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# TEACHER–CHILD RELATIONSHIPS, INTERACTIONS, AND CULTURALLY INCLUSIVE PEDAGOGY

## A study on pre- and in-service early childhood education teachers in Finland

Wenwen Yang

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SARJA – SER. B OSA – TOM. 670 | HUMANIORA | TURKU 2024

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ISBN 978-951-29-9749-7 (PRINT)
ISBN 978-951-29-9750-3 (PDF)
ISSN 0082-6987 (Print)
ISSN 2343-3191 (Online)
Painosalama, Turku, Finland 2024

UNIVERSITY OF TURKU
Faculty of Education
Department of Teacher Education
Education
WENWEN YANG: Teacher–child relationships, interactions, and culturally inclusive pedagogy: A study on pre- and in-service early childhood education teachers in Finland
Doctoral Dissertation, 133 pp.
Doctoral Programme on Learning, Teaching and Learning Environments Research
May 2024

## ABSTRACT

The purpose of this thesis is to develop valid and reliable assessment tools to examine and foster Finnish early childhood education (ECE) teachers' professional development from the undergraduate level onward and to improve the effectiveness of ECE teacher training programs. Three major theoretical concepts in this thesis were explored: teacher–child relationships, self-efficacy of culturally inclusive pedagogy, and teacher–child interaction, which are aligned with the key competence domains specified by the multidimensional adapted process model of teaching in educational context (MAP). Participants were ECE student teachers from a university bachelor's degree program and qualified ECE teachers working in daycare centers in Finland. This study adopted a mixed methods approach consisting of statistical analyses for questionnaire data and systematic video observations.

This thesis is comprised of three empirical studies. Study I validated the factorial validity and measurement invariance of the modified version of the Student–Teacher Relationship Scale-Short Form (STRS-SF) to investigate ECE student teachers' and qualified teachers' perceptions of closeness and conflict in their overall relationships with children. Multi-group confirmatory factor analyses (CFA) confirmed the closeness and conflict factors of the two-factor structure. ECE student teachers and two qualified ECE teacher groups reported overall high levels of close and low levels of conflictual relationships with children. Perceptional differences were demonstrated among groups of teachers at various career stages. Qualified teachers who voluntarily participated in training to enhance their professional skills perceived their relationships with children as having more conflicts. Student teachers reported fewer conflicts than qualified teachers enrolled in training and perceived less closeness compared to qualified teachers not attending training. This study extends the application of the STRS-SF in a Finnish educational context.

Study II developed a new scale, Culturally Inclusive Pedagogy (CIP), for assessing ECE student teachers' and qualified teachers' self-efficacy beliefs in planning and implementing culturally inclusive pedagogy with diverse children. The CFA results revealed that CIP is a one-factor structure scale, and pre- and in-service ECE teachers' self-efficacy beliefs were overall high at the construct level. At the item level, qualified teachers reported higher levels of efficacy than student teachers.

The reciprocal relations between high self-efficacy of inclusive practices and self-perceived close teacher–child relationships were found among both student teachers and qualified teachers. The concurrent validity evidence implies the need for integrating training about relational processes and inclusive pedagogy into curriculum design for both pre- and in-service teachers.

Study III aimed at evaluating the observed quality of ECE student teacher–child reading interactions and fostering student teachers' pedagogical competence in higher education setting. The students were provided with a study module which consists of lectures about the knowledge of child development and ECE pedagogy, and tutorials as well as practices for identifying, implementing, and reflecting on high-quality interactions with children. The video-recorded one-on-two joint picture book reading interactions were assessed by the observational tool Classroom Assessment Scoring System (CLASS) Pre-K. The domain level analyses showed the imbalanced pattern of student teachers' high quality of emotional support and classroom organization but low quality of instructional support. The behavioral level analyses indicated that student teachers primarily asked simple questions but rarely asked complex questions or provided extensive feedback to promote children's higher-order thinking and language use. The results further showed that student teachers' self-reported closeness with children improved and conflict decreased after the study module. This study highlights the importance of fostering higher-quality instructional support in teacher preparation programs and improving the effectiveness of university degree programs.

Taken together, this dissertation contributes to the innovative use of research-based self-assessment and observation tools in the Finnish ECE context, allowing for further valuable cross-cultural comparison studies. Moreover, the utilization of these tools in Finnish teacher training programs provides practical significance for fostering teachers' professional development.

KEYWORDS: teacher–child relationship, teacher self-efficacy, culturally inclusive pedagogy, teacher–child interaction, Student–Teacher Relationship Scale, Classroom Assessment Scoring System Pre-K, confirmatory factor analysis, measurement invariance, early childhood education

TURUN YLIOPISTO
Kasvatustieteiden tiedekunta
Opettajankoulutuslaitos
Kasvatustiede
WENWEN YANG: Opettaja–lapsisuhteet, vuorovaikutus ja kulttuurisesti inklusiivinen pedagogiikka: Tutkimus suomalaisista varhaiskasvatuksen opettajaopiskelijoista ja opettajista
Väitöskirja, 133 s.
Oppimisen, opetuksen ja oppimisympäristöjen tutkimuksen tohtoriohjelma
Toukokuu 2024

## TIIVISTELMÄ

Väitöskirjan tarkoituksena on kehittää päteviä ja luotettavia arviointimenetelmiä varhaiskasvatuksen opettajien ammatillisen osaamisen ja varhaiskasvatuksen alan tutkinto-ohjelmien tehostamiseksi. Väitöskirjan kolme keskeisintä teoreettista käsitettä – opettaja-lapsisuhde, pystyvyyden tunne kulttuuritietoisen inklusiivisen pedagogiikan toteuttamisessa sekä opettaja-lapsivuorovaikutus – sisältyvät myös Opettajan osaamisen MAP-malliin, jota sovelletaan valtakunnallisesti opettajien perus- ja täydennyskoulutuksessa. Tutkimukseen osallistui varhaiskasvatuksen opettajaopiskelijoita sekä päiväkotien varhaiskasvatuksen opettajia (ent. lastentarhanopettajat, jatkossa opettajat). Väitöskirjassa sovellettiin monimenetelmällistä tutkimusotetta: kyselyaineistoja, videohavainnointeja ja tilastollisia analyyseja.

Väitöskirja koostuu kolmesta empiirisestä osatutkimuksesta. Osatutkimuksessa I selvitettiin suomen kieleen ja kulttuurin sovitetun Opettaja-lapsisuhteen itsearviointimenetelmän (Student–Teacher Relationship Scale; STRS-SF) faktorien validiteettia ja mittausinvarianssia. Tavoitteena oli verrata varhaiskasvatuksen opettajaopiskelijoiden ja päiväkodeissa työskentelevien opettajien kokemuksia läheisyydestä ja ristiriidoista suhteissaan lapsiryhmiin. Usean ryhmän konfirmatorinen faktorianalyysi vahvisti oletetun kahden faktorin rakenteen. Yleisesti ottaen uransa eri vaiheessa olevat opettajat kokivat suhteensa lapsiin läheisiksi ja ristiriidattomiksi. Yliopistolliseen täydennyskoulutukseen osallistuneet opettajat kokivat enemmän ristiriitoja suhteissaan lapsiin. Opettajaopiskelijat kokivat vähemmän ristiriitoja kuin täydennyskoulutukseen osallistuneet opettajat ja vähemmän läheisyyttä verrattuna opettajiin, jotka eivät osallistuneet täydennyskoulutukseen. Tulokset vahvistavat, että itsearviointimenetelmä soveltuu opettaja-lapsisuhteen arvioimiseksi suomalaisessa varhaiskasvatuksen kontekstissa.

Osatutkimuksessa II kehitettiin uusi menetelmä Kulttuuritietoinen inklusiivinen pedagogiikka (Culturally Inclusive Pedagogy; CIP), jolla opettajat arvioivat minäpystyvyyttään opetuksen suunnittelussa ja toteuttamisessa moninaisissa lapsiryhmissä. Konfirmatorinen faktorianalyysi vahvisti yhden faktorin rakenteen parhaiten kuvaavan arviointimenetelmää. Tulokset osoittavat, että varhaiskasvatuksen opettajaopiskelijoiden ja päiväkodeissa työskentelevien opettajien koettu minäpystyvyys kulttuuritietoisen inklusiivisen pedagogiikan suunnittelussa ja toteutta-

misessa olivat faktoritasolla korkealla. Väittämätasolla opettajat kuitenkin raportoivat opettajaopiskelijoita korkeampaa minäpystyvyyttä. Korkeampi minäpystyvyyden tunne oli vastavuoroisessa yhteydessä korkeampaan läheisyyden tunteeseen opettaja–lapsisuhteissa niin opettajaopiskelijoiden kuin opettajien ryhmissä. Osatutkimus antaa viitteitä siitä, että varhaiskasvatuksen tutkinto-ohjelmien ja täydennyskoulutuksen opetussuunnitelmiin tulisi sisällyttää enemmän sosiaalisiin suhteisiin ja kulttuuritietoiseen inklusiiviseen pedagogiikkaan liittyvää koulutusta.

Osatutkimuksen III tavoitteena oli arvioida varhaiskasvatuksen opettajaopiskelijan ja kahden lapsen vuorovaikutuksen laatua strukturoiduissa kuvakirjan lukutilanteissa sekä kehittää opiskelijoiden pedagogista osaamista. Opiskelijat osallistuivat opintojaksoon, johon sisältyi luentoja lapsen kehityksestä ja pedagogisesta vuorovaikutuksesta, pienryhmäopetusta ja harjoituksia, joiden tavoitteena oli tunnistaa, pohtia (reflektoida) ja toteuttaa laadukasta opettaja-lapsivuorovaikutusta. Videotallenteet opiskelijan ja lasten lukutilanteesta arvioitiin Classroom Assessment Scoring System-PreK (CLASS-PreK) –arviointimenetelmän avulla. Faktoritason (domain) analyysit paljastivat selkeän epätasapainon opiskelijoiden pedagogisessa osaamisessa: tunnetuki ja toiminnan organisointi olivat korkeatasoista, mutta ohjauksellinen tuki heikkoa. Käyttäytymisen tason (behavioral markers) analyysit ohjauksellisesta tuesta osoittivat, että opettajaopiskelijat esittivät pääasiassa yksinkertaisia kysymyksiä ja tarjosivat vain harvoin monimutkaisia kysymyksiä ja laaja-alaista palautetta tukeakseen lasten korkeatasoisempaa ajattelua ja kielellistä kehitystä. Tulokset osoittivat myös, että opiskelijoiden läheisyyden tunne lapsiin lisääntyi ja kokemukset ristiriidoista vähenivät opintojakson jälkeen. Tämä osatutkimus korostaa tarvetta kehittää varhaiskasvatuksen opettajaopiskelijoiden korkeatasoisempaa ohjauksellista tukea ja entisestään parantaa tutkinto-ohjelmien tehokkuutta yliopistollisessa opettajakoulutuksessa.

Yhteenvetona voidaan todeta, että väitöskirjan kolme osatutkimusta tarjoavat uusia tutkimusperustaisia itsearviointi- ja havainnointimenetelmiä käytettäväksi kansainvälisissää varhaiskasvatuksen vertailuissa. Lisäksi arviointimenetelmiä voidaan hyödyntää varhaiskasvatuksen opettajien tutkinto-ohjelmissa opettajien ammatillisen kehittymisen tukemiseksi.

ASIASANAT: opettaja–lapsisuhde, opettajan minäpystyvyys, kulttuuritietoinen inklusiivinen pedagogiikka, opettaja–lapsivuorovaikutus, Student–Teacher Relationship Scale, Classroom Assessment Scoring System Pre-K, konfirmatorinen faktorianalyysi, mittausinvarianssi, varhaiskasvatus

# Acknowledgements

As I stand at the end of completing this doctoral journey, it is the time to express my profound gratitude and humility to the invaluable support, guidance, and encouragement that I have received along the way. This dissertation would not have been possible without the supports from those important individuals.

First and foremost, I would like to express my deepest gratitude to my first supervisor, Professor Maarit Silvén for your endless support and guidance. I am truly fortunate to have had the opportunity to work under your guidance and work in your research projects. Thank you so much for devoting your countless time, patience, efforts, and expertise to provide me with constructive and thoughtful comments and inspirations on my work. You not only guided me in how to do the research, but also cared about my well-being. It is your advices, encouragement, and belief in me that powers me along all these years. Your mentorship and your dedication to excellence have always been an invaluable asset and an inspiring force for me to carry on.

I would also like to express my heartfelt thanks to my second and third supervisors, Professor Nancy Commins, and associate Professor Emmanuel Acquah. Thank you for your valuable comments and suggestions to improve my research.

I am also grateful that Professor Joana Cadima from University of Porto and Docent Jenni Salminen from University of Jyväskylä accepted to become the pre-reviewers of my dissertation, providing insightful and encouraging feedback. Additionally, I am honored to have docent Jenni Salminen as my opponent in the doctoral defense.

I would like to extend my sincere gratitude to my co-author and other colleagues in the Jump Along project. I want to thank my co-author Statistician Eero Laakkonen for sharing your knowledge and expertise in guiding me running the statistical analyses. Without your help, the first and second articles would not be possible. I also want to thank members used to work in the Jump Along project, Dr. Anne Sorariutta, Dr. Satu Laitinen, Dr. Jingwen Jiang, and Jenny Marttila for your support and great discussions in the seminars. Your academic discussions, and shared experiences have enriched my journey immeasurably. Especially, my sincere thanks to Jenny Marttila, for your friendship, support, caring, and all conversations related to academic and personal life.

It has been a privilege for me to be part of Department of Teacher Education and the Doctoral Programme on Learning, Teaching and Learning Environments Research (OPPI). This is such a supportive academic community that all the teachers who have taught me and all the staff I have met provided me with the resources, facilities, and a conducive environment for research and learning. I want to thank you, Professor Emerita Erno Lehtinen, you were not only my master thesis's supervisor but also the one who recommended me to my doctoral supervisor, thus initiating this journey for me. Thank you, all colleagues in Professor Maarit Silvén's and Professor Niina Junttila's joint doctoral seminar group and Professor Emerita Marja Vauras's writing and publishing seminar group for all of your enlightened discussions and useful comments on my studies. Especially I want to thank Dr. Anne-Elina Salo, for your kindness to support me with the abstract translation.

I want to acknowledge the funding and grants that have supported this endeavor. I am grateful for receiving the financial support from the Jump Along project being funded by Ministry of Education and Culture, which was awarded to Professor Maarit Silvén, as well as the work grant received from OPPI program. I also want to thank Sanna Niukko, Anne Niemimäki, and Jenni Kankaanpää for your administrative support throughout the whole doctoral study.

I would also like to extend my gratitude to my doctoral fellows and friends. Especially to my dear friend, Yoojin Kim, who have been my cornerstone to bring constant encourage, care, and support to my life. We shared many ups and downs, and I am so grateful for those memorable time we spent together. I also want to thank all my Chinese friends in Finland and in China, Yili Wang, Xingguo Zhou, Xue Zhang, Wenyang Xu, Shujun Liang, Yu Yang, Le Jiang, and Weihua Zhang, your precious friendship and warmhearted support give me sense of community and enrich my life in Finland.

My deepest thanks go to my family for your unwavering support, love, and encouragement. To my mother, father, grandma, and grandpa, for your trust, support and relentless belief in me have shaped me into the person I am today. Especially I want to thank my grandma in heaven, you are the strongest and kindest woman in my mind and you are always the role model for me. Thank you Dongdong for standing by me, comforting my anxiety, and bringing me so much happiness in life.

My appreciation also goes to all the participants of this study, those undergraduates in university, qualified early education teachers, principals, and children who involved in the data collection. Your willingness to contribute to this research has been essential in advancing our understanding of the early childhood teacher education field.

17.5.2024
*Wenwen Yang*

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# List of Original Publications

This dissertation is based on the following original publications, which are referred to in the text by their Roman numerals:

I Yang, W., Laakkonen, E., & Silvén, M. (2021). Teachers' relationships with children in the Finnish early childhood education context: A validation study. *Journal of Psychoeducational Assessment*, *39*(7), 848–860. doi: 10.1177/07342829211019150

II Yang, W., Laakkonen, E., & Silvén, M. (2022). Closeness, conflict, and culturally inclusive pedagogy: Finnish pre- and in-service early education teachers' perceptions. *Frontiers in Psychology*, 13: 834631. doi: 10.3389/fpsyg.2022.834631

III Yang, W., & Silvén, M. (2024). Fostering high-quality reading interactions in pre-service early childhood teacher education. Manuscript under review. University of Turku.

In each publication, Yang contributed to the study conceptualization and design. Yang was mainly responsible for the data collection, data analysis and writing of the manuscript in all publications.

# 1 Introduction

The quality of teacher–child relationships and interactions is a crucial aspect of teachers' professional development that educators, researchers, and teachers aim to promote during pre- and in-service teacher trainings. Extensive research has demonstrated the significance of teacher–child relationships and interactions in the developmental process of children during their early years. The value of establishing close and trustworthy relationships and high-quality interactions between early childhood education (ECE)[1] teachers and children to foster future social, emotional, and language development as well as academic achievement has been strongly recognized (Hamre & Pianta, 2001; Hamre et al., 2014; Mashburn et al., 2008; Pianta & Stuhlman, 2004). Research on self-assessment tools to examine teacher–child relationships has increased. In particular, the most widely used measurement, the Student–Teacher Relationship Scale (STRS) and its short form (STRS-SF) developed by Pianta (2001a, 2001b), has been central to this assessment. Additionally, investigations into the psychometric properties of the longer and shorter forms, including factorial validity and measurement invariance, have expanded across diverse educational and cultural contexts (Aboagye et al., 2019; Koomen et al., 2012; Milatz et al., 2014; Tsigilis & Gregoriadis, 2008; Webb & Neuharth-Pritchett, 2011; Whitaker et al., 2015). While the aforementioned studies conducted in the United States, Europe, and Africa focused on assessing in-service teacher–child relationships, more research on how ECE teachers at different career stages perceive their relationships with children in various educational contexts is needed. One of the research questions of the Study I is to investigate how Finnish ECE teachers at various career stages, from the undergraduate level onward, perceived their overall relationships with a group of children using a modified version of the STRS-SF (Whitaker et al., 2015).

Children learn and develop through interactions in various cultural contexts and across generations. Considering the diversity of ethnic, cultural, and linguistic

[1] The acronym ECE is commonly applied in the context of international publications, whereas the acronym ECEC is used in the official translations of Finnish documents such as the national core curriculum.

factors in Western societies, a growing body of research has discussed the importance of teachers' cultural competence and culturally responsive teaching on children's social and linguistic skills and academic achievement in school contexts (e.g., Gay, 2010; Ok et al., 2016; Romaine, 2009; for ECE, see Gunn et al., 2021; Han & Thomas, 2010). Nonetheless, the exploration of teachers' confidence in effectively engaging diversity in ECE classrooms (self-efficacy) —an essential facet of their professional competence—and the correlation between self-efficacy and the quality of teacher–child relationships remains relatively scarce. Although there has been research on assessing teachers' self-efficacy beliefs of inclusive practices or culturally responsive teaching in school contexts (e.g., Geerlings et al., 2018; Malinen et al., 2013; Sharma et al., 2012; Siwatu, 2007), surprisingly, little attention has been devoted to ECE teachers' cultural competence (Leung & Hue, 2017; Obegi & Ritblatt, 2005) or self-efficacy for inclusive practices (Park et al., 2016; Romijn et al., 2020). Given the differences in educational contexts, the constructs of self-reports developed for specific cultural and educational systems may not function well in other countries. Therefore, one of the aims of the current dissertation is to fill this research gap by developing a reliable and valid self-rated instrument to evaluate Finnish ECE teachers' self-efficacy of culturally inclusive pedagogy as well as to explore the association of self-efficacy with teachers' self-perceived relationships with children.

Self-reports are an effective and time-saving method that have the advantage of collecting large samples of data; however, they also have social desirability bias. Besides the self-report method, researchers have also suggested including observations as an objective approach to assess teacher–child interactions in real classrooms. Recent research on classroom quality in terms of teacher–child interactions using observational tools has increased (see Downer et al., 2012; Lerkkanen et al., 2012; Lippard et al., 2018; Pakarinen et al., 2010; Pianta et al., 2008a). Among these, the most widely used observation tool was the Classroom Assessment Scoring System (CLASS) Pre-K developed by Pianta et al. (2008a). However, the majority of research has been interested in in-service teachers, and very limited research has focused on pre-service ECE teachers (for exceptions, see Hu et al., 2022; 2023; La Paro et al., 2012). Therefore, the current dissertation aims to evaluate and improve pre-service ECE teachers' effective interactions with 3-to-5-year-old children during their second academic year in a university teacher preparation programs in Finland and to explore how observed student teachers' interactions with children in classrooms are related to the self-reported teacher–child relationships assessed by the modified STRS-SF.

The educational system in Finland, one of the Northern European countries, emphasizes the inclusive nature of mainstream classrooms. This means that children who have diverse ethnicities, languages, abilities, and developmental skills attend

regular classrooms. The common values of equity, equality, and respect for diversity are reinforced in early childhood education and care (ECEC) legislation. ECEC in Finland provides high-quality and accessible services for all families. Every child under school age has the right to participate in ECEC programs, which encompass education, care, and teaching, with an emphasis on pedagogy, as defined by legislation. In line with the national core curriculum for ECEC (Finnish National Agency for Education, 2018), the programs prioritize all children's well-being, holistic development, and learning, irrespective of their age, gender, religion, language, or ability differences. Embracing an inclusive educational approach, children with special emotional, social, and cognitive needs and immigrant backgrounds are integrated into regular classrooms, and they also receive additional support from local social and healthcare services.

In Finnish daycare centers, it is typical for three ECE staff members with different levels of educational qualifications to be responsible for a group of 12 children (or 24 children if older than 3 years). Staff consist of qualified teachers, social pedagogues, and child caretakers. This multi-professional team is led by a qualified ECE teacher, who serves as the pedagogical leader and is required to hold a three-year bachelor's degree in early childhood teacher education from a university. Social pedagogues obtain a bachelor's degree in social sciences with a specialization in ECE from a university of applied sciences. In this thesis, the recruited qualified ECE teachers were either from a university or an applied sciences university with various years of work experience, and the recruited ECE student teachers were first- and second-year undergraduates from a university.

The multidimensional adapted process model of teaching (MAP; Metsäpelto et al., 2022) serves as a higher-level conceptualization of professional development believed to be crucial for the teaching profession in the Finnish educational context. The major theoretical concepts of the dissertation relate to the major domain in the MAP model. The concepts of teacher–child relationships and teacher efficacy can be perceived as teachers' professional practices and the third concept of teacher–child interaction has been recognized as teaching practices in the teaching competences domain. Due to overlapping, teachers' perceptions of their relational skills and self-efficacy beliefs can partly also be regarded as individual competencies. Although the MAP model does not directly focus on the ECEC context, the fundamental indicators of the competences can also be applied in ECE teacher education programs in higher education.

The current and timely discussion on the importance of teacher professionalism in ECE has been recognized not only in Finland (Fonsén & Ukkonen-Mikkola, 2019), but also across different countries in the world (e.g., Hu et al., 2023; Sabol & Pianta, 2012). Despite the accumulating studies, teachers at various career stages from the undergraduate level onward, their self-perceptions of their overall relationships with

preschool-aged children and the self-efficacy of culturally inclusive pedagogy have remained unknown in the Finnish ECE context. Therefore, it is imperative to discover and compare teachers' perceptions of their pedagogical competence in different career phases and to evaluate the effectiveness of teacher preparation and training programs.

## 1.1 Teacher–child relationships

Attachment theory (Bowlby, 1969) and bio-ecological systems theory (Bronfenbrenner, 1986) lay the theoretical foundation for exploring the importance of the quality of adult–child interactions in multiple environments—for example, the family, daycare center, and school—on children's social and emotional development and sense of security (Pianta, 1999; Sroufe, 1988). From the developmental systems perspective (Lerner, 1998), children are seen as active and self-regulated organism and the relationships between children and adults are crucial for driving developmental changes (Pianta et al., 2003). The parent–child relationships within family settings and the teacher–child relationships in classroom settings are the primary unit of analysis that offer an integrative conceptual framework to understand children's development (Bronfenbrenner, 1986; Pianta, 1999). The social and cognitive processes in the classroom provides the opportunity to enhance the relationships between teachers and children. Substantial evidence has shown that the quality of teacher–child relationships plays a major role in children's school adjustment and success and could function as a buffer to school risk (e.g., Baker et al., 2008; Birch & Ladd, 1997; Hamre & Pianta, 2005; Pianta & Steinberg, 1992; Pianta & Stuhlman, 2004). In line with the key competence domains specified by Metsäpelto et al. (2022), teachers' relational skills represent a major aspect of teachers' individual competencies and teaching competences.

Relationships result from the ongoing, reciprocal exchanges of information and behavior between individuals during daily interactions which occur repeatedly over time (see Figure 1). To assess the quality of relationships and understand the various dimensions of relationships, various assessments methods have been developed (Pianta et al., 2003). The teacher–child relationship has been assessed from the perspective of the teacher, the child and/or the researcher. Initial analyses which explored ECE teachers' feelings and perceptions of a specific child, indicated that warmth and openness are highly correlated and formed a closeness dimension, and teachers perceived dependency as a somewhat negative dimension (Pianta & Nimetz, 1991). The understanding of child–teacher relationships involved a shift towards emphasizing more explicitly negative elements within the relationship, including feelings of anger, conflict, and confusion.

Derived from attachment theory, Pianta (2001a) developed the STRS, a self-report to assess teachers' perception of their social-emotional relationship with an individual child (4 to 8 years of age) participating in the classroom. This 28-item measure of the teacher's relational representation has shown good internal consistency. The STRS consists of three subscales that measure closeness, conflict, and dependency. Closeness refers to the degree to which the teacher feels a warm, trusting, and positive relationship with the specific child. Conflict refers to the degree to which the teacher feels a conflictual and negative relationship with the specific child. Dependency refers to the degree to which the teacher perceives the child as overdependent. Moreover, Pianta (2001b) also proposed a shortened version of the STRS, which is called the STRS-SF. The shortened 15-item version is comprised of two subscales, closeness and conflict, rated on a 5-point Likert scale. The majority of studies have explored the dyadic relationships between a teacher and an individual child (e.g., Milatz et al., 2014; Pianta & Stuhlman, 2004).

Teachers' relational representations of individual children in their ECE classroom are stored in long-term memory. These representations influence teachers' anticipations about new relationships in future ECE classrooms. Through experience with new children, the representations become generalized over time. In contrast, ECE student teachers have little work experience and they are not employed in daycare centers. Thus, there is a need to investigate student teachers' relational representations about their past experiences with children in general. In the present thesis, a modified version of the STRS-SF (Whitaker et al., 2015) was applied and adapted into the Finnish ECE context. Compared to the STRS at the individual level, the modified version represents a more generalized construct of teachers' overall relationships with a group of children, which can be used when comparing pre- and in-service teachers. The modified version was developed by changing the singular forms of nouns and verbs into plural forms (e.g., "child" to "children").

Many empirical studies have focused on examining the predictive and factorial validity of the longer version of the STRS. Regarding its predictive validity, studies have indicated how relationships with an individual child would influence that child's developmental outcomes. For example, the quality of teacher–child relationships has been demonstrated to relate to school adjustment (Birch & Ladd, 1997), social competence (Howes, 2000), and behavior outcomes (Baker et al., 2008). Other studies have attempted to explain how the child's and teacher's characteristics, such as the child's age, gender, ethnicity (Choi & Dobbs-Oates, 2016; Saft & Pianta, 2001), and behavioral problems (Hamre et al., 2008) or the teachers' education and emotional status (e.g., self-efficacy, workplace stress, and depression), would affect teachers' perceptions of their relationships with children (Hamre et al., 2008; Kesner, 2000; Whitaker et al., 2015). As shown in Figure 1, besides child's and teacher's individual characteristics, teachers' representations of

their relationships with children are influenced by information exchange processes and external influences (Pianta et al., 2003).

Other studies have shown the link between teachers' reports of their relationships and their pedagogical practices with children. Thijs and colleagues (2008) found that teachers' self-reported conflictual relationships with individual kindergarteners were related to their self-reported more socio-emotional support and more behavior regulations for children. Additionally, they also reported that children's behaviors evaluated by teachers could partly mediate the associations between teachers' reported relationships and their practices. Moreover, Stuhlman and Pianta (2002) conducted semi-structured interviews to understand teachers' perceptions of their relationships with children and linked these perceptions to observed behaviors. Teachers who expressed more negative emotions during the interviews were observed to exhibit more negative behaviors toward the children.

With respect to the factorial validity, a growing number of studies conducted in the United States and Europe have explored the validity of the longer version of the STRS across different cultures, languages, and educational levels. These studies have utilized either exploratory factor analysis or confirmatory factor analysis (CFA). In the United States, research on teachers of 4- to 8-year-olds using the original scale items (Pianta, 2001a) and teachers of 5-year-olds with a reduced set of items (Webb & Neuharth-Pritchett, 2011) confirmed the three-factor structure. Similarly, in Europe, studies conducted in Greece (Gregoriadis & Tsigilis, 2008), Norway (Solheim et al., 2012), Germany and Austria (Milatz et al., 2014), the Netherlands (Koomen et al., 2012), and Italy (Fraire et al., 2013) found an acceptable fit for the original three-factor structure after making adjustments to account for cultural and linguistic contexts. However, the European studies generally indicated that the three-factor models fit better when certain STRS items were excluded.

Pertaining to the measurement invariance studies on STRS, researchers have examined whether the concepts of closeness, conflict, and dependency in the STRS have consistent meanings among ECE teachers across various children, contextual characteristics, and sociocultural contexts. Studies have indicated that when assessing children of different genders and ages (Koomen et al., 2012), in diverse educational contexts (Milatz et al., 2014), or in different country contexts (Cadima et al., 2015), ECE teachers tended to interpret the STRS items in a similar manner. However, it should be noted that ECE teachers of ethnically diverse groups of children did not interpret the three constructs of the STRS similarly (Webb & Neuharth-Pritchett, 2011). Thus far, it seems that no studies have tested whether teacher characteristics, such as age, educational background, and work experience, would affect their perceptions about their relationships with children.

Although research on the factorial validity and measurement invariance of the longer version of the STRS has increased, few studies have tested the factor structure

of the STRS-SF. In the Nordic educational context, the original three-factor STRS fit a Norwegian preschool sample only after excluding several items of dependency subscale (Solheim et al., 2012). Similarly, due to low reliability, the dependency subscale was dropped in a Swedish preschool sample (Rydell et al., 2005). In addition, it was the two-factor structure of individual-level STRS-SF, not including the dependency subscale, fit the Norwegian school context (Drugli & Hjemdal, 2013). The above-mentioned studies indicated that dependency dimension is more related to cultural issues, which provides a rationale for investigating the application of the STRS-SF in the current Finnish ECE context. The few studies that have applied CFA have confirmed the two-factor structure of the STRS-SF in Greek (Tsigilis & Gregoriadis, 2008), Norwegian (Stensen et al., 2023), and Ghanaian (Aboagye et al., 2019) ECE settings. Further studies have revealed strong or partially strong invariance of the STRS-SF, suggesting that teachers perceived their relationships with children in a similar way, regardless of the child's gender, age, or school type (e.g., Aboagye et al., 2019; Stensen et al., 2023; Tsigilis & Gregoriadis, 2008). As mentioned earlier, prior research has shown that teacher characteristics are a significant predictor of teacher–child relationship quality; however, it seems that no studies have explored the measurement invariance of the modified STRS-SF across teacher characteristics in any cultural context. In other words, it remains unknown whether teachers who have different characteristics would perceive the meanings of the scale differently.

To sum up, for the purposes of assessing teachers' relational competence and estimating the effects of teacher training programs, the current dissertation aims to gain a deeper understanding of how Finnish ECE teachers at various career stages perceive their overall relationships with children by examining the factor structure of the modified version of the STRS-SF in the Finnish ECE context and testing the measurement invariance across diverse ECE teachers' professional competence.

## 1.2 Teachers' self-efficacy of culturally inclusive pedagogy

Grounded in social cognitive theory, the concept of self-efficacy proposed by Bandura (1997) was defined as an individual's belief in their ability to successfully accomplish certain tasks. Bandura (1977, 1997) emphasized the prominence of self-efficacy beliefs in various domains, including the education field. Over the decades, in the educational context, teacher efficacy commonly refers to a teacher's belief in their capability to organize and implement teaching practices to influence and facilitate students' learning outcomes. Teacher efficacy is rooted in the role of beliefs in shaping a teacher's behavior and performance, and it is a motivational construct based on a teacher's self-perceived competence, which could be either higher or

lower than the actual performance (Tschannen-Moran & Woolfolk Hoy, 2007). Research on teacher efficacy has been correlated with classroom processes' quality, student achievement, and teachers' psychological well-being (Klassen & Tze, 2014). That is, if teachers perceive that they have high levels of self-efficacy, this could contribute to successful pedagogical interactions in actual teaching, favorable learning outcomes for both teachers and students, and increased positive psychological well-being.

Align with the MAP model (Metsäpelto et al., 2022), teacher efficacy plays a crucial role in teachers' professional development and adaptation to the teacher profession. Past research has indicated variations in the degree of teacher efficacy beliefs along the career path. Pre-service teachers tend to have high self-efficacy during the teaching preparation program but later decreased self-efficacy as novice teachers when starting the profession (Woolfolk Hoy & Spero, 2005). Additionally, experienced teachers tend to have higher self-efficacy beliefs compared to novice teachers (Tschannen-Moran & Woolfolk Hoy, 2007). Another study found that in-service preschool teachers' self-efficacy beliefs increased over school years, especially with those who receiving a coaching intervention, suggesting the possibility for changes in teachers' beliefs (von Suchodoletz et al., 2018). Teachers' professional development is seen as a continuum starting from pre-service training, and qualified teachers are anticipated to advance their professional competence continuously throughout their careers. Therefore, to better understand the development of professional competence, it is important to compare both pre-service ECE teachers' and qualified teachers' possible similarities and differences in their self-efficacy beliefs.

Bandura (1997) suggested that rather than a generalized construct, self-efficacy is multifaceted and contextual and may vary based on context, task, and domain. This argument indicates that the assessment of efficacy beliefs should consider the specificity of the domain and the consistency with specific tasks. Responding to this conceptual concern, recently, measures assessing teacher efficacy in general have captured multi-dimensional constructs (Bandura, 1997; Gibson & Dembo, 1984; Tshannen-Moran & Woolfolk Hoy, 2001). Abundant evidence has shown that in the school context, teachers' sense of efficacy differs between various educational settings and subjects (e.g., Ryan et al., 2015; Ryan & Mathews, 2022). While there is abundant research on general teacher efficacy topics, limited studies have specifically examined teacher efficacy in engaging diverse students in regular classrooms. In the current dissertation, in line with the inclusive nature of the Finnish educational system, cultural diversity broadly refers to a range of children's developmental dimensions, such as ethnicity, ability, and language (Ainscow, 2016).

In the school context, the existing measure Teacher Efficacy for Inclusive Practices developed by Sharma et al. (2012) has been proven as a valid three-factor

structure scale to assess pre-service teachers' efficacy beliefs in executing inclusive practices with special needs children in four countries/areas (Canada, Australia, Hong Kong, and India). Malinen et al. (2013) further validated the three-factor constructs using inclusive instruction, collaboration, and managing behavior (after minor modifications) in another cross-cultural school context (China, Finland, and South Africa). In a pre-service ECE teacher sample from the United States, the Teacher Efficacy for Inclusive Practices scale was found to be a one-factor structure with three specific aspects of the general factor of self-efficacy in inclusive practices (Park et al., 2016).

Researchers have used different teacher efficacy scales to explore the relationships between teachers' self-efficacy beliefs, classroom practices, and children's gains. In Finnish kindergartens, higher personal teacher efficacy (see Gibson & Dembo, 1984) was related to higher observed emotional support in the classroom (Pakarinen et al., 2010). Based on a combined sample of ECE and primary teachers from four EU countries (Great Britain, Italy, the Netherlands, and Poland), constructs of general and diversity-related self-efficacy (see also Siwatu, 2007) proved to be positively related to teacher-reported diverse classroom practices (Romijn et al., 2020). In the U.S. context, researchers found that preschool teachers who had a higher sense of efficacy to manage and motivate children (see Bandura, 1997) received a higher observed quality of literacy instruction (Justice et al., 2008), and higher levels of teacher efficacy was related to children's higher vocabulary gains within observed emotional support classrooms (Guo et al., 2010). Teacher efficacy beliefs about their teaching competence and expectations for children may influence—and be influenced by—the quality of teacher–child relationships and interactions. Turning to interpersonal student–teacher relationships, a few studies have shown associations between teacher efficacy and the student–teacher relationship quality in terms of closeness and conflict. Mashburn et al. (2006) reported that self-efficacious preschool teachers were more likely to establish positive relationships with children. Hamre et al. (2008) found that less self-efficacious preschool teachers tended to report a higher level of conflict with their children in the classrooms. Additionally, classroom quality moderates the relation between teacher efficacy and children's gains (Guo et al., 2010). Furthermore, student engagement plays a mediating role in the relation between affective teacher–child relationships and students' development in the school context (Kiuru et al., 2014; Roorda et al., 2017). Positive teacher–child relationships and an emotionally positive classroom could increase children's engagement in learning and teacher efficacy for implementing optimal pedagogical practices, thus improving children's developmental outcomes. Therefore, it is important to examine teacher efficacy beliefs in engaging diverse children, self-reported teacher–child relationships, and the association between these two constructs.

As illustrated by the literature in the United States, teachers' cultural competence is linked to their effective interactions with students from various ethnic backgrounds in the school context (Ladson-Billings, 2009). Cultural competence refers to a broader set of awareness, knowledge, and skills that educators possess to effectively interact with students from diverse cultural backgrounds (Moule, 2011). Gay (2002) defined culturally responsive teaching as a specific approach to teaching that involves cultural characteristics, experiences, and perspectives of ethnically diverse students and adjusts instructional strategies for effective teaching. Considerable evidence has shown that culturally and linguistically responsive teachers could support the social and language development and school achievement of children with diverse backgrounds (Ladson-Billings, 2009; Ok et al., 2016; Romaine, 2009; for ECE, see Gunn et al., 2021; Han & Thomas, 2010).

Children's social, emotional, and cognitive development begins at birth (Piaget, 1964). Language acquisition also begins in infancy and continues throughout early childhood (Bates et al., 1988; Silvén et al., 2014). Given the deep connections between language, culture, and cultural identity, it is important for responsive ECE teachers to take into account children's multilingual needs and demonstrate the pedagogical knowledge and skills to support their cultural identity and multilingual development (Lucas & Villegas, 2013; Romaine, 2009). One could expect that, similar to the school context, culture and language exert a significant influence on the teaching and learning within ECE settings. To optimize developmental results, teachers should recognize and respect children's diversity, stimulate learning, and nurture development by integrating children's lived experiences (Gunn et al., 2021; Han & Thomas, 2010).

However, few studies have paid special attention to the assessment of ECE teachers' cultural competence (for measures validated in the school context, see Spanierman et al., 2011; Yang et al., 2020; for Finnish, see Acquah et al., 2016). Within the ECE context, a scale with three-factor structure reflecting teaching skills, knowledge, and relationships was validated among Hong Kong preschool teachers with varying educational backgrounds (Leung & Hue, 2017). Another scale with a unidimensional solution of cultural competence consisting of awareness, knowledge, and skills items was applied in a sample of infant and toddler caregivers with varying educational backgrounds in the United States (Obegi & Ritblatt, 2005). The findings suggested that the caregivers who received more culture-related training or education reported higher scores on cultural competence. It is unclear whether the self-reported constructs of cultural competence developed for certain cultural and educational contexts would show generalization in other cultural and linguistic contexts.

Taken together, studies concerning ECE teachers' cultural competence and their efficacy beliefs of inclusive practices in recognizing and responding to children's various cognitive, emotional, and social needs are scarce. Therefore, one of the aims

of the current dissertation is to develop a teacher efficacy scale that adds new understanding of how much confidence Finnish ECE teachers have at different career stages when planning and implementing inclusive practices in the Finnish educational setting. Moreover, in order to explore if perceived teacher–child relationships provide concurrent validity for the teacher efficacy of inclusive practices, the reciprocal association between teacher efficacy beliefs in engaging diverse children and self-reported teacher–child relationships is also investigated.

## 1.3 Teacher–child reading interactions

According to major developmental theories, children learn and develop through interactions with their caregivers, teachers, and peers in the social environment (Bowlby, 1969; Bronfenbrenner, 1986; Vygotsky, 1978). Since children may spend nearly half of their time outside of the home, the quality of teacher–child relationships and interactions has significant influences on children's later social, behavioral, language, and academic skills (Hamre et al., 2014; Leyva et al., 2015; Mashburn et al., 2008). The quality of Finnish ECE relies significantly on the professionalism of teachers. One important means to enhance the quality of teaching practices is to support teachers in their pedagogical interactions with children (Metsäpelto et al., 2022). In order to examine process quality in terms of teacher–child interactions in the ECE and primary school classrooms, Pianta et al. (2008a) developed an observational tool called the CLASS. The CLASS is based on the Teaching through Interactions framework (Hamre & Pianta, 2007). It has been widely used to assess in-service teachers' interactions with children and to provide evidence of construct and predictive validity in the United States (see Burchinal et al., 2008; Hamre et al., 2013). The CLASS has been applied and validated in various educational contexts, such as Germany (von Suchodoletz et al., 2014), Finland (Pakarinen et al., 2010), Chile (Leyva et al., 2015), and China (Hu et al., 2016).

The CLASS consists of three major domains of interactions, which are emotional support, classroom organization, and instructional support (Hamre & Pianta, 2007; Hamre et al., 2013). The three-domain (latent factor) structure is based on more discrete dimensions and observable behavioral markers. Researchers have intensively explored the associations between the three domains and children's outcomes. Most of these studies have been conducted in the United States with at-risk children from low-income families (e.g., Bulotsky Shearer et al., 2020; Curby et al., 2009, 2013). Emotional support represents the emotional connections between teachers and children and reflects teachers' sensitivity, awareness, and responsiveness toward children's needs. Studies have shown that emotionally consistent interactions predict the development of social competence in young children at preschool age and language, literacy, and social competence at

kindergarten age (Curby et al., 2009, 2013; Mashburn et al., 2008). Moreover, emotional support might also function as a protective factor for at-risk preschool-aged children with challenging behaviors (Bulotsky Shearer et al., 2020) and first-graders at risk for unfavorable language and literacy outcomes (Hamre & Pianta, 2005).

Classroom organization focuses on teachers' organization of time and routines in the classroom to maximize the learning time and increase children's interest in and engagement with activities. Classroom organization has been positively associated with children's later language and/or literacy skills (Bulotsky Shearer et al., 2020; Dobbs-Oates et al., 2011). Moreover, well-functioning and effective interactions have been related to kindergarten-aged children's better self-regulatory skills and less off-task time spent in the classroom (Rimm-Kaufman et al., 2009).

Instructional support concentrates on teachers' facilitation and encouragement of children to develop higher-order cognitive processes, such as thinking and language skills. ECE professionals at preschools that offer higher-quality classroom instructional support have been linked to improved academic, language, and literacy skills in children (Bulotsky Shearer et al., 2020; Hamre et al., 2014; Mashburn et al., 2008). In one study, these benefits were shown to persist even after one year, up until the end of kindergarten (Burchinal et al., 2008).

The aforementioned empirical studies on the predictive validity of CLASS demonstrated that higher-quality classroom interactions were related to children's better social-emotional and cognitive skills. However, recent meta-analyses exploring the combined predictive validity of the three broad CLASS domains, each associated with three to four specific dimensions, reported weak or no significant effect sizes of the three-domain structure on children's development, especially, between instructional support and children's language and literacy outcomes (McDoniel et al., 2022; Perlman et al., 2016). The inconsistent findings of the teacher–child interactions to support child outcomes raise concern over what and how to observe and improve quality in ECE classrooms effectively. Differences in the predictive validity could be linked to the levels of CLASS evaluations provided, as previous research has concentrated on broader domain and dimensions rather than the more detailed, behavioral level of analyses. This viewpoint is further supported by the discussions about molar and molecular as highlighted by Pianta and colleagues (2020).

Cross-cultural evidence of teacher–child interactions suggests the same imbalanced pattern of ECE teachers' professional competence. Studies on in-service teachers have found medium-to-high level of emotional support and classroom organization and lower quality instructional support (e.g., Hu et al., 2016; Mashburn et al., 2008; von Suchodoletz et al., 2014; Yoshikawa et al., 2015; for first-graders, see Cadima et al., 2010). In Finland, the same pattern has also appeared in samples

of toddlers (Salminen et al., 2022) and kindergartners (Pakarinen et al., 2010). One would expect to see the same imbalanced pattern for teacher–child interactions with preschool-aged Finnish children as well.

In response to the low quality of instructional support, programs to improve professional competence have been developed for in-service teachers. These intervention studies have demonstrated positive effects on enhancing the quality of teacher–child interactions and pedagogical competences across all three CLASS domains (for a review, see Egert et al., 2020). Especially two programs based on the Teaching through Interactions framework (Hamre et al., 2013; Pianta et al., 2008a) have been proved to be effective in improving in-service teacher–child interactions. My Teaching Partner is a web-based system focusing on improving teacher–child interactions using video-based consultation and web-based videotaped teaching exemplars (Downer et al., 2011; Pianta et al., 2008b). Making the Most of Classroom Interactions was adapted from a college-level course, where teachers participate in face-to-face sessions to enhance their ability to identify effective classroom interactions (Early et al., 2017).

Interventions to improve pre-service teachers' interactional quality are limited. The few existing pre-service studies have mainly applied CLASS domain content, and fairly similar teaching approaches, whereas student teachers' outcomes have been assessed either using video-recorded training data and/or self-reports. Some studies on pre-service programs in the United States have used video-recorded training data to assess learning outcomes. In Joseph and Brennan's study (2013), the ECE student teachers were moved systematically from *knowing* about and *identifying* high-quality interactions to *doing* and *reflecting* on their own and other students' interactions with children recorded in ECE classrooms. The authors concluded that the pedagogical step, including peer coaching and self-reflection, were effective means for improving the quality of interaction based on the broad CLASS domains evaluated from short video-clips recorded during training. Similarly, self-reflections of video-recorded interactions, peer discussions, and instructors' feedback in small-group meetings were used in La Paro et al. (2012). Interestingly, after training, the authors found a significant decline in emotional support and a non-significant increase in instructional support, which is partly in contrast with the findings of a well-controlled pre- and post-test Chinese study by Hu and colleagues (2023). The ECE student teachers who received intensive individualized video-based coaching improved in emotional support during their internship compared to the control group (no individualized coaching), but again there was no improvement in classroom management or instructional support. These pre-service studies also confirmed the higher-quality emotional support and lower-quality instructional support pattern among ECE student teachers just before graduation at the transition to work.

Other studies applying the CLASS framework only used self-reports to evaluate pre-service teachers' learning outcomes. According to a study by Scott-Little et al. (2011; see also Hu et al., 2022), the ECE student teachers' understanding of the content of the training improved, and their beliefs and attitudes on these topics changed in a positive direction. This is the only intervention in higher education that combined CLASS related content with a specific focus to support children's language and literacy development.

The current dissertation analyzes the quality of Finnish ECE student teachers' observed interactions with preschool-aged children in a shared picture book reading setting during their practical training in daycare centers as one part of the study module provided by a higher education teacher program. As suggested by (Cabell et al., 2013; Thorpe et al., 2020), a more targeted, short-time daily activity for CLASS observations, as opposed to the common practices of random time-sampling, could enhance the reliability and comparability of assessments. A joint reading activity was chosen as the context for the teacher–child interactions because of the beneficial effects of shared reading on children's language and literacy outcomes (for emotional competence, see Aram & Aviram, 2009; Bailey et al., 2013). Already in early infancy, the mother–infant dyad constructs mutual meaning in successive ritualized and predictable turns during picture book reading interactions, which have shown positive effects on children's attention and learning (Ninio & Bruner, 1978). Furthermore, the positive influences of parent–child one-on-one shared reading on children's vocabulary, language, and literacy development have been widely acknowledged (for reviews and meta-analyses, see Bus et al., 1995; Mol et al., 2008; Scarborough & Dobrich, 1994).

Many interventions on dialogic reading have been implemented in the home setting. Instead of directly reading the text to the child, Whitehurst et al. (1988) taught parents of preschool-aged children to actively engage the child by prompting age-appropriate questions, expanding the child's verbalizations, extending dialogues, providing scaffolding and feedback, and praising the child's efforts to tell the story. Later, compared to one-on-one home settings, the effects of dialogic conversations during shared picture book reading in the ECE classroom have also been found to be beneficial for children's language and literacy development (Dickinson & Smith, 1994; Wasik et al., 2006). Moreover, these intervention studies indicated that in conjunction with home reading, high-quality and frequent dialogic reading in ECE classrooms could promote at-risk children's vocabularies, story comprehension, and emergent literacy skills (for reviews and meta-analyses, see Dickinson et al., 2003; Mol et al., 2009; Zevenbergen & Whitehurst, 2003). Interventions have also evidenced that teachers made improvements in using effective reading strategies in preschool classrooms, for example, asking more open-ended questions, giving more responsive feedback, and sustaining longer and richer

conversations with more turns (Houen et al., 2022; Milburn et al., 2014). Therefore, joint book reading interactions containing co-constructed conversations with successive predictable turns might be the optimal setting for both assessing and enhancing teachers' professional development at the granular, behavioral level as well as children's favorable language and literacy outcomes (see also McDoniel et al., 2022).

## 1.4 The conceptual model of the dissertation

Figure 1 demonstrates that the quality of teacher–child interactions in the picture book reading setting is manifested and emerged from the bidirectional exchange processes of information. The nature of these dynamic verbal and nonverbal interactions between the teacher, the boy, and the girl affects and gradually influences their memory representations of the relationships. This, in turn, reciprocally alters the quality of interactions evolving between them. Teachers' self-efficacy beliefs of culturally inclusive pedagogy, on the other hand, is an aspect of the overall relationship dynamics which can influence how teachers approach and engage in relationships with children. The external factors, such as teacher–child ratio in ECE classrooms, activity setting, and school climate were not the focus of the current study, but they also have influences on the quality of teacher–child interaction and relationships.

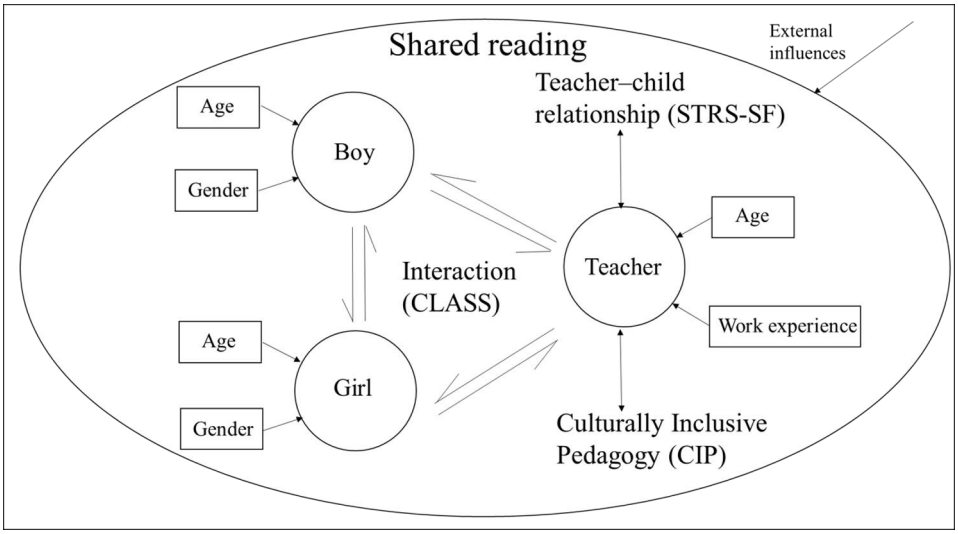


**Figure 1.** A conceptual model of the relations between the three constructs applied in the dissertation (adapted from the model presented by Pianta et al., 2003).

# 2 Research Questions

The overall aim of this thesis is to assess Finnish pre- and in-service ECE teachers' professional development in order to improve the effectiveness of ECE teacher training programs and to foster ECE teachers' professional development from the undergraduate level onward (see Table 1 for the general purpose, research aims, and questions of the dissertation). The first research aim of the thesis is to explore how ECE teachers at various career stages evaluate their professional practices, that is teacher–child relationships and self-efficacy of culturally inclusive pedagogy, and to observe ECE student teachers' teaching practices, that is the quality of teacher–child interactions. The second research aim is to develop valid and reliable measures to evaluate these three major concepts. The research questions of the each sub-study are stated below:

## Study I

What is the validity and reliability of the STRS-SF in the Finnish ECE context? How do ECE student teachers enrolled in a study module, qualified ECE teachers enrolled in in-service training, and a control group of qualified ECE teachers (not enrolled in training) perceive their overall relationships with children, and do the three groups of teachers perceive their relationships differently?

Study I aimed to validate the STRS-SF, a self-assessment instrument, and to assess teachers' perceptions of their overall relationships with a group of children. The factorial validity and measurement invariance of the hypothesized two-factor STRS-SF model were examined using multi-group CFA. The factorial validity confirmed that the items in the scale measure the two latent constructs of closeness and conflict. Measurement invariance across teacher characteristics was tested to ensure that the two constructs had the same meaning for the three groups of teachers. Measurement invariance, showing at least partial strong invariance, is the prerequisite for reliable and valid comparisons between groups.

## Study II

What is the validity and reliability of the Culturally Inclusive Pedagogy (CIP) scale developed for the Finnish ECE context? Do ECE student teachers and qualified ECE

teachers differ in their self-efficacy beliefs regarding culturally inclusive pedagogy? Is there a reciprocal relationship between teachers' efficacy beliefs of culturally inclusive pedagogy and self-perceived teacher–child relationships?

Study II aimed to develop and validate a new self-assessment scale to assess teachers' self-efficacy of culturally inclusive pedagogy. Study II compared student teachers' and qualified ECE teachers' self-efficacy beliefs. The study explored whether the factor structure of the hypothesized one-factor model (representing a coherent inclusive pedagogy construct) or a two-factor model (representing the planning and implementation of inclusive practices) would fit the data using a multi-group CFA. Measurement invariance was used to test whether the two groups of teachers interpreted the items and the construct similarly.

### Study III

What is the quality of pedagogical interactions of novice ECE student teachers who were enrolled in a study module and assessed in a joint book reading setting using CLASS Pre-K? Does the pre-service training have a transfer effect on how student teachers perceive their overall relational processes with children (STRS-SF)? Are demographic characteristics, such as children's age and student teachers' work experience, related to the observed quality of student teachers' reading interactions during practical training and the student teachers' perceptions of the overall quality of their relationships with children?

Study III was an intervention study aimed at assessing and promoting the quality of ECE student teachers' pedagogical competence at the start of their second academic year. Study III explored the effects of a university study module consisting of lectures, tutorials, learning assignment, and practice in daycare centers. This is the first Finnish study to examine the quality of student teachers' pedagogical interactions in a shared reading setting with two preschool-aged children in the beginning of their five-week practical training using the adapted CLASS Pre-K. In terms of the long-term purpose of developing pre-service teacher education, it is the students' behavioral level that can be changed by training. To capture the behavioral level of how ECE student teachers provide instructional support, a more detailed level of analyses, i.e. the frequency and duration of several behavioral markers that represents the indicators of instructional support were systematically coded and analyzed. The continuous and overall process of emotional support was assessed in line with the original scale. Study III examined whether there was a relationship between the observations of reading interactions and the demographic characteristics of both children and student teachers, such as age, child gender, and student teachers' work experience.

**Table 1.** The general purpose, research aims, and questions of the dissertation.

| General Purpose | | |
|---|---|---|
| Assessing professional development in Finnish pre- and in-service teachers to improve the effectiveness of teacher education and teaching in preschool classrooms. | | |
| **Research Aims** | | |
| Expanding the conceptual understanding of professional practices (i.e. teacher–child relationships and self-efficacy of culturally inclusive pedagogy), and teaching practices (i.e. teacher–child interaction). | Develop reliable and valid measures to assess major domains of teaching competence (MAP) from the undergraduate level onwards. | |
| **Research questions** | | |
| Validate a modified self-report scale (STRS-SF) to assess ECE teachers' perceptions of their overall relationships with a group of children.<br>Compare three groups of ECE student teachers' and qualifid teachers' perceptions of their relationships with children at different stages of their career. | Develop and validate a self-report scale (CIP) to assess self-efficacy of culturally inclusive pedagogy.<br>Compare student teachers' and qualified teachers' self-efficacy beliefs, and explore the relations between self-efficacy of culturally inclusive pedagogy and perceived teacher–child relationships. | Observe ECE student teachers' interaction in a picture book reading setting.<br>Apply an observational measure (CLASS Pre-K) to assess the quality of pedagogical interactions in a one-on-two setting.<br>Examine the effects of pre-service training during a study module on the observed interactional quality (CLASS Pre-K) and self-perceived relationships with children (STRS-SF). |

# 3 Methods

In the current dissertation, a mixed methods approach (Yoshikawa et al., 2008), including both quantitative and qualitative approaches to data collection and analyses, was employed according to the research questions of each sub-study (see Table 2 for a summary of participants, methods, and data analyses). The self-report method was considered effective for collecting large samples of data instead of observation or interview methods since those are time consuming and expensive. The observation method was used to assess the quality of teacher–child interactions. The quantitative approach weighs stronger in the first two studies than the qualitative approach, for example, the process of constructing the new questionnaires as well as conducting factor analyses which can confirm the theoretical concepts are regarded as the qualitative approach. In Study III, the observational analysis of the video-recorded interaction data is based on a qualitative approach, as well as more detailed quantitative data analysis techniques, such as coding the frequency and duration of student teachers' behaviors and practices.

In Study I, a new modified version of the STRS-SF was adapted into the Finnish context to assess ECE teachers' overall perceptions of their relationships with a group of children. In Study II, a new self-report scale, the CIP, was developed to explore teachers' self-efficacy of their culturally inclusive pedagogy. In Study III, the CLASS Pre-K observational tool was applied to evaluate the quality of ECE student teachers' reading interactions with two preschool-aged children.

## 3.1 Participants and procedure

### Study I

Study I consisted of three groups of ECE teachers ($N$ = 258). The first group was first-year ECE student teachers from a bachelor's degree program in early childhood teacher education (180 ECTS; European Credit Transfer and Accumulation System, https://ec.europa.eu) at a university. Of the 112 student teachers who filled out the online questionnaire at the beginning of a study module, 103 (females = 93) gave their consent to use their data in the current research. The students had completed

around 30 ECTS credits, including one week of practical training in daycare centers with 3-to-5-year-old children.

The second and third group were ECE teachers who had obtained their bachelor's degrees in either education from a university or in social sciences from an applied sciences university. They were qualified teachers working in daycare centers in the southwestern provinces of Finland. The data were gathered from eight municipalities for the second group and 44 municipalities for the third group. Invitations to either participate in a professional in-service training program or to respond to an online questionnaire were sent via email to the municipalities' administrators. Of the 40 teachers who voluntarily agreed to participated in the in-service training organized by two universities, 39 teachers (females = 38) responded to the online questionnaire before training and gave their consent for the data to be used in the current study. These 39 teachers constituted the second group. The third group was 116 ECE teachers (females = 113) who did not attend in-service training but agreed to respond to the online questionnaire.

The ANOVAs demonstrated that the ECE student teachers were younger ($M$ = 25.13, $SD$ = 6.32 years) than the second ($M$ = 42.58, $SD$ = 11.18 years) and third ($M$ = 42.90, $SD$ =11.17 years) groups of qualified ECE teachers. The teachers in training had less work experience ($M$ = 10.79, $SD$ = 6.89 years) compared to the teachers ($M$ = 15.40, $SD$ = 11.47 years), and the teachers in training worked with younger children ($M$ = 3.92, $SD$ = 1.48 years) than the teachers ($M$ = 4.69, $SD$ = 1.42 years). The two groups of qualified ECE teachers did not differ with respect to their educational background, child–teacher ratio, and number of immigrant and special needs children in their classrooms.

## Study II

Participants of Study II consisted of ECE student teachers and qualified ECE teachers ($N$ = 326). The student teachers ($n$ = 171, females = 156) represented two cohorts from 2019 (Study I) and 2020. In the 2020 cohort, 68 (females = 63) of the 72 student teachers who filled out the online questionnaire gave their consent to use their data in the study. The age of the student teachers ranged from 19 to 49 years ($M$ = 25.57, $SD$ = 6.54).

The second group represented the qualified ECE teachers from Study 1 ($n$ = 155; females = 151). With respect to their educational backgrounds, 75 (48.4%) had a bachelor's degree in social sciences from applied sciences universities, 66 (42.6%) had a bachelor's degree in ECE, and 14 (9%) had a master's degree in ECE from universities. The age of the qualified teachers ranged from 23 to 63 years ($M$ = 42.84, $SD$ = 11.14) and the work experience from 1 to 40 years ($M$ = 14.25, $SD$ = 10.64). The qualified teachers worked with 1-to-7-year-old children ($M$ = 4.55, $SD$ = 1.46).

The number of children with special needs and with immigrant backgrounds ranged from 0 to 9 ($M$ = 2.34, $SD$ = 2.23) and from 0 to 22 ($M$ = 3.50, $SD$ = 4.52), respectively. The child–teacher ratio in the classrooms varied from 2.33 to 12.00 ($M$ = 5.73, $SD$ = 1.77).

### Study III

Participants of Study III consisted of second-year ECE student teachers enrolled in a professional early childhood teacher education study module ($N$ = 100) of a university bachelor's degree program. Of the 100 student teachers who completed the online questionnaires, 79 (female = 77) in autumn and 71 (females = 67) in winter gave their consent to use their data in the current study.

The aim of the study module in Study III was to develop ECE student teachers' professional competence in effective observations and interactions with children. The study module included online lectures about children's language development and high-quality pedagogical interactions. The student teachers also completed independently assignments and studied learning materials provided on a digital platform. To promote co-constructed dialogues, they attended online tutorials in small groups to discuss and practice identifying effective teacher–child interactions via video-recorded observations. The teacher educator's role was to inspire discussion, self-reflection, and peer assessment between the student teachers both before and after the practical training period.

To further foster evidence-based professional development, the student teachers video recorded their picture book reading interactions with two children, one boy and one girl, in daycare centers as one of the learning tasks of their five-week practical training. In each classroom, the boy and the girl who were closest to 4 years old were selected to participate in the current study. The written consent forms from the head of the daycare centers and the parents of the children who participated in the video recordings were collected by the student teachers. Of the 100 student teachers who returned the video recordings, 59 students agreed to have their videos used as research data. To avoid self-selection bias, the students who agreed to have their reading interactions used as research data did not differ in their self-reported close or conflictual relationships with children from those students who did not agree as assessed by the Mann–Whitney $U$ test.

Among the 59 students, only the videos of 45 student teachers (41 females) who practiced in 35 different daycare centers met the video inclusion criteria. The criteria were that parents' consent was obtained, the student teacher worked with two children, the video had good sound and visual quality, the video's length was longer than five minutes, and the student teacher spoke Finnish and did not wear a mask. The age of these 45 student teachers ranged from 19 to 43 years ($M$ = 25.20, $SD$ =

5.98). The student teachers had on average less than one year of work experience. The age of the boys who participated the video-recorded reading interactions ranged from 24 to 65 months ($M$ = 47.58, $SD$ = 9.64), and the age of the girls ranged from 24 to 72 months ($M$ = 47.38, $SD$ = 10.24). Correspondingly, before and after the study module, 38 of the 40 and 42 of 44 students gave their consent to use the online questionnaire in the study. The few missing values ($n$ = 5 before and 1 after) were handled by regression imputations in IBM SPSS Statistics (Version 27).

## 3.2 Measures

This dissertation adopted mixed methods and multiple sources of data (see Table 2): self-reports of ECE student teachers' and qualified teachers' perceived relationships with children as assessed by a modified version of the STRS-SF and their self-efficacy beliefs in their culturally inclusive pedagogy using a new CIP scale developed by the author and other experts in the project. All participants completed the online Webropol questionnaire, which included questions about demographic characteristics, relationships with children, and culturally inclusive pedagogy. The participants took about 15–20 minutes to complete the questionnaire. In addition, the video observations of student teacher–child reading interactions were assessed by CLASS Pre-K.

The decision to employ a group-level STRS-SF rather than the original individual-level assessment of a specific child stems from the fact that the student teachers were not yet qualified for working as teachers in ECE classrooms, so they could only assess their relationships based on their past training or other experiences with children in general. In addition, it was also more cost-effective to ask the qualified ECE teachers' to assess their relationships at the group-level instead of assessing each individual child in their ECE classroom. While the CLASS Pre-K assessment is more laborious, based on an observer's view of video recorded interaction, the STRS-SF offers a complementary perspective and a cost-effective tool to explore perceptual changes. Combining both observation and self-report methods would not only increase the validity and reliability of the research, but can inform the design of future interventions through the insights gained from mixed methods.

The decision to develop a new CIP scale is because the limited existing measures either concentrate on efficacy beliefs related to teaching special needs students or are developed in different cultural contexts, thereby failing to capture the inclusive nature of Finnish ECE. There is a necessity to create a new scale that specifically addresses the ECE context and aligns with the Finnish educational and cultural contexts.

### 3.2.1 Teachers' relationships with children

In all three studies, the modified version (Whitaker et al., 2015) of the original STRS-SF (Pianta, 2001b) was chosen as the most suitable measure to assess teachers' overall self-perceived relationships, closeness, and conflict with a group of children. The modified version shares the same content meaning as the original STRS-SF version, except the word "child" and the singular verbs were changed into their plural forms. The modified version of the STRS-SF questionnaire was translated into Finnish by three ECE experts who were native Finnish speakers and spoke English as their second language, and the questionnaire was back translated into English by a professional translator to ensure its quality. The final version took into account cultural differences and language discrepancies. The Finnish version of the STRS-SF was approved by the developer of the STRS-SF, Professor Robert Pianta.

The instructions were as follows:

> Please, assess how well each of the statements below currently applies to your relationship with children in your classroom. All relationships are individual, but in responding, please think about your relationships with the children in general. Use the scale below to choose the appropriate response for each item.

For the student teachers with no stable classroom, "children attending ECE settings" was used instead of "children in your classroom."

Closeness consisted of seven items representing the positive, kind, and warm aspect of relationships (for example, "I share an affectionate, warm relationship with the children"; "The children openly share their feelings and experiences with me"). Conflict was composed of eight items assessing the negative, conflictual, and passive side of relationships (for example, "The children and I always seem to be struggling with each other"; "The children are uncomfortable with physical affection or touch from me"). The participants rated each statement using a 5-point Likert scale (1 = definitely does not apply to 5 = definitely applies). In the original version, a score of 3 stands for "neutral, not sure," but in the Finnish version, "in-between" was used. A higher score on closeness means a positive relationship, whereas a higher score on conflict indicates a more negative relationship between teachers and children in the classrooms.

### 3.2.2 Teachers' self-efficacy of culturally inclusive pedagogy

In Study II, teacher self-efficacy of planning and implementing culturally inclusive pedagogy in the mainstream classroom was assessed by the eight-item CIP scale. The development of the CIP scale was influenced by Bandura's (1977) context, task, and domain-specific self-efficacy constructs. The basic principles of constructing the

items specific to the Finnish ECEC context were based on the Finnish ECEC legislation and the national core curriculum for ECEC (Finnish National Agency for Education, 2018). As the leader of the multi-professional team, the ECE teacher is responsible for planning and executing activities for children from diverse backgrounds in collaboration with parents and other team members.

Two ECE professionals initially developed a set of 16 CIP items in which half of the items were based on the Finnish curriculum, and the other half were influenced by a scale developed for teaching school children that had been validated among pre-service teachers in the U.S. educational and cultural context (Siwatu, 2007). In the current study, a broad definition of diversity was employed that included children's ability, ethnicity, and language (not only special needs as in some other studies; see Malinen et al., 2013; Sharma et al., 2012). Overall, the CIP scale represents the inclusive nature of the Finnish educational system.

The questionnaire instructions for the qualified teachers were as follows: "There are more and more children from different language, cultural, and family backgrounds in early childhood education. Consider the following statements and evaluate how well the statements describe your activities as an early childhood educator." For student teachers who had no stable classrooms, the term "as an early childhood educator" was changed to "as a student teacher in early childhood education." Participants rated each statement on a 5-point Likert scale (1 = definitely does not apply to 5 = definitely applies). For example, "I can take into account the diverse backgrounds of children when I am planning activities and interacting in teaching-learning interaction", and "I can form groups of children in which children with diverse backgrounds interact positively with each other." A higher CIP score represented greater confidence in planning and implementing inclusive pedagogy.

### 3.2.3 Teacher–child reading interactions

To code the quality of student teacher–child reading interactions in Study III, a coding scheme was developed based on the CLASS Pre-K (Pianta et al., 2008a). The CLASS is a widely applied and validated observation tool to assess the three domains of emotional support, classroom organization, and instructional support. The student teachers were instructed to video record a 20-minute observation cycle of their reading interactions with one boy and one girl at the beginning of their five-week practical training period at child care centers. They were asked to read a picture book written by Sanna Pelliccioni named *Onni-poika menee päiväkotiin* (in English: *Little Onni Goes to Day Care*) to the preschool-aged children. This book was selected because the content is close to children's everyday life. On average, the length of the recorded videos was around 14 minutes ($M$ = 13.94, $SD$ = 2.40). All videos were transcribed and subtitled in English by a professional translator for data analysis.

The videos were coded by two independent observers who had passed the reliability test (i.e., 80% of the codes were within 1 point of the master codes for each dimension across five videos after the training workshop) provided by Teachstone. Consistent with the CLASS manual, the two observers coded the 45 videos using Likert scales. The two independent observers double coded 20% of the videos to ensure the inter-rater reliability. Across all the CLASS Pre-K dimensions, the inter-rater agreement within 1 scale point ranged from 89% to 100%, and intra-class correlation coefficients ranged from .39 to 1.00.

## 3.3 Data Analysis

### 3.3.1 Self-report data

Mplus 8 (Muthén & Muthén, 2017) was used to investigate the factor structure and measurement invariance of the three groups (Study I) and two groups (Study II) of ECE teachers' self-perceived relational processes (STRS-SF). Similarly, the factor structure and measurement invariance of the two groups of ECE teachers' efficacy in planning and implementing culturally inclusive pedagogy were explored in Study II.

Factorial validity refers to the degree to which the items in the scale actually measure the underlying factor structure of a measure. Measurement invariance means that a measurement works consistently across different groups or situations, and it is an important prerequisite to making meaningful group comparisons (Meredith & Teresi, 2006). Measurement invariance involves testing the equivalence of the constructs of the latent factors across two or more groups (Byrne et al., 1989). The most frequent technique to assess measurement invariance is using multi-group CFA. Measurement invariance consists of three increasingly constrained models, namely, configural, metric, and scalar invariance (Byrne, 2006; van de Schoot et al., 2012). The first level is configural invariance, which tests whether the number and pattern of the factor structure of a model is equivalent across various groups. Failure to demonstrate configural invariance indicates that the underlying constructs are discrepant among diverse groups (see Webb & Neuharth-Pritchett, 2011). The second level is metric invariance, which tests whether the factor loadings of the construct are similar across various groups. Passing the configural and metric invariance represents the weak measurement invariance. The third level is scalar invariance, which tests whether the intercepts of the items are equal across groups. When scalar invariance (also known as strong measurement invariance) is achieved, it ensures that not only the structure and patterns of a construct are consistent across groups but also that the measurement units are the same. This means that the factor means and variances can be compared between groups. It is worth noting that partial

scalar invariance is also accepted by relaxing certain items' intercepts in the model (Greiff & Scherer, 2018; Steenkamp & Baumgartner, 1998).

Structural equation modeling (SEM) comprises two aspects: the measurement model and the structural model. CFA is regarded as an optimal method to explore the measurement model (i.e., how the pattern of observed variables represents the latent constructs of the hypothesized measurement model; Schreiber et al., 2006). CFA was used to test the fit of the postulated two-factor structure (factors: closeness and conflict) of the STRS-SF in Study I for the three ECE subgroups (student teachers, qualified ECE teachers in in-service training, and qualified ECE teachers not attending training) and in Study II for the two ECE subgroups (student teachers and qualified ECE teachers). CFA was also applied in Study II to test whether a one- or two-factor structure of CIP fit the sample data. Moreover, to make meaningful comparisons and explore associations, it was important to use multigroup CFA to test whether the different groups of teachers interpreted the constructs of the STRS-SF and CIP similarly in Studies I and II. The structural model elucidates the relationships between the latent constructs. In Study II, two structural models were specified to explore the reciprocal (predictive) relations between teacher efficacy of culturally inclusive pedagogy and self-perceived teacher–child relationships separately for the two groups.

The parameters of the models were estimated using the maximum likelihood estimation method. The following indicators were used to evaluate the goodness-of-fit of the specific models for the sample data: the chi-squared likelihood ratio test ($p > 0.05$), the comparative fit index (CFI $\geq 0.95$), the Tucker–Lewis index (TLI $\geq 0.95$), the standardized root mean squared residual (SRMR $\leq 0.08$), and the root mean squared error of approximation (RMSEA $\leq 0.06$; Hu & Bentler, 1995). For the group comparisons, a chi-squared difference test ($\Delta\chi^2$) and $\Delta$CFI were chosen to test and assess the differences between the alternative nested models (Cheung & Rensvold, 2002; van de Schoot et al., 2012).

Regarding the reliabilities of the measures, the internal consistencies of the instruments were estimated by calculating the Cronbach's alpha, ordinal alpha, and reliability coefficient rho. In Study I, the internal consistency (Cronbach's alpha and ordinal alpha) of the 15-item closeness and conflict scales was medium to high. In Study II, the reliability coefficient rho values based on the maximum likelihood estimation method of the 12-item STRS-SF were acceptable for the whole sample, the student teachers, and the qualified teachers. In addition, the reliability coefficient rho values of the eight-item CIP scale were high for the whole sample, the student teachers, and the qualified teachers. In Study III, the Cronbach's alphas of the closeness and conflict items for the whole sample before and after the intervention were also acceptable.

Before the SEM and reliability analyses, other preliminary examinations of the data were conducted for each study using SPSS (Version 27). For example, descriptive statistics were provided to give a description of the sample data. Normality of the STRS-SF and CIP items were verified in the first phase to ensure that the parameters of the data were adequate for further analysis. Almost all of the distributions of the questionnaire data were within the normal range, with skewness below |2| and kurtosis below |7| (West et al., 1995). The few missing data from the questionnaires were treated as missing at random in the SEM analyses. Due to the small sample size in Study III, the analyses concerning STRS-SF were reported with non-parametric tests.

Correlation matrixes were examined to ensure that the scale items were significantly correlated with each other. Most of the correlations for the 15-item STRS-SF were positive and significant. Moreover, in Study I, one-way ANOVA with Tukey's Honestly Significant Difference post hoc test was used to compare the ages of the three groups of teachers. Also, the *t*-test was used to compare the other demographic information between the two qualified teacher groups.

### 3.3.2 Observation data

In Study III, the coding system for assessing the quality of student teacher–child joint picture book reading interactions was developed based on the CLASS Pre-K manual (Pianta et al., 2008a). All the verbal or non-verbal interactions were analyzed (see Article III for more details about the adapted dimensions, indicators, and behavioral markers). The dimensions in the emotional support domain were rated on a 7-point Likert-scale (1 = low to 7 = high). The reliability in terms of the Cronbach's alpha for emotional support was .87 after exclusion of the negative climate dimension due to no negativity observed during the reading interactions.

One of the coders used the ELAN annotation software, version 6.1 (2022) to analyze the detailed moment-to-moment coding of the frequency and duration of the classroom organization and instructional support domains. Regarding classroom organization, given the highly structured and well-informed setting, only a few indicators were detected: clear behavior expectations, redirection of misbehavior, and clarity of learning objectives. The instructional support domain was coded into the following eight indicators: analysis and reasoning, feedback loops, providing information, encouragement and affirmation, open-ended questions, extension, yes-or-no questions, and requests for labeling. Note that the latter two indicators were not in the original manual and were added by the author to represent closed-ended questions.

ELAN also enabled analyses of the duration and frequency of student teachers' direct reading, boys' and girls' engagement in discussions, and the turns of the back-

and-forth exchanges (feedback loop) sustained by the student teacher and the two children during the reading interactions. Feedback loops were coded into three categories: one feedback loop, two feedback loops, and three or more feedback loops. One feedback loop contained two or three turns of utterances, initiated by either the student teacher or the child, followed by either partner's response, and/or continued by either partner's feedback. Boys' and girls' utterances were coded as boys' and girls' engagement.

SPSS (Version 27) was used to present the descriptive statistics and normality of the emotional support, classroom organization, and instructional support of the ECE student teachers' observed picture book reading interactions. The distribution of the sample data was mostly within the normal range, with skewness below |2| and kurtosis below |7| (West et al., 1995). Due to the small sample size and some non-normal indicators in the instructional support domain, the computed summary variables, nonparametric Friedman test, and Spearman's correlations were mainly used in further analyses. To control for variations in the length of the recorded videos, frequency rates and durations per 10 minutes were calculated and used in the reported statistical analyses.

## 3.4 Ethical issues in data collection and data analyses

Ethical issues concerning research design, conduct, and data handling were addressed according to the ethical principles of the Finnish National Board on Research Integrity guidelines 2019 (https://tenk.fi/en). The data collection involved administering online questionnaires and conducting video-recorded observations. In all studies, the instructions provided in the online questionnaire explained the purpose of the study and the use of the data to participants. In Study III, student teachers were instructed orally and in writing how to conduct a video observation task and digitally return the video recordings to the author through a personal link at the beginning of the study module before they started their practical training in daycare centers. The children were also informed about the video recordings of the reading session and that they could choose if they wanted to participate. Student teachers' participation in the questionnaire and observation was voluntary, and all data analyses were based on their consent. Before collecting qualified teachers' data, the administration of the municipalities and the daycare centers' principals were informed of the study, and the principals granted permission for the data collection. Qualified teachers' participation in the online questionnaire was also voluntary, and data were only used in the current study with their consent. Regarding video observations, participating student teachers, children's parents, and the daycare centers' principals all approved the study and gave their written consent.

All personal information was handled with anonymity. The participants' personal information, the questionnaire data, and the video recordings were carefully stored and could only be accessed by the author of this thesis and the first supervisor. Video recordings and questionnaire data were saved online in Seafile and Webropol, respectively, as well as on a mobile hard drive with a password. After the research was completed, all data were removed if necessary.

The author actively participated in collecting and analyzing the data. The author gathered the research data for the three studies from 2019 to 2021.

## 3.5 Summary of participants, methods, and data analyses

A summary of each sub-study of the dissertation is provided in Table 2.

**Table 2.** Summary of the sub-studies

| Study | Participants | Methods | Datasets | Data Analysis |
|---|---|---|---|---|
| I | Whole sample (*N* = 258)<br>- Student teachers (*n* = 103)<br>- Teachers in training (*n* = 39)<br>- Teachers (*n* = 116) | Survey (Finnish modified version of STRS-SF) | Participants' self-perceptions of their relationships with children | - Descriptive statistics<br>- Correlational analyses (Pearson's correlation)<br>- Cronbach's alpha and ordinal alpha<br>- Analysis of variance: One-way ANOVA with Tukey's Honestly Significant Difference and *t*-test<br>- SEM: CFA and measurement invariance |
| II | Whole sample (*N* = 326)<br>- Student teachers (*n* = 171)<br>- Qualified teachers (*n* = 155) | Surveys (CIP and Finnish modified version of STRS-SF) | Participants' self-efficacy of culturally inclusive pedagogy and self-perceptions of their relationships with children | - Descriptive statistics<br>- Correlational analyses (Pearson's correlation)<br>- Reliability coefficient rho<br>- Analysis of variance: *t*-test<br>- SEM: CFA and measurement invariance |
| III | - Video observations: student teachers (*n* = 45)<br>- Survey: student teachers before the intervention (*n* = 79), after the intervention (*n* = 71) | Video observations of student teacher–child reading interactions (CLASS Pre-K); survey (Finnish modified version of STRS-SF) | Video recordings of each participant's interaction with one boy and one girl (exceptions: three students had two girls, and one student had two boys) | - Coding the frequency and duration of student teacher–child reading interactions with CLASS observation tool using ELAN<br>- Descriptive statistics<br>- Correlational analyses (Pearson's correlation and Spearman's correlation)<br>- Cronbach's alpha<br>- Analysis of variance: Friedman test and post hoc comparison<br>- Mann–Whitney U test |

# 4 Overview of the Empirical Studies

## 4.1 Study I

**Yang, W., Laakkonen, E., & Silvén, M. (2021). Teachers' relationships with children in the Finnish early childhood education context: A validation study. *Journal of Psychoeducational Assessment*, *39*(7), 848–860. https://doi.org/10.1177/07342829211019150**

The quality of teacher–child relationships is a crucial topic in ECE. Warm and trusting teacher–child relationships promote children's learning and development. The aim of Study I was to examine the factorial validity and measurement invariance of STRS-SF among ECE pre- and in-service teachers in the Finnish cultural context. In particular, this study compared three groups of teachers: first-year student teachers ($n$ = 103), qualified ECE teachers in in-service training ($n$ = 39), and qualified ECE teachers not attending in-service training ($n$ = 116). The participants rated their overall relationships, closeness, and conflict with the whole group of children using the modified scale of the group-level version of the STRS-SF (Whitaker et al., 2015). The reliability and validity of the Finnish version of the instrument was investigated. The internal consistency of the 15-item closeness and conflict scales were acceptable as calculated by the ordinal alpha.

The factor structure of the hypothesized two-factor measurement model for the whole sample based on the 15-item scale was measured and tested using CFA. Three items were removed, and three pairs of error covariances were added to establish a good model fit for the whole sample as well as the three sub-groups. The measurement invariance testing supported the partial strong measurement invariance across three groups of teachers as assessed by the multi-group CFA. The group comparison results showed that in general, pre- and in-service teachers perceived high levels of close and low levels of conflictual relationships with children. Moreover, the qualified ECE teachers who attended training reported higher levels of conflictual relationships with children than the qualified ECE teachers who did not attend in-service training. This difference in perceptions could reflect teachers' real encounters with pedagogically challenging classrooms, shedding light on their motivations to engage in the training. This interpretation is in line with the other data

indicating that teachers who attended in-service training had fewer years of work experience and had younger children in their classrooms compared to those qualified teachers who did not attend in-service training. However, student teachers reported less closeness with children than qualified ECE teachers and less conflicts than the qualified ECE teachers in in-service training.

The findings suggest that the STRS-SF is a reliable and valid self-report measure to assess teachers' overall relationships with a whole group of children in the Finnish ECE context. Further studies could apply the group-level version in comparative research and teacher training. Reflections and feedback about teacher–child relationship in ECE classrooms could change the quality of these relationships, thus improving professional development.

## 4.2 Study II

**Yang, W., Laakkonen, E., & Silvén, M. (2022). Closeness, conflict, and culturally inclusive pedagogy: Finnish pre- and in-service early education teachers' perceptions. *Frontiers in Psychology*, *13:834631*. https://doi.org/10.3389/fpsyg.2022.834631**

There is an increasing need for culturally competent and responsive teachers who can effectively interact with children and families representing gender, age, skill, language, cultural, and religious diversity. The first aim of this study was to examine ECE pre- and in-service teachers' self-efficacy in engaging with diversity in classrooms and compare the two groups of teachers' self-efficacy in the Finnish ECE context. Second, the study explored the reciprocal associations between teachers' sense of efficacy in engaging with diversity and their perceived teacher–child relationships as assessed by the modified STRS-SF, which was validated in Study I.

The participants of Study II included first-year ECE student teachers ($n$ = 171) and qualified ECE teachers ($n$ = 155). The development of the Culturally Inclusive Pedagogy (CIP) scale was based on Bandura's (1977) construct of context, task, and domain-specific efficacy; the ECEC legislation and national core ECEC curriculum (Finnish National Agency for Education, 2018); and the existing measure (Siwatu, 2007). The participants responded to the CIP scale and STRS-SF online. The reliability and validity of the two measurements were investigated. The internal consistency of the eight-item CIP scale and the 12-item closeness and conflict scale were acceptable as calculated by the reliability coefficient rho based on the maximum likelihood estimation method.

The results of the multi-group CFA showed that the CIP scale represented a one-factor structure after being reduced to eight items and adding one pair of error covariances. According to the tests of measurement invariance, ECE student teachers

and qualified ECE teachers interpreted the CIP constructs differently to some extent. At the item level, the qualified teachers' self-efficacy beliefs in their ability to engage diverse children were higher than those of the student teachers. Multi-group CFA results further indicated that the two-factor structure of the modified version of the STRS-SF fit the student teacher and the qualified teacher sample data respectively. However, failure to achieve metric invariance showed that the two groups of teachers conceptualized the closeness and conflict constructs somewhat differently. Moreover, the fit indices (chi-squared test) for the measurement models with three correlated factors (closeness, conflict, and culturally inclusive pedagogy) were unacceptable for the whole sample. Thus, based on these results, structural models were specified to characterize the bidirectional relationships between the three constructs.

To address the second aim of the study, the analysis regarding concurrent validity indicated that higher levels of reported efficacy beliefs—that is, confidence in planning and executing teaching-learning interactions with diverse children—were related to closer and warmer relationships with children as perceived by the teachers in both groups. Only among student teachers, higher self-efficacy beliefs predicted less conflictual relationships with children. The findings may reflect reciprocal effects between teacher efficacy and close teacher–child relationships.

Overall, one of the main contributions of the current study was the creation of the CIP self-assessment tool, which proved to be a reliable and valid instrument and could be utilized in teacher training and for professional development purposes. In addition, incorporating more training and practice on relational processes in the curriculum could have beneficial effects on ECE teachers' self-efficacy of inclusive pedagogy in classrooms.

## 4.3 Study III

**Yang, W., & Silvén, M. (2024). Fostering high-quality reading interactions in pre-service early childhood teacher education. Manuscript under review. University of Turku.**

This study aimed to assess and promote ECE student teachers' professional competence in the beginning of their second year in Finnish higher education. The study investigated the observed quality of interactions between ECE student teachers and children in a one-on-two joint picture book reading setting. The study also examined whether the pre-service training have a transfer effect on how ECE student teachers perceive their overall relationships with children and whether student teachers' and children's characteristics were associated with the observed quality of the reading interactions.

The participants were Finnish second-year student teachers ($N$ = 100) enrolled in a professional study module provided by a university teacher preparation program. The study module aimed to foster student teachers' effective interactions with preschool children. This study module provided the students with knowledge about child development and ECE pedagogy, and practice identifying, implementing, and reflecting on high-quality interactions with children. Students were instructed to video record a 20-minute picture book reading interaction with one girl and one boy in the beginning of their five-week practical training period in daycare centers. The 45 reading interactions that met the inclusion criteria were coded using the CLASS Pre-K (Pianta et al., 2008), which consists of the emotional support, classroom organization, and instructional support domains. Correspondingly, before and after the study module, 38 of the 40 and 42 of 44 students gave their consent to use the online questionnaire in the study.

Two observers coded the 45 video-recorded reading interactions using the original CLASS Pre-K coding manual. The domain level analyses confirmed the expected imbalance pattern of high-quality emotional support and low-quality instructional support. It is believed that students' teaching behaviors that can be changed by training. Thus, in order to better understand how ECE student teachers provide instructional support, one observer utilized ELAN to code the detailed, molecular level of analyses (see also Pianta et al., 2020), i.e. the moment-to-moment frequency and duration of behavioral markers that represents the indicators of instructional support domains.

The behavioral level analyses revealed that the students showed relatively low-quality instructional support because they mainly asked simple questions (yes-or-no questions and requests for labeling). The students rarely asked complex questions (analysis and reasoning as well as open-ended questions) or provided extensive feedback (providing information, encouragement and affirmation, and extension) to boost children's higher-level thinking and language use. The students who asked more simple questions also posed more complex questions and sustained longer back-and-forth exchanges. The results also indicated that less time spent on direct reading was related to more positive emotional interactions, child engagement, and extensive feedback and to less short back-and-forth exchanges. After the study module, ECE student teachers reported more closeness and less conflict in their overall relations with children.

The in-depth analysis using the adapted CLASS Pre-K coding system contributed to a greater understanding of how to assess and improve teachers' low-quality instructional support in higher education. Teacher preparation programs should foster ECE student teachers' interactional competence to use more open-ended and reasoning questions and to sustain longer conversations related to picture book contents to better promote children's concept development and language learning.

# 5 Main Findings and Discussion

This last section begins with a summary of the overall aim of this dissertation. Then, it provides the main findings of the three empirical studies. In addition, the theoretical, methodological, and practical implications are discussed. Last, the limitations of the dissertation and suggestions for future research are presented.

The research aim of this dissertation is twofold (see Table 1): the first research aim is to explore how ECE teachers at various career stages evaluate their professional practices, that is teacher–child relationships and self-efficacy of culturally inclusive pedagogy, and to observe ECE student teachers' teaching practices, that is the quality of teacher–child interactions. The second aim is to develop valid and reliable measures to evaluate these three major concepts.

Study I provided new understanding of the psychometric properties of a Finnish version of the widely accepted self-report instrument STRS-SF. The study collected data on ECE teachers' perceptions of closeness and conflict in their overall relationships with children from the undergraduate level onward and demonstrated perceptional differences among groups of teachers at various career stages, extending the application of the STRS-SF in the Nordic teacher education context.

In Study II, a new scale for assessing teacher efficacy for planning and implementing culturally inclusive pedagogy in ECE classrooms with children of diverse backgrounds was developed. The psychometric properties of the newly developed CIP scale were explored, and ECE student teachers' and qualified ECE teachers' self-efficacy beliefs were compared. Building on Study I's contributions, Study II further investigated the reciprocal relations between self-efficacy of inclusive practices and self-perceived teacher–child relationships. The findings highlighted the need to incorporate more relational training and inclusive pedagogy into the curriculum design for pre- and in-service teachers.

In Study III, the quality of ECE student teacher–child interactions in a shared picture book reading setting was observed, and the structured one-on-two setting was assessed by the CLASS Pre-K. The detailed ELAN analyses revealed several underlying pedagogical activities that highlight the imbalanced pattern of high-quality emotional support and classroom organization and relatively low-quality instructional support that ECE student teachers displayed during the reading

interactions. Study III further demonstrated that after the study module, ECE student teachers' reported higher closeness and less conflict in their overall relations with children. This study stresses the importance of fostering ECE student teachers' interactional competence and improving the effectiveness of a university program.

## 5.1 Teachers' relationships with children

The aim of Study I was to validate a modified self-report scale (STRS-SF) to assess ECE teachers' perceptions of their overall relationships with a group of children. The psychometric properties of the modified group-level STRS-SF (Whitaker et al., 2015) was validated in the Finnish ECE context. CFA results confirmed the two-factor structure of closeness and conflict with reduced items. This result is in accordance with other factorial validity studies showing that the two-factor model fit the ECE samples in Ghana (Aboagye et al., 2019), Norway (Stensen et al., 2023), and Greece (Tsigilis & Gregoriadis, 2008). These three studies applied the original form of the STRS-SF, which assesses teacher–child relationships at the individual child level rather than at the aggregated classroom level. Due to the overlap of item contents, three pairs of error covariances were added in the current model to increase model fit (see also Tsigilis & Gregoriadis, 2008; for school-aged children, see Patrício et al., 2015). Adding parameter specifications that represent random measurement errors is typically accepted to improve model fit (Byrne, 2006).

As expected, moderate to high negative correlations between closeness and conflict were found, which indicated that the more the teachers perceived themselves as having close and warm relationships with the whole group of children, the less they perceived negative and conflictual feelings. The magnitude of the correlations of the two constructs for groups of ECE student teachers, qualified ECE teachers attending in-service training, and qualified ECE teachers not attending training in Study I were higher than the correlations between latent factors in the traditional (individual level) form of the STRS-SF reported in Ghanian (Aboagye et al., 2019), Greek (Tsigilis & Gregoriadis, 2008), and Dutch (Chen et al., 2023) studies and between the summary scores of the group-level STRS-SF reported by Whitaker et al. (2015). The difference in magnitude among the two studies using the group-level STRS-SF may be partly because the latent factors in Study I, in contrast to the summary scores, were free of random or systematic measurement errors (see Tsigilis & Gregoriadis, 2008). Chen et al. (2023) also reported a similarly high association between the latent factors of closeness and conflict in the traditional STRS-SF in the Chinese ECE context. Cultural values and educational practices may contribute to the variations in the associations between closeness and conflict. The high relationships across all teacher groups representing different career stages might reflect culture-specific values of Finnish society regarding teachers' professional

expectations for and approaches to high-quality teacher–child relationships in ECE classrooms. While both Finnish and Chinese cultures value positive relationships, the ways in which these values are expressed and realized in the educational context might differ. Finnish culture values equality, trust, and collaboration. Extending to classroom practices, ECE teachers often adopt a child-centered approach and act as facilitators, encouraging children's free play, active participation, and open communication. Chinese culture values collectivism, harmony, and respect for authority. Chinese early education classrooms tend to be more structured and emphasize teacher-led instruction and discipline.

The second aim of Study I was to compare three groups of ECE student teachers' and qualified teachers' perceptions of their relationships with children. Testing measurement invariance of assessment tools is a rigorous prerequisite for reliable and valid comparisons of diverse groups. In Study I, a partial strong measurement invariance across ECE student teachers, qualified teachers in in-service training, and qualified teachers not attending training was evidenced. As it is difficult to achieve strong measurement invariance, the three non-invariant items—Item 2 from the conflict factor and Items 3 and 15 from the closeness factor—did not impede the further invariance testing of factor means and variances (Little, 2013).

In Study I, all three groups of teachers, who represented different stages in their careers, perceived high levels of closeness and low levels of conflict in their overall relationships with children. The group comparisons revealed that the qualified ECE teachers who did not participate in in-service training reported higher levels of closeness compared to the ECE student teachers. Moreover, the qualified ECE teachers who participated in in-service training reported more conflictual relationships with children compared to the other two groups of teachers. This result may be due to teacher and classroom differences because the qualified teachers in training had less work experience and younger children in their classrooms compared to those who did not participate in in-service training. However, the first-year student teachers' lack of practical work experience might have influenced how accurately they evaluated their relational competences and pedagogical strengths, showing less consciousness of possible problems occurring in relationships with diverse children. All groups of teachers valued high closeness and low conflict in overall relationships with children, which may partly be an overestimation not reflecting their real interactional competences. This might be interpreted as teachers' social desirability bias and/or Finnish teachers' shared values of establishing high-quality relationships with children. Prior research on pre- and in-service teacher training suggested that teachers' reflections on their relational competence could change the quality of interactions with children in real classrooms and, hence, improve pedagogical competences (Sabol & Pianta, 2012).

The modified group-level STRS-SF with 12 items and three error covariances was further applied in Study II with a larger sample of data for Finnish first-year student teachers and the whole sample of qualified teachers from Study I. The factorial validity and measurement invariance of the two-factor structure were again tested by multi-group CFA. The results showed that two-factor model fit was acceptable for the student teachers and qualified teachers but not for the whole sample. The magnitude of the correlations between the two constructs for each group were similar to Study I. Therefore, the measurement model of STRS-SF in Study II replicated the results in Study I. Regarding the measurement invariance, the test revealed that ECE student teachers and qualified ECE teachers to some extent interpreted the group-level items differently, which is somewhat different from the findings of Study I. The failure to achieve even weak measurement invariance might because of the sample differences: Study II included the student teachers of Study I as well as a second cohort of student teachers, and the two groups of qualified teachers from Study I were combined. The combined sample of qualified teachers (qualified teachers attending in-service training and qualified teachers not attending training) represented different stages of their professional development, which might have influenced them to respond differently to the same set of items.

In Study III, second-year ECE student teachers reported their overall relationships with children as assessed by the Finnish version of the modified STRS-SF before and after the study module. The results indicated that the student teachers perceived higher closeness and lower conflict after the study module. This finding implies the positive transfer effects of pre-service training on how second-year student teachers perceive their overall relationships with children in ECE classrooms.

Overall, the three studies contribute to extending the application of the group-level STRS-SF and the assessment of teacher–child relationship research to a Nordic educational context and add to our knowledge of more advanced methods and measurement invariance in psychoeducational assessments.

## 5.2 Teachers' self-efficacy of culturally inclusive pedagogy

The aim of Study II was to develop and validate a teacher efficacy scale, the CIP, to explore Finnish ECE pre-service and in-service teachers' efficacy for inclusive pedagogy. In accordance with the main tenet that self-efficacy is context specific (Bandura, 1997; Tschannen-Moran & Woolfolk Hoy, 2007), the CIP scale reflects the nature of inclusive practices in the Finnish educational context and the common practice of including children with various developmental and familial backgrounds in mainstream ECE classrooms. The aim of developing the CIP scale was to provide

new insights into how ECE teachers at different stages of their careers evaluated their confidence in planning and implementing inclusive pedagogies.

The factorial validity of the new CIP instrument was examined. A hypothetical one-factor model representing culturally inclusive pedagogy and a hypothetical two-factor model representing two separate but related constructs—the self-efficacy of planning and implementing teaching practices—were tested using multi-group CFA. The model fits of both hypothetical models were acceptable after some modifications to the scale. Finally, the one-factor model containing eight items with one error covariance was the best solution because the unidimensional construct reflected self-efficacy beliefs in a more parsimonious way compared to the two-factor model.

The second aim of Study II was to compare student teachers' and qualified teachers' self-efficacy beliefs, and explore the relations between self-efficacy of culturally inclusive pedagogy and perceived teacher–child relationships. This study adopted a rigorous method of testing different degrees of measurement invariance (Little, 2013; Meredith, 1993), which has typically been overlooked in previous studies involving group comparisons, for example, perceptual comparisons on pre- and in-service teachers (e.g., Ismailos et al., 2019; Spanierman et al., 2011). Measurement invariance across ECE student teachers and qualified ECE teachers was tested before making meaningful group comparisons of teachers' self-efficacy beliefs. A partial strong measurement invariance with four unstrained intercepts of the items was found; thus, it is reasonable to compare factor means and variances between the groups (Little, 2013; Meredith & Teresi, 2006).

In general, the ECE student teachers and qualified ECE teachers demonstrated equally high self-efficacy beliefs and variability of culturally inclusive pedagogy at the factor level, although the qualified teachers had much more work experience than the student teachers. This somewhat unexpected finding could imply student teachers' shared values and positive beliefs toward pedagogical competence adopted during pre-service training rather than actual competence in planning and implementing inclusive pedagogies with diverse children. This explanation is in line with the findings of previous research suggesting that students' self-efficacy is likely to increase during the initial teacher training but decrease during their first years of independent work in the classroom (Woolfork Hoy & Spero, 2005).

However, as suggested by Byrne et al. (1989) and Chen (2008), the percentage of non-invariant items could influence the inflation and deflation of the factor means. Therefore, the unexpected results of the current study were carefully explored by setting free two of the four original intercepts. This resulted in a different but expected finding suggesting that the qualified ECE teachers reported higher self-efficacy beliefs of culturally inclusive pedagogy than the ECE student teachers. The qualified ECE teachers, who had more years of work experience (ranging from 1 to 40 years) and a minimum of a bachelor's degree, compared to student teachers, who

were mainly fresh undergraduates, had more confidence in teaching and interacting with child and familial diversity. Thus, it can be concluded that at least at the item level, the student teachers and the qualified teachers conceptualized the self-efficacy of culturally inclusive pedagogy construct somewhat differently. One would expect, as suggested by Tschannen-Moran and Woolfork Hoy (2007), an increase in self-efficacy with more years spent in the teaching position, since mastery experience is one of the aspects that contributes to an individual's sense of self-efficacy (Bandura, 1997).

The CIP scale reflects teachers' self-efficacy of inclusive practices with diverse children and their families. Teacher efficacy has been related to observed classroom interactions (Guo et al., 2010; Justice et al., 2008; Pakarinen et al., 2010), but few studies have explored its relation with teachers' perceived relationships with children. The modified group-level version of the STRS-SF was used in Study II to provide evidence for the concurrent validity of the newly developed CIP scale.

A three-factor measurement model (culturally inclusive pedagogy, closeness, and conflict) failed to show an acceptable model fit for the whole sample but indicated a good fit for the qualified ECE teachers and a threshold *p* value for the ECE student teachers. Therefore, concurrent validity was analyzed separately for each group. Among the student teachers, culturally inclusive pedagogy positively predicted closeness and negatively predicted conflict. However, culturally inclusive pedagogy positively predicted closeness but not conflict among qualified teachers. The results revealed that the more confident the teachers were in planning and executing teaching–learning interactions with diverse children and families, the closer and warmer relationships they felt they had with the children during classroom interactions. When testing the reverse direction, the analyses showed that closeness positively predicted culturally inclusive pedagogy among both ECE student teachers and qualified ECE teachers. The reverse prediction reflected the reciprocal relations between the two constructs during and beyond pre-service training. In line with the evidence on qualified teachers provided by Mashburn et al. (2006), ECE teachers' higher self-efficacy for the management and motivation of children was related to closer (but not conflictual) relationship with children. The Finnish study provides new findings regarding the relationships between pre-service teachers' self-efficacy of culturally inclusive pedagogy and perceived relational processes, which suggests the need to explore the role of closeness and conflict in teacher–child relationships (Hamre et al., 2008; Hamre & Pianta, 2001; Mashburn et al., 2006).

Overall, the development and validation of the CIP, a self-assessment tool, contributes to identifying teachers' competence in planning educational goals and implementing inclusive pedagogies for the whole group of children in the ECE classroom. The concurrent validity also manifested the reciprocal and beneficial

relations between ECE teachers' self-efficacy of professional competence and close teacher–child relationships.

## 5.3 Student teachers' observed reading interaction quality

The aim of Study III was to assess the observed quality of the ECE student teachers' interactions with two preschool-aged children in a picture book reading setting during a study module of a teacher education program. This is the first Finnish study to investigate ECE student teachers' pedagogical interactions with preschoolers assessed by the CLASS Pre-K (Pianta et al., 2008a). The Teaching through Interaction framework (Hamre et al., 2013) gives insight into effectively designing the study module aiming at cultivating ECE student teachers' interaction quality and relationships with children in higher education.

Second-year student teachers enrolled in a study module consisting of online lectures, self-study material and assignments, online discussions and reflections on identifying effective teacher–child interactions via video observations, and practical training. They video recorded a shared picture book reading interaction with two children at the beginning of their practical training period at daycare centers. Two independent observers first analyzed the video interactions using the CLASS Pre-K manual. According to Egert et al. (2020), detailed video observations may be more appropriate than live observations for an in-depth analysis of instructional and language interactions. Therefore, in order to capture the moment-to-moment behavioral changes in how ECE student teachers provided instructional support, one of the observers analyzed the frequency and duration of the indicators and behavioral markers of instructional support using ELAN.

Due to the fact that the timing, content, and format of classroom observations could bias CLASS coding (Cabell et al., 2013; Thorpe et al., 2020), the advantage of the current study was to adopt the same educationally focused observation, the reading interaction setting including co-constructed conversations between the student teacher and two children. As expected, the scale means of the three domains indicated that Finnish pre-service ECE teachers displayed high-quality emotionally supportive interactions and classroom organization with preschool-aged children during the one-on-two reading interaction but demonstrated relatively low-quality instructional support, which is the core pedagogical competence in supporting children's development of higher-order cognitive thinking and language skills. This imbalanced pattern is in accordance with previous studies on Finnish in-service ECE teachers' one-on-group classroom interactions conducted in classrooms with groups of toddlers (Salminen et al. 2022) and kindergartners (Pakarinen et al. 2010). The findings are also aligned with in-service studies conducted in various cultural and

educational contexts (e.g., Hamre et al., 2014; Hu et al., 2016; La Paro et al., 2009; Leyva et al., 2015; von Suchodoletz et al., 2014; Yoshikawa et al., 2015) and pre-service studies conducted at the end of teacher education (e.g., Hu et al., 2023; La Paro et al., 2012). Besides, it was not surprising that in the highly structured one-on-two reading setting, student teachers with children who were well-informed about the activity before it began, demonstrated high-quality classroom organization. Although high-quality in-service teacher training programs have shown positive effects for improving instructional support (Egert et al., 2020), the few existing pre-service studies have not been successful in improving ECE student teachers' instructional support during their final academic year (e.g., Hu et al., 2023; La Paro et al., 2012; for self-reported improvement, see Hu et al. 2022).

To further understand how the Finnish ECE student teachers during their second academic year supported children's higher-order thinking skills, language development and quality of feedback, the frequency and duration of various behavioral markers were explored. As revealed by theses analyses of instructional support, the student teachers primarily asked simple questions, such as yes-or-no questions or requests for the children to label the name of a person, object, or place during dialogic reading. Simple questions limit children's opportunities to develop higher-order thinking and expressive communication. Simple questions could play a role in scaffolding children's participation in the conversations, especially if the teacher then engages the children with more demanding questions to co-construct longer conversations. The relations between the indicators revealed that emotional support was related to more time spent on longer conversations and more extensive feedback. Finally, less time spent on direct reading was related to more positive emotional interactions, child engagement, and extensive feedback and to longer back-and-forth exchanges.

It is acknowledged that shared reading of picture books can provide a favorable context for developing preschool-aged children's basic language competence (e.g., Houen et al., 2022; Zevenbergen & Whitehurst, 2003). The findings of study III revealed that the student teachers rarely asked complex open-ended questions or why or how questions, which require deeper thinking, cognitive involvement, and longer verbal answers. Although longer (three) feedback loops were more common than shorter feedback loops, the longer conversations were linked to sequences of simple questions rather than complex questions. The students practically rarely attempted to initiate analyses and reasoning discussions related to problem solving, prediction, classification, or evaluation, fostered concept development as evidenced by activities involving creation and integration, or used self- and parallel talk or advanced language. These findings shed light on how to improve the teacher education program by providing concrete feedback to ECE teacher students about the strengths and weakness of their teaching behavior. It is noteworthy for student teachers to be

aware and capable of using the learning opportunities in any daily activity for children, as language and conceptual learning can occur beyond educationally focused settings. A highly conscious and competent teacher would even promote analyses and reasoning discussions during care and free play activities. The findings suggest that more knowledge and refection on effective practices must be incorporated into ECE teacher education programs.

Study III showed a positive transfer effect of the study module on the ECE student teachers' perceived relational quality with children, which adds to the existing evidence in this regard (for self-reports on other learning outcomes in higher education, see Hu et al., 2022; Scott-Little et al., 2011). After the study module, student teachers perceived more closeness and less conflictual relationships with children. Additionally, the observed reading interaction was related to the student teachers' later relational perceptions. The findings indicated that the more time student teachers spent on direct reading and on short exchanges, the less they perceived conflictual feelings with the children. In contrast, the more they engaged the children in longer exchanges, the more they perceived conflicts. Furthermore, consistent with research on in-service teachers (Koepke & Harkins, 2008), the result also showed that the more the student teachers engaged with the boy (but not the girl) during reading interactions, the more they perceived conflictual relationships after the study module. These findings may reflect the relations between the different patterns of content-related conversations and the approaches to coping with feelings of (in)security and self-efficacy during the reading setting. In other words, student teachers felt securer when maintaining the book-related reading and short conversations, so they perceived less conflicts with the children. However, those who maintained longer conversations that were not necessarily related to the book content (e.g., casual talk) may have felt insecure and off task, so they reported more conflicts with children.

The ECE student teachers' ages and work experience were not significantly related to the quality of observed reading interactions. There was a tendency for ECE student teachers who had more work experience to ask more complex questions (for in-service ECE staff, see Pianta et al., 2005). Regarding children's demographic characteristics, the results revealed that there were no gender differences in boys' and girls' engagement in discussions during the reading interaction. Some minor gender effects suggested that the younger the boy, the more the ECE student teachers engaged the boy in shorter exchanges. The same relation was not found for girls. Higher levels of emotional support were related to ECE student teachers' engagement of the girls (but not boys) in the discussions.

In sum, Study III enhances our knowledge of ECE student teachers' professional competence in one-on-two teacher–child interactions. This study further extends the existing literature on applying the CLASS coding system in higher education and

expands the original coding system to capture the rich context that characterizes the quality of teacher–child interactions, especially in the instructional support domain. This study also suggests that future ECE teacher education programs should focus on supporting student teachers to intentionally use more high-demanding and complex questions and sustain longer book content-related conversations in practice. This recommendation aligns with the findings of Houen et al. (2022), Milburn et al. (2014), and Muhonen et al. (2022).

## 5.4 Theoretical and methodological implications

The Teaching through Interactions framework (Hamre et al., 2013; Pianta et al., 2003) acted as the theoretical and methodological basis for understanding and assessing ECE qualified teachers' and student teachers' perceptions of their overall relationships with children (STRS-SF) as well as ECE student teachers' observed interactions with children (CLASS Pre-K). The teachers' and children's life history and prior interactional and relational experiences stored in long term memory as representations, have an impact on the quality of interaction in a new setting with (un)familiar adults and children (e.g. Pianta et al., 2003).

As depicted in Figure 1, the quality of interaction in the picture book reading setting is manifested and emerged from the bidirectional exchange processes of information. The quality of these dynamic exchanges of verbal and nonverbal communication between the teacher, the boy, and the girl influences and gradually changes the memory representations of the relationships, which, in turn reciprocally changes the quality of interaction developing between the partners. The thesis explored only teacher (not children's) relational representations: teachers' perceptions of their overall relationships with children.

Moreover, teachers' self-efficacy beliefs of culturally inclusive pedagogy (CIP), as shown in Figure 1, was based on the theory of teacher efficacy by Bandura (1997). This aspect of the overall relationship dynamics can influence how teachers approach and engage in relationships with children. Both the quality of interaction and emerging relational representations are influenced by each individuals' background attributes, such as gender, age, and work experience. Other external factors, such as teacher–child ratio in ECE classrooms, activity setting, and school climate were not the focus of the current study, but they also have influences on the quality of teacher–child interaction and relationships.

The MAP model of teachers' professional development (Metsäpelto et al., 2022) recognizes the three major theoretical concepts of the thesis: teacher–child relationships, self-efficacy of culturally inclusive pedagogy, and teacher–child interaction. In the MAP model, the concepts fall into individual competencies and teaching competences which represent two key competence domains of the teaching

profession in educational contexts. Positive teacher–child relationships lay the foundation for effective interactions, and a teacher's sense of efficacy influences the perceptions of their relationships with children and vice versa. While the current thesis focuses on some aspects of the teacher competence model, future studies could target other aspects of the model to provide a more collective conception of teachers' professional development in both pre- and in-service education.

For the purpose of understanding how the Finnish ECE student teachers supported children's thinking and language development and provided feedback, this thesis provided global ratings of the three CLASS domains and in-depth analyses of specific behavior exchanges to identify the strengths and weaknesses of students' instructional skills during a reading activity. This innovative use of CLASS Pre-K is in line with considerations about the focus of the assessment of teacher–child interactions (see discussion about molar and molecular level of analyses by Pianta et al., 2020). The findings point out the directions for student teachers to examine and alter their behaviors in practice, and also have important implications for the refinement of early childhood teacher program in Finnish higher education.

Another methodological contribution of this dissertation is the use of mixed methods involving both quantitative and qualitative data collection and analyses (Yoshikawa et al., 2008). The first methodological novelty is the innovative use of assessment tools, including the modified group-level STRS-SF in Study I, the new developed self-assessment CIP scale in Study II, and the modified classroom observation CLASS Pre-K tool in Study III.

Study I is the first study to apply the modified STRS-SF in a Nordic context and validate its psychometric properties, factorial validity, and measurement invariance. This group-level measure aims to examine ECE teachers' overall perceptions of relationships with a group of children instead of an individual child. The methodological contribution of Study II is the development and validation of a new teacher efficacy measure, the CIP, to explore ECE teachers' self-efficacy beliefs regarding culturally inclusive pedagogy with diverse children and families in the Finnish ECE context.

Another methodological novelty is the use of an advanced and robust statistical method, multigroup CFA, to analyze the questionnaire data. In Study I, using CFA, the theoretical two-factor structure of closeness and conflict in the modified STRS-SF was confirmed with Mplus. Moreover, in order to meaningfully compare multiple groups of teachers' perceptions, this study was also the first to examine the measurement invariance of the modified STRS-SF across teacher characteristics. A similar rigorous method was applied in Study II. The CIP scale was validated as a unidimensional self-assessment tool and an invariant measure used by ECE student teachers and qualified teachers in the Finnish ECE context. Additionally, the multi-group CFA was also used to specify the relationships between the new teacher

efficacy scale (the CIP) and the modified group-level STRS-SF and to explore the relationships between the three constructs (culturally inclusive pedagogy, closeness, and conflict) in groups of ECE student teachers and qualified ECE teachers separately. The group-level STRS-SF and the CIP proved to be valid and reliable measures suitable for the Finnish ECE educational setting, and more research is needed to further validate the scale in different cultural contexts.

Although the self-report method is optimal for collecting large samples of data, it may reflect respondents' social desirability bias to some extent. In contrast to self-reports, trained researchers' assessments of recordings in real ECE classrooms play a key role in understanding the quality of teacher–child interaction in a more objective way. Therefore, in Study III, besides applying the modified group-level self-report STRS-SF, the observation method was included to explore if and to what extent the ECE student teachers' relational self-perceptions were related to their actual pedagogical practices during reading interactions with two children. The combination of subjective self-reports and researchers' observational analyses make a novel methodological contribution to the field. The expanded use of CLASS Pre-K coding system to the student teachers' interactional quality in the structured on-on-two shared reading setting was a major methodological contribution of Study III. With the annotation program ELAN, the coding system provided an in-depth description of the moment-to-moment behavioral changes in student teachers' instructional support for children during the reading interactions.

One concern is the relatively small sample size in relation to the generalizability of the findings, especially for the teachers in the training group in Study I, which might affect the estimated parameters and standard errors in terms of accuracy and stability (Li, 2016). Since all SEM analyses using Mplus were uncomplicated and based on CFA modeling, the sample sizes of the studies were considered adequate. Moreover, the relatively low factor loadings and reliability coefficients of the closeness and conflict factors, as well as the number of reduced items and the number of added error covariances, may indicate that the meaning of the relational constructs of the modified group-level STRS-SF was somewhat differently interpreted by the ECE student teachers and ECE teachers, representing a Nordic cultural context. From a cross-cultural perspective, the researchers kept a balance between maintaining the core meaning of the two constructs of closeness and conflict and accepting the modifications of certain culture-specific items (see also Chen, 2008; Sabol & Pianta, 2012).

## 5.5 Practical implications

This thesis brings practical implications for teachers, researchers, curriculum developers, and policymakers about the importance of developing reliable and valid

assessment tools to assess and foster pre- and in-service ECE teachers' professional competence and to improve the effectiveness of teacher education programs in higher education, especially in the Finnish but also Nordic educational contexts.

This thesis provides the first evidence that the newly modified group-level version of the two-factor STRS-SF is a reliable and valid measure for both pre- and in-service teachers in the Finnish ECE context to explore their perceptions of overall close and conflictual relationships with a group of children. It adds to the current Nordic evidence showing that the individual-level STRS-SF has promising psychometric properties among Norwegian professional caregivers of 1-to-6-year-old children, which covers the full age range before primary school (Stensen et al., 2023). This thesis expands the knowledge about the modified group-level STRS-SF's applicability by including first-year pre-service teachers because ECE student teachers' perceptions of their relationships have not received attention before.

In individualistic cultures such as North American and North European societies, autonomy, competence, and self-assertion are more positively valued, and dependency can be more negatively valued at preschool age compared to South European societies such as Greece (see Drugli & Hjemdal, 2013; Solheim et al. 2012). A previous Nordic study indicated that the two-factor structure of individual-level STRS-SF, not including the dependency scale of the original three-factor structure of the STRS, fit a large-scale sample of Norwegian teachers of school children from Grades 1 to 7 (Drugli & Hjemdal, 2013). Another study on younger children further confirmed that the meaning of the STRS may be subject to cultural differences. Solheim et al. (2012) found support for the three-factor structure in a Norwegian preschool sample only after excluding three out of the seven dependency items. Similarly, the dependency subscale was dropped in a Swedish pre-school sample due to low reliability (Rydell et al., 2005).

This thesis is also the first to make meaningful comparisons of self-perceptions of ECE student teachers, qualified ECE teachers enrolled in an in-service training, and qualified ECE teachers not attending training using robust statistical methods. The differences across the groups could be partly explained by participants' different stages of professional development. Future professional training should address pre- and in-service teachers' self-reports of their overall relationships with children. For example, the qualified teachers enrolled in training reported that they had more conflictual relationships with children compared to those qualified teachers not attending training. Prior studies have shown that ECE teachers' reports of conflict were related to children's problem behaviors (Hamre et al., 2008; Zhang & Sun, 2011). Consequently, concentrating on providing more focused training on strategies for dealing with conflictual situations with children is the most important issue. Based on this evidence, the modified group-level version of the STRS-SF could be used by teacher educators and researchers to develop and implement pre- and in-

service training to evaluate the effectiveness of the training program and professional learning in the ECE context.

The development of the CIP scale responds to the request for domain- and culture-specific self-efficacy scales that meet the characteristics of Finnish inclusive pedagogy in the ECE setting. Student teachers (a sample of first-year undergraduates) and qualified teachers (a sample of teachers enrolled in in-service training as well as those not attending such training) both reported high self-efficacy in planning and conducting culturally inclusive pedagogy. As mastery experience is the most important source of self-efficacy (Bandura, 1997), one would expect experienced teachers to have more professional confidence and a deeper understanding of their relationships with children and families from diverse backgrounds (Tschannen-Moran & Woolfolk Hoy, 2007). To some extent, age could be regarded as a proxy of teaching experience. Analyses indicated that age alone was a significant predictor of teacher efficacy for both student teachers and qualified teachers. The qualified teachers had advanced educational levels and 1 to 40 years of work experience, while the student teachers were mainly fresh graduates from high school, although it also included a few older students who had some vocational qualifications or work experience in daycare centers.

Earlier research has shown that professional education and training related to culture contributed to infant and toddler caregivers' differences in self-reports on cultural competence (Obegi & Ritblatt, 2005). Furthermore, Malinen et al. (2013) found that in-service teacher training on inclusive education had a significant effect on self-efficacy among Finnish school teachers. The degree program in higher education has already embedded training targeting culturally inclusive pedagogy and linguistic responsive teaching in the curriculum. In addition to providing relevant knowledge and education, ensuring student teachers gain sufficient concrete experience by implementing research-based evidence during their first years in higher education arises as an important message. Therefore, higher education curriculum developers need to systematically plan and implement the study modules of the degree program (not only during the internship) to better support ECE student teachers' professional development and provide opportunities for facing concrete and diverse realities in ECE classrooms and for high-quality reflections on actual classroom practices. In the higher education context, more robust evidence-based in-service training for qualified teachers should be developed, and these teachers should be exposed to the latest research and updated knowledge about inclusive pedagogy in the ECE context. Teachers who have several decades of work experience may lack specific training on culturally inclusive pedagogy. The good practice is that evidence-based in-service teacher training programs have been organized by the universities in Finland. This is an optimal learning opportunity for qualified teachers

to share, discuss, learn, and reflect on their practices with other teachers and with teacher educators.

This thesis includes the first assessment of Finnish second-year ECE student teachers' observed interactions with preschoolers using the CLASS Pre-K. Earlier Finnish research investigated qualified ECE teachers' observed interactional quality with toddlers (Salminen et al., 2022) and kindergartners (Pakarinen et al., 2010). The assessment was implemented during a higher education study module aimed at fostering student teachers' professional pedagogy with children. The study module included a range of professional development strategies, including online lectures of evidence-based knowledge; self-study assignments; online tutorials for observing, identifying, and discussing effective interactions; self-reflections; peer evaluation; feedback teaching; and practices in classrooms. The moment-to-moment analyses of one-on-two interactions revealed the student teachers' low-quality instructional support. This finding sends an important message for teacher educators that in future teacher training curricula, more attention should be paid to improving teachers' competence in supporting young children's language and cognitive skills, such as asking complex questions, providing constructive feedback, and language modeling.

The findings also showed a positive transfer effect of the study module on how student teachers perceived their overall relational processes with children. This favorable result is in accordance with other existing intervention studies aimed at improving pre-service teachers' high-quality pedagogical interactions with children. For example, training on relational practices has the potential to produce positive effects on knowledge, attitudes, and skills for pre-service teachers (Hu et al., 2022; Joseph & Brennan, 2013). One practical implications of this study for teacher educators is that the teacher training program should target relationship and interaction quality through the process-oriented approach (Sheridan et al., 2009), moving from learning new knowledge (awareness) to putting that knowledge into practice (action) and ultimately integrating it into one's own professional mindset and competence (adoption of dispositions). The effective teacher training should focus on providing student teachers with not only advanced knowledge relevant to classroom practices but also supporting and improving each individual's pedagogical competence, behaviors, and practices in classroom contexts for the ultimate goal of enhancing children's learning outcomes.

## 5.6 Directions for future research

This dissertation creates **new research directions for future studies. First,** the assessment of teacher–child relationships in the current thesis was measured through teacher reports; future studies might combine teacher and/or child interviews. Interviews give teachers a platform to express their thoughts, feelings, and concerns

about teacher–child relationships in more depth, offering a supplementary narrative aspect to valuable questionnaire data. Spilt and Koomen (2009) found that teachers' narratives collected by the Teacher Relationship Interview provided concurrent validity of self-rated perceptions of teacher–child relationships as assessed by the STRS in the Dutch kindergarten context. Additionally, future research could investigate examples of how cultural practices influence teachers' perceptions of their relationships with children in diverse classrooms. With in-depth narratives, teachers could illustrate how they make positive changes in establishing a trusting and warm relationship with children in diverse classrooms. For instance, one might describe experiences with a Chinese child who initially appeared reserved and rarely spoke up in class. This behavior might reflect the child's shy personality, unfamiliarity with Finnish culture, lack of Finnish language skills, and/or the Chinese culture's respect for authority figures. However, through the teacher's understanding of the child's home culture and efforts to create a supportive and inclusive classroom environment, the child later became more engaged in discussions.

Children's perspectives could be gained through child-friendly questionnaires or interviews. For younger children who have not developed writing and reading skills, the examiners could combine speech with visual aids. For example, the examiner could read a statement, and the child could pick one emoji that represents their relationship with the ECE teacher. Future studies could also use interviews, open-ended questions, or drawings to gain rich insights into children's feelings and perspectives toward their relationships with teachers.

International comparison of the widely applied STRS-SF measure in different educational and cultural contexts is a necessity to increase scientific knowledge. Cross-cultural studies have shown discrepancies in how teachers and/or children from different nations perceive their relational quality with each other (Cadima et al., 2015; Chen et al., 2023). In a comparative European study, Portuguese teachers reported that they had similar levels of closeness and conflict with both girls and boys, while Belgium teachers felt they had closer relationships with girls than boys (Cadima et al., 2015). Another cross-cultural study by Chen et al. (2023) indicated that Dutch and Chinese ECE teachers did not differ in their perceptions of close or conflictual relationships with children. However, compared to Dutch children, Chinese children felt lower closeness and higher conflict with their ECE teachers.

International studies concerning the topic of teacher–child relationships are still limited. More studies are necessary to improve our understanding of the role that culture plays in the teacher–child relationship context in ECE. For instance, most of the research on teacher–child relationships has been conducted in Western, individualistic countries, but we cannot expect that these findings could be directly generalized to Eastern, collectivistic countries, such as China, Japan, and South

Korea. Only one study was found comparing teacher–child relationships between Western and Eastern countries within the ECE setting (see Chen et al., 2023).

Second, the newly developed CIP scale represents the construct of culturally inclusive pedagogy with diverse children in general. Since this measure is designed to reflect the Finnish ECEC curriculum's requirements of offering culturally and linguistically responsive teaching to children and families from diverse backgrounds, the conclusion based on the CIP items should be interpreted within this context. Future studies could expand the scale into a multi-dimensional scale by incorporating more specific and detailed inclusive tasks related to typical pedagogical practices, collaboration with colleagues and parents, as well as challenges faced in inclusive education (Lai et al., 2016; Park et al., 2016). Finnish ECE teachers in daycare centers are obligated to create individualized educational plans for each child, which are regularly updated to facilitate the child's optimal learning experience in mainstream early childhood classrooms. In accordance with these educational plans, the expanded CIP could encompass items assessing the teacher's confidence in supporting diverse children's language and literacy skills; social-emotional competence; mathematics, science, and technology skills through the use of play; reading; music; drama; crafts; and outdoor activities.

This thesis provides evidence of the concurrent validity of the CIP scale with the recently modified group-level STRS-SF. Previous studies using the individual-level STRS-SF showed that qualified ECE teachers who reported lower efficacy tended to have a higher degree of conflict with individual children (Hamre et al., 2008), and higher efficacy was associated with teachers' ratings of positive relationships with individual children (Mashburn et al., 2006). This thesis extends the previous evidence from the U.S. context on qualified ECE teachers to both pre- and in-service ECE teachers from the Finnish ECE context. Future studies could further obtain validation of the reciprocal effects between teacher efficacy, closeness, and conflict in professional development using longitudinal research designs.

Third, this thesis includes a study on a Finnish ECE teacher preparation program, and the generalization of the findings to other cultural contexts should be noted. Most intervention studies on pre-service teacher training have assessed improvement in professional competence using self-reports (e.g., Hu et al., 2022) or observations (e.g., La Paro et al., 2012), with the exception of Hu et al. (2023) who used both observation and self-report methods. Thus, future studies should apply mixed methods combined with a pre- and post-test design to assess student teachers' perceived and observed interactional quality in ECE classrooms to confirm the impacts of teacher training in higher education. It is necessary to conduct more comprehensive multivariate data analyses using larger samples from diverse higher education programs to validate the results in various educational contexts. The quality of teacher–child reading interaction in the current thesis was observed during

one highly structured cycle of interaction with a special focus on the content and format of the observed activities to increase reliability and validity of assessing the moment-to-moment behavioral changes in instructional support (see also Cabell et al., 2013; Thorpe et al., 2020). No follow-up observations were collected to explore improvements in the shared reading activity. Therefore, future studies could include multiple observation cycles across time with larger child groups of various age levels and across different activities such as play, art, music, and math to better represent the quality of daily pedagogical interactions during pre-service training. Observations and reflections upon how student teachers implement inclusive practices through their interactions with diverse children would be an interesting topic for future intervention studies. International comparisons of teacher–child interactions using the CLASS could be another future research direction (for comparisons between teacher–child interactions in Finnish and Portuguese toddler classrooms, see Salminen et al., 2021). Last, a longitudinal study manifested how qualified ECE teachers' interactional quality and children's engagement evolved over time in Swedish preschool classrooms (Castro et al., 2017). Future studies could also include a longitudinal design to depict the developmental changes in student teachers' observed classroom interactions.

In conclusion, this thesis presents the innovative development and application of assessment tools for assessing professional competence among Finnish ECE student teachers and qualified teachers. The three major theoretical concepts of the thesis manifest some of the key competence domains perceived by Metsäpelto and colleagues (2022) to be critical for the teaching profession in the educational context. The practical implications of this thesis could be extended to both pre-service and in-service teacher education in the ECE context, contributing to the enhancement of professional competence, feedback provision to individuals and groups, and refinement of early childhood teacher program in Finnish higher education.

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TURUN
YLIOPISTO
UNIVERSITY
OF TURKU

Painosalama, Turku, Finland 2024

ISBN 978-951-29-9749-7 (PRINT)
ISBN 978-951-29-9750-3 (PDF)
ISSN 0082-6987 (Print)
ISSN 2343-3191 (Online)