheri et al. (2021), another implementor of the intervention beside a SLP was a special educator and they worked together. In the study by Katz & Girolametto (2015), a SLP trained three early childhood educators to implement the intervention. The intervention began with two 30-minute-long training sessions for the early childhood educators where the SLP instructed them how to implement the intervention. The early childhood educators participated in the peer training with the SLP by co-leading and then supervised the intervention sessions. After the intervention, the SLP also provided guidance and support to the early childhood educators via four telephone meetings. The early childhood educators were instructed to keep pairing up the child with ASD with a trained peer, and the SLP encouraged this and answered the early childhood educators' questions in these follow-up meetings. In the study by Thiemann-Bourque et al. (2016) there was a collaboration between two daycare centers to make the intervention possible, and the staff of these centers cooperated to enable the peers to attend the other daycare center and participate in the intervention. The peer training was conducted by two SLPs and one special education teacher, and in the intervention phase an occupational therapist was guiding the activities alongside with the SLP and the special education teacher.

## **6 DISCUSSION**

The aim of this thesis was to differentiate the components of speech and language therapy aiming to improve the social interaction skills of children with ASD. Social interaction is an important part of everyday life and rehabilitating impairments in the skills takes time and requires participation of many different people. The material consisted of eight peer-reviewed articles that introduced interventions aimed to improve different areas of social interaction skills of children with ASD. Common components between the articles were differentiated and combined. As a result, four themes emerged: peer-mediated approaches, parental involvement, collaboration with other professionals and utilizing augmentative and alternative communication (AAC) methods.

### **6.1 Examination of the results**

According to this literature review, rehabilitating social interaction skills in speech therapy consists of many components. The main theme seems to be strong involvement of other people, which is often the case when rehabilitating children with ASD (Moilanen & Rintahaka, 2025; Vanhala, 2014). The people participating in the rehabilitation process in this thesis included parents, peers, SLPs, occupational therapists, special education teachers, early childhood teachers and other daycare staff. Launonen (2023), Moilanen & Rintahaka (2025) and Vanhala (2014) all point out the importance of including parents, daycare, school and other professionals in the interventions, which support the results of this thesis. There is also research done on peer-mediated approaches that has shown positive results suggesting that utilizing peers in the intervention process is useful for children with ASD (Watkins et al., 2014).

The social interaction skills that were targeted in the studies implementing peer-mediated approaches were initiating, answering, commenting, responding and overall functional communication (Edgar et al., 2024; Katz & Girolametto, 2016; Thiemann-Bourque et al., 2016). All these skills are important for making friends and forming meaningful relationships which are essential for the well-being of an individual (Boucher, 2017; Moilanen & Rintahaka, 2025). Playing with peers also promotes the development of language and social interaction skills which supports the use of peer-mediated approaches (Launonen, 2023). Especially initiating and responding are important aspects of interacting with others and targeting them with interventions is essential for the development of social interaction skills (Boucher, 2017). In the studies by Edgar et al. (2024), Katz & Girolametto, 2015

and Thiemann-Bourque et al. (2016), the interventions were conducted at the participants' daycares and schools. This is in line with the literature showing that the interventions are most efficient, and the generalization of the skills is possible when they are integrated into the natural environments of the child (Hyman et al., 2020; Launonen, 2023; Moilanen & Rintahaka, 2025). The selection criteria for peers including good social skills, consistent attendance, ability to follow directions and willingness to participate is backed up by previous research stating these same things as criteria for peer selection (Edgar et al., 2024; Katz & Girolametto, 2015; Odom & Strain, 1984; Sperry et al., 2010; Thiemann-Bourque et al., 2016; Watkins et al., 2015). Peers who have these characteristics may be more likely to perform correctly in the interaction sessions which can lead to better generalization results (Watkins et al., 2015).

In the studies incorporating caregivers as part of the interventions the targeted skills were question-asking, attention- and assistance-seeking strategies, caregivers' strategy use, child language outcomes, social communication and self-regulation (Mohammadzaheri et al., 2021; Roberts et al., 2022; Nowell et al., 2019; Hampton et al., 2020). The aim with including the caregiver into the intervention session was to teach the caregiver to use the intervention strategies and encourage them to use them at home as well and increase social interaction between caregivers and their children with ASD. Inclusion of the caregivers promotes the generalization of skills because the methods are then used often and in many contexts (Hyman et al., 2020; Launonen, 2023; Moilanen & Rintahaka, 2025).

The Teach-Model-Coach-Review (TMC) method was used for parent training in the studies by Hampton et al. (2020) and Roberts et al. (2022). The use of this method has been demonstrated to be useful and increasing the learning outcomes of parents participating in parent-mediated interventions and learning the intervention methods (Roberts et al., 2014; Wright et al., 2017). In the study by Roberts et al. (2014), it was reported that the generalization of the use of the intervention methods to home was limited, and that, to maximize it, the TMCR approach should be implemented across routines at home as well as at the clinic where intervention sessions are held. In the studies by Hampton et al. (2020) and Roberts et al. (2022), all or part of the intervention sessions were conducted at participants' home. Based on the results of the study by Roberts et al. (2014), that may have been a positive aspect in the parental acquisition of the intervention strategies.

In all the included studies except the studies by Mohammadzaheri et al. (2021) and Roberts et al. (2022) some type of AAC was used. In the studies by Edgar et al. (2024) and Hampton et al. (2020) a speech-generating device was used. According to Schlosser (2003), SGDs can promote expressing

opinions, requesting and answering questions in addition to other social interactions skills, and these were some of the skills targeted in the studies by Edgar et al. (2024) and Hampton et al. (2020). According to Lerna et al. (2012), the use of PECS increases the use of social interaction skills including joint attention, requesting, initiating and playing together with others in nonverbal children with ASD. In the study by Thiemann-Bourque et al. (2016) the aim was to increase functional communication of the children with ASD. These two studies are not fully comparable, since in the study by Thiemann-Bourque et al. (2016) the intervention was peer-mediated and therefore the aims were different than in the study by Lerna et al. (2012). In the studies by Katz & Girolametto (2015), Kuschke et al. (2016) and Nowell et al. (2019) pictures were used to support the communication and transitions. According to the study by Gillespie-Smith et al. (2014), children with ASD can understand information from pictures in a same way than typically developing peers do. This further supports Vanhala (2014), that many children with ASD have benefits of using pictures as part of their daily life, and the result of this thesis that many studies use pictures as part of the intervention.

## **6.2 Consideration of the method**

Integrative literature review was chosen as a method because the aim was to describe the phenomenon widely and it is possible to include different types of research into it (Salminen, 2011, p.8). The research articles included in this study were different by their methods and settings so integrative literature review made it possible to combine all of them and answer the research question extensively. One of the data-base search criteria was that the study had to be conducted in 2015-2025. This criterion was chosen to get the newest research since the view of rehabilitating social interaction of children with ASD has started to shift into understanding their way of interacting instead of focusing only on the problems in the interaction (Launonen, 2023). Currently the aim of rehabilitation is to integrate it into the child's everyday life and conduct it in collaboration with parents and other adults in the child's life. Because of this change, only articles from the year 2015 were included in the study. This was done to increase the reliability of the thesis.

The research process was described precisely to increase the reliability of the study. The process started with doing test searches with different search terms to make sure all the meaningful studies were included in the final search. All appropriate articles regarding ASD were

The possibility of including all the studies regarding ASD was increased by using different wordings as shown in the methods section. Since the terminology is changing, some of the subgroup names

were included to increase the reliability of this thesis. The term “social interaction skills” has many synonyms and because of this, the reliability may have been decreased. In this thesis, the terms “social interaction skills”, “people skills” and “interactional skills” were used, but choosing other words might have changed the outcomes and some articles may have been missed due to this.

The aim in a content analysis is to find meanings in the text and form a synthesis of the findings (Tuomi & Sarajärvi, 2018; Vilkkä, 2023). Content analysis was chosen as the analysis method because the aim of this thesis was to find different themes from the material and combine them. Content analysis is usually conducted as data-driven and the aim is to produce a description of the phenomenon under study (Tuomi & Sarajärvi, 2018). The analysis of the material of this thesis was data-driven and the categories presented in the results were formed in the analysis phase. Content analysis was an appropriate analysis method for this thesis also because one way to conduct it is the reduction and grouping into categories and subcategories (Tuomi & Sarajärvi, 2018). Since the aim was to find different components from the material, content analysis was a good way to do this by grouping similarities into separate categories. These typical methods for integrative literature review enabled answering the research question extensively. However, locating the meaningful parts of the materials, and grouping them is subjective which means that different researchers may choose different things from the materials and categorize them differently. The aim was to make the study as neutrally as possible, but the chosen methods may affect the repeatability of the research.

### **6.3 The clinical meaning of the thesis and topics for future research**

This thesis aims to discuss and describe the components of speech and language therapy aiming to improve the social interaction skills of children with ASD. The topic is important, because social interaction is a central part of humanity that is present all the time (Eickers, 2024; Launonen, 2023; Loukusa et al., 2011). The deficits in social interaction skills are central in ASD and they may lack many of these skills needed to live a meaningful life (Boucher, 2017; Moilanen & Rintahaka, 2025). Rehabilitation focusing especially on the social interaction skills is essential because they affect later development and quality of life (Moilanen & Rintahaka, 2025). This thesis shows how broad area the rehabilitation of social interaction skills is and how much there needs to be collaboration between the family of the child with ASD, daycare staff, teachers, other school staff and therapists. The results of this thesis cannot be generalized because of the small sample size. However, this thesis gives some information about the deficits of social interaction skills of children with ASD and about the extent

of the rehabilitation process. All the studies included in this thesis except for the study by Kuschke et al. (2016) include either caregivers or peers in the intervention sessions making them more interactive and integrative in nature. This is in line with the view changing from seeing the difficulties of children with ASD as problems to seeing them as different ways of interacting (Launonen, 2023).

In this thesis the age of the children with ASD varied greatly; the youngest participant was two years old and the oldest was 12 years old. It would be interesting to focus on a more specific age group in the future, since the components in rehabilitation could be very different with different aged children; other components could be more important in some age group than others. Only one of the studies, the study by Nowell et al. (2019) utilized having the participants in a group during the intervention. Group interventions could also be studied more closely in the future to examine what they consist of. Peer-mediated approaches, used in this thesis in the studies by Edgar et al. (2024), Katz & Girolametto (2015) and Thiemann-Bourque et al. (2016), would be another topic that would be interesting to study more closely. In these three studies all the participants were aged from three to nine years old. It might be interesting to focus on a specific age group, for example only on very young children or, on the other hand, older children.

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## Appendix 1. Articles chosen for the thesis

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