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Teacher–Child Interactions in Relation to Teachers' Stress, Work Engagement, and Children's Social Competence

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PSYCHOLOGY

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ABSTRACT

This doctoral thesis consists of three sub-studies that examined the associations between the quality of teacher–child interactions and teachers' occupational well-being in kindergarten and first grade classrooms. In addition, teacher–child interactions and teachers' occupational well-being were examined in relation to children's social competence. The quality of teacher–child interactions (emotional support, classroom organization, and instructional support) was assessed with the Classroom Assessment Scoring System (CLASS Pre-K and K-3). Teachers (sub-study 1: $n = 47$, sub-study 2: $n = 54$, and sub-study 3: $n = 51$) rated their occupational well-being in terms of stress, emotional exhaustion, depressive symptoms, and work engagement. Furthermore, teachers assessed the social competence of children (sub-study 3: $n = 815$) in their classroom in terms of prosocial and antisocial behaviors. The data were analyzed by conducting path models (sub-study 1), latent profile analyses (sub-study 2), and multilevel models (sub-study 3). In sub-study 1, the results showed that teachers' stress predicted lower subsequent quality of emotional support and classroom organization, whereas teachers' work engagement was associated with a higher quality of instructional support. In sub-study 2, four profiles of teacher–child interactions were identified. The profiles differed in teachers' levels of stress, emotional exhaustion, and depressive symptoms. In sub-study 3, the results showed a reciprocal association between children's prosocial behavior and quality of instructional support. Moreover, children's prosocial behavior predicted teachers' higher work engagement, whereas teachers' work engagement predicted less antisocial behavior. Finally, teachers' work engagement positively predicted the quality of all three domains of teacher–child interactions. Overall, the results suggest that it is important to support teachers' occupational well-being to enhance the quality of teacher–child interactions and children's social competence. It should be noted that especially children's prosocial behavior also plays a role in the quality of teacher–child interactions and in teachers' occupational well-being. Thus, it is important to support children in their social competence.

Keywords: teacher–child interactions; teachers' occupational well-being; children's social competence; kindergarten; first grade

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Tämä väitöstutkimus koostuu kolmesta osatutkimuksesta, joissa tarkasteltiin esi- ja alkuopettajien ohjausvuorovaikutuksen laadun ja työhyvinvoinnin välisiä yhteyksiä. Lisäksi selvitettiin lasten sosiaalista kompetenssia suhteessa ohjausvuorovaikutuksen laatuun ja opettajien työhyvinvointiin. Ohjausvuorovaikutuksen laatua (tunnetuki, toiminnan organisointi ja ohjauksellinen tuki) arvioitiin Classroom Assessment Scoring System (CLASS Pre-K ja K-3) -havainnointityökalun avulla. Lisäksi opettajat (osatutkimus 1: $n = 47$; osatutkimus 2: $n = 54$; osatutkimus 3: $n = 51$) arvioivat työhyvinvointiaan koetun stressin, uupumusasteisen väsymyksen, masennusoireiden ja työn imun osalta. Opettajat arvioivat myös luokkansa lasten (osatutkimus 3: $n = 815$) sosiaalista kompetenssia prososiaalisen ja antisosiaalisen käyttäytymisen osalta. Aineisto analysoitiin polkumallien (osatutkimus 1), latentin profiilianalyysin (osatutkimus 2) ja monitasomallien (osatutkimus 3) avulla. Osatutkimus 1 osoitti opettajien kokeman stressin ennustavan matalampaa tunnetuen ja toiminnan organisoinnin laatua ja työn imun olevan myönteisesti yhteydessä ohjauksellisen tuen laatuun. Osatutkimuksessa 2 tunnistettiin neljä vuorovaikutusprofiilia, jotka erosivat opettajien kokeman stressin, uupumusasteisen väsymyksen ja masennusoireiden osalta. Osatutkimuksessa 3 havaittiin vastavuoroinen yhteys lasten prososiaalisen käyttäytymisen ja ohjauksellisen tuen laadun välillä. Lisäksi havaittiin lasten prososiaalisen käyttäytymisen ennustavan opettajien korkeampaa työn imua ja korkeamman työn imun ennustavan lasten vähäisempää antisosiaalista käyttäytymistä. Lopuksi tulokset osoittivat työn imun ennustavan kaikkien kolmen ohjausvuorovaikutuksen osa-alueen korkeampaa laatua. Tulokset lisäävät ymmärrystä ohjausvuorovaikutuksen laadun, opettajien työhyvinvoinnin ja lasten sosiaalisen kompetenssin välisistä yhteyksistä. Tulosten perusteella on tärkeää tukea opettajien työhyvinvointia sekä ohjausvuorovaikutuksen laadun että lasten sosiaalisen kompetenssin vahvistamiseksi. Toisaalta myös lasten sosiaalisen kompetenssin vahvistaminen on tärkeää, sillä se on yhteydessä sekä ohjausvuorovaikutuksen laatuun että opettajien työhyvinvointiin.

Asiasanat: ohjausvuorovaikutus; opettajien työhyvinvointi; lasten sosiaalinen kompetenssi; esi- ja alkuopetus

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ORIGINAL PAPERS

The present doctoral study is based on three published empirical sub-studies, listed below. Copies of the published articles can be found as appendices to this report, and they have been reprinted with the permission of the publishers.

Article I   Penttinen, V., Pakarinen, E., von Suchodoletz, A., & Lerkkanen, M.-K. (2020). Relations between kindergarten teachers' occupational well-being and the quality of teacher–child interactions. *Early Education and Development, 31*(7), 994–1010. https://doi.org/10.1080/10409289.2020.1785265

Article II   Penttinen, V., Pakarinen, E., von Suchodoletz, A., & Lerkkanen, M.-K. (2022). The quality of teacher–child interactions and teachers' occupational well-being in Finnish kindergartens: A person-centered approach. *Early Education and Development*. Advance online publication. https://doi.org/10.1080/10409289.2022.2139549

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The author of this thesis has been the first author of all three articles. She has been responsible for data collection, coding the observation data, reviewing the literature, and writing the manuscripts. She also conducted the statistical analyses with consultation from the co-authors. The co-authors had advisory roles in the design of the studies and interpretation of the results. The co-authors also provided comments for all three manuscripts. The data used in the three publications had been collected as part of the Teacher and Student Stress and Interaction in Classroom (TESSI) study.

TABLE

CONTENTS

1   INTRODUCTION

The weakening of teachers' occupational well-being (Golnick & Ilves, 2020, 2022; Kauppi et al., 2022) has generated concern in the Finnish media over the past few years (e.g., Ursin, 2022; Åkman, 2021). At the same time, the Covid-19 pandemic has presented unique challenges to teachers' occupational well-being (Pöysä, Pakarinen, & Lerkkanen, 2021; Sainio et al., 2022). In fall 2021, the Finnish Trade Union of Education announced that 63% of early childhood education (ECE) teachers and 59% of primary school teachers had considered leaving the teaching profession, mainly because of the extraordinary workload (Finnish Trade Union of Education, 2021). Teachers' occupational well-being has also garnered growing interest in international educational research. Both negative and positive indicators of teachers' occupational well-being have been examined (for a review, see Cumming, 2017). Negative indicators include, for example, teachers' experiences of stress (e.g., Kyriacou, 2001), burnout (e.g., Chang, 2009), and depressive symptoms (e.g., Gluschkoff et al., 2016), whereas positive indicators include, for example, experiences of work engagement (e.g., Hakanen et al., 2006) and job satisfaction (e.g., Klassen & Chiu, 2010).

Focusing on teachers' occupational well-being is important because poor occupational well-being is, for example, related to teachers' lower self-efficacy (Klassen & Chiu, 2011; Skaalvik & Skaalvik, 2010), lower professional and organizational commitment (Hakanen et al., 2006; Klassen & Chiu, 2011), and higher intentions to leave the teaching profession (Høigaard et al., 2012; Klassen et al., 2012; Klassen & Chiu, 2011; Schaack et al., 2020; Skaalvik & Skaalvik, 2016). Research has also indicated that teachers' poor occupational well-being may be associated with lower quality of teacher–child interactions (Ansari et al., 2022; Jennings, 2015; Sandilos et al., 2015). However, although the relation between teachers' occupational well-being and the quality of teacher–child interactions has received some attention in educational research, earlier studies have mainly focused on the negative aspects of occupational well-being, such as stress (e.g., Friedman-Krauss et al., 2014) or depressive symptoms (e.g., Sandilos et al., 2015), whereas the positive indicators, such as work engagement, have received less attention in relation to the quality of teacher–child interactions. Moreover, little

is known about the direction of the association as few of the studies have been longitudinal or have examined cross-lagged associations.

The association between teachers' poor occupational well-being and lower quality of teacher–child interactions is disquieting because high-quality teacher–child interactions are central for children's learning of basic academic skills (Ansari & Pianta, 2018; Hu et al., 2019; Rankin et al., 2022) and for their social competence (Broekhuizen et al., 2016; Luckner & Pianta, 2011; Pakarinen et al., 2020). The Finnish curriculum (Finnish National Agency of Education, 2016a, 2016b) also emphasizes that children learn by interaction with peers and teachers. Researchers have examined the quality of teacher–child interactions in authentic classrooms quite extensively in different educational contexts from toddler (e.g., Salminen et al., 2022) to secondary school classrooms (e.g., Virtanen et al., 2019) and with several observational measures (see Ishimine & Tayler, 2014). One of the widely used measures is the Classroom Assessment Scoring System (CLASS: Pianta et al., 2008a, 2008b), which has been validated in several countries around the world (e.g., Hu, Fan, Gu et al., 2016; Leyva et al., 2015; Pakarinen, Lerkkanen et al., 2010). In the CLASS, teacher–child interactions are described through three domains (emotional support, classroom organization, and instructional support) in line with the Teaching Through Interactions (TTI) framework (Hamre et al., 2013). The framework is based on developmental theories, such as Bronfenbrenner and Morris's (1998, 2006) bioecological model, supporting the assumption that daily interactions promote children's learning and development.

The quality of teacher–child interactions in early childhood education (ECE) has also been investigated using the person-centered approach to identify groups of teachers who share similarities in their interactions with children (Hu, Fan, LoCasale-Crouch et al., 2016; LoCasale-Crouch et al., 2007; Salminen et al., 2012). Recognizing unique patterns of teacher–child interactions based on the 10 dimensions of the CLASS suggests that teacher–child interactions are individually constructed (Halpin & Kieffer, 2015). A few studies have also examined the link between teachers' occupational well-being and teacher–child interactions with a person-centered approach (Jeon et al., 2016; Paschall et al., 2022). However, more research with versatile measures for occupational well-being is needed to gain an understanding of the individual differences in teacher–child interactions and their relation to teachers' occupational well-being in ECE.

One of the central aims in Finnish pre-primary and first grade education is to enhance children's social competence (Finnish National Agency of Education, 2016a, 2016b) which can be defined as the presence of prosocial behaviors and absence of antisocial behaviors (Junttila et al., 2006). Although compelling evidence of the association between high-quality teacher–child interactions and children's higher social competence exists (Broekhuizen et al., 2016; Burchinal et al., 2010; Luckner & Pianta, 2011; Mashburn et al., 2008; Siekkinen et al., 2013), most of the studies have only examined if the quality of teacher–child interactions contributes to children's social competence, but not vice versa (for an exception, see Pakarinen et al., 2020). To gain a better understanding of the dynamics between social competence and teacher–child interactions, more research is

needed. Moreover, we are far from understanding whether teachers' occupational well-being and children's social competence are linked to each other. There are some indications that teachers' stress is associated with children's lower social competence (Herman et al., 2018; Siekkinen et al., 2013), but the association among positive aspects of occupational well-being – teachers' work engagement – and children's social competence has remained unstudied.

To address the gaps found in the earlier literature, the first aim of the present thesis was to examine the cross-lagged associations between the quality of teacher–child interactions and kindergarten teachers' occupational well-being, specifically in terms of stress and work engagement. The second aim was to identify profiles based on the quality of teacher–child interactions in kindergarten and to further examine if there are differences in teachers' occupational well-being across the profiles. Finally, to further expand on the previous studies, the third aim of the thesis was to examine cross-lagged associations between children's social competence and both the quality of teacher–child interactions and teachers' work engagement.

2 TEACHER–CHILD INTERACTIONS

2.1 Conceptualizing the quality of teacher–child interactions: Teaching Through Interactions (TTI) framework

Over time, several researchers have referred to effective teaching using various concepts, such as teacher knowledge (e.g., Ben-Peretz, 2011), teaching skills (e.g., Kyriacou, 2018), and teaching strategies (e.g., Orlich et al., 2012). During the twenty-first century, focus has shifted from structural factors, such as teachers' level of education (e.g., Burchinal et al., 2002) to specific classroom processes, especially the interactions that teachers and children have in the classroom (Pianta et al., 2009, 2016; see also Early et al., 2007). The importance of the interactions between children and adults has been highlighted by Bronfenbrenner and Morris (1998, 2006) in their bioecological model of human development. According to the bioecological model, the daily interactions that children have with adults (e.g., with teachers) are proximal processes that can enhance children's development. Indeed, a considerable amount of research has shown that teachers can support children's academic (Ansari & Pianta, 2018; Burchinal et al., 2010; Cash et al., 2019; Hoglund et al., 2015) and social skills (Broekhuizen et al., 2016; Burchinal et al., 2010; Pakarinen et al., 2020; Siekkinen et al., 2013) by providing high-quality interactions.

To assess the quality of the teaching and teacher–child interactions, several observational measures have been developed. Examples of these measures include the Caregiver Interaction Scale (CIS; Arnett, 1989), the Early Childhood Environment Rating Scale (ECERS-R; Harms et al., 1998; ECERS-E; Sylva et al., 2006), the International Comparative Analysis of Learning and Teaching (ICALT; van de Grift, 2007), the Early Childhood Classroom Observation Measure (ECCOM; Stipek & Byler, 2004), the Classroom Assessment Scoring System (CLASS; Pianta et al., 2008a, 2008b), and the Individualized Classroom Assessment Scoring System (inCLASS; Downer et al., 2010). Besides these

measures, there are several content-specific observational measures available, such as the Protocol for Language Arts Teaching Observation protocol (PLATO; Grossman et al., 2013), and the Individualizing Student Instruction (ISI) classroom observation and coding system (Connor et al., 2009).

In this thesis, the quality of teacher–child interactions is conceptualized based on the TTI framework developed by Hamre et al. (2013). The TTI framework has been widely utilized in studies around the world, for example, in Brazil (Bartholo et al., 2022), Portugal (Cadima et al., 2014), China (Hu et al., 2020), Chile (Leyva et al., 2015), Australia (Rankin et al., 2022), and the United Arab Emirates (von Suchodoletz et al., 2020), and with different age groups from toddler classrooms (Salminen et al., 2022) to elementary (e.g., Hoglund et al., 2015) and lower secondary schools (e.g., Westergård et al., 2019). In the TTI framework, interactions between teacher and children or among children are conceptualized under three domains (emotional support, classroom organization, and instructional support), each of which consists of three to four more specific dimensions. The quality of these domains and dimensions (see Table 1) can be assessed with the CLASS tool (Pianta et al., 2008a, 2008b; see also section 6.2.1).

TABLE 1   Domains and dimensions in the Classroom Assessment Scoring System Pre-K and K-3. Modified from Pianta et al. (2008a, 2008b).

Domains	Emotional support	Classroom organization	Instructional support
Dimensions	Positive climate	Behavior management	Concept development
	Negative climate	Productivity	Quality of feedback
	Teacher sensitivity	Instructional learning formats	Language modeling
	Regard for student perspectives		

The first domain of the TTI framework, emotional support, refers to warmth, respect, enjoyment, and absence of negativity in the classroom (Hamre et al., 2013). In emotionally supportive classrooms, the teacher is aware of and responsive to both children's academic and emotional needs. Moreover, there is an emotional connection between teacher and children, and children's interests are considered in the learning activities. The theoretical foundations of emotional support are in attachment theory (Ainsworth et al., 1978; Bowlby, 1969) and self-determination theory (Ryan & Deci, 2000). According to attachment theory, emotionally supportive, safe, and predictable relationships with adults enhance children's social and emotional development. According to self-determination theory, children have intrinsic psychological needs for relatedness, competence, and autonomy.

Research has shown that high-quality emotional support in ECE is related to children's higher engagement (Castro et al., 2017) and social competence (Burchinal et al., 2010; Mashburn et al., 2008; Pakarinen et al., 2020). There are also fewer behavioral problems in classrooms where the quality of emotional support is high (Burchinal et al., 2010; Mashburn et al., 2008). Furthermore, emotional support has been associated with children's higher skills in rhyming,

letter naming, expressive language, and solving math problems (Curby et al., 2013).

According to Hamre et al. (2013), the second domain, classroom organization, refers to the methods that enable children to organize their behavior and attention toward learning. It includes proactive, rather than reactive, strategies to prevent problem behavior, and if problem behavior occurs, the teacher deals with it quickly and efficiently so that little time is taken away from learning. In well-organized classrooms, there are clear expectations for child behavior. Moreover, the teacher plans the activities appropriately and manages time and transitions effectively (Hamre et al., 2013; see also Emmer & Strough, 2001).

The domain of classroom organization is based on research showing that clear and consistent expectations, rules, routines, monitoring child behavior, and effectively dealing with problem behaviors, help children to develop self-regulatory and executive functioning skills (Evertson et al., 1983; Raver et al., 2009). These skills again support children's learning of academic skills (Blair, 2002; Ponitz, Rimm-Kaufman, Grimm et al., 2009). Thus, effective classroom organization allows learning to occur; it is difficult for children to learn if there is chaos, disruptive behaviors, or no time for learning in the classroom (see Emmer & Strough, 2011).

Studies have shown that children have higher learning motivation (Pakarinen, Kiuru et al., 2010), behavioral and cognitive self-control, and more positive work habits and that they spend less time off task and are more engaged in learning (Rimm-Kaufman et al., 2009) in ECE classrooms where quality of classroom organization is high. Moreover, in well-organized ECE and first grade classrooms, children show higher early reading (Ponitz, Rimm-Kaufman, Brock et al., 2009), writing (Leyva et al., 2015), and math skills (Hu et al., 2019; Leyva et al., 2015).

The last domain, instructional support, refers to interactions that promote higher-order thinking skills and understanding of the presented concepts (Hamre et al., 2013). These interactions involve effective questioning, scaffolding, and feedback from the teacher. Moreover, in instructionally supportive classrooms, the teacher uses different language-stimulation and language-facilitation techniques to promote children's linguistic development.

The domain of instructional support is based on research that has examined children's development of cognitive and linguistic skills. For example, according to Vygotsky (1978), children can learn and develop in interaction with teachers or other adults in ways that could not be possible for them without the support. Vygotsky (1978) called this process as learning in the zone of proximal development. Later on, the process has been referred to as scaffolding (Wood et al., 1976). In addition to scaffolding, studies have shown that children's cognitive skills can be supported with connecting teaching to the children's own world (Bransford et al., 2000), and giving right-timed, specific feedback (Kulik & Kulik, 1988). Furthermore, earlier research has highlighted the importance of understanding and reflection instead of merely memorizing facts (Mayer, 2002).

Research on the quality of instructional support has shown positive associations mostly between high-quality instructional support and children's academic skills. High-quality instructional support in ECE has been associated with children's better math (Burchinal et al., 2010; Hu et al., 2020; Mashburn et al., 2008) and literacy skills, such as receptive vocabulary (Cash et al., 2019; Hu et al., 2020; Mashburn et al., 2008), rhyming (Cash et al., 2019; Mashburn et al., 2008), letter identifying, and expressive language (Burchinal et al., 2010; Mashburn et al., 2008), and early writing skills (Leyva et al., 2015). Besides higher academic skills, children have shown higher executive functioning (Hu et al., 2020; Leyva et al., 2015), more empathy, and less disruptive behavior (Siekkinen et al., 2013) in ECE classrooms with a high quality of instructional support.

2.2 Person-centered approach in studying teacher–child interactions

With the person-centered approach, it is possible to identify profiles (i.e., groups of teachers or classrooms) which share similarities in their observed quality of teacher–child interactions (Halpin & Kieffer, 2015). These profiles represent patterns of teacher–child interactions which may differ either in the overall quality of teacher–child interactions or in the quality of specific interaction domains or dimensions. For example, some teachers might score high in some dimensions of teacher–child interactions and lower in other dimensions (e.g., Virtanen et al., 2019). Thus, the person-centered approach makes it possible to investigate the 10 interaction dimensions simultaneously, not separately, giving information about the complexity of the interactions in the classrooms (Halpin & Kieffer, 2015).

The first person-centered studies adopting the TTI framework conducted cluster analysis to identify profiles based on the observed quality of teacher–child interactions (LoCasale-Crouch et al., 2007), whereas more recent studies have utilized latent profile analysis (LPA) for the same purpose (Hu, Fan, LoCasale-Crouch et al., 2016; Lerang et al., 2021; Salminen et al., 2012; Virtanen et al., 2019). Together, these studies have shown that the person-centered approach can reveal differences in teachers' interactions with children. For example, Salminen et al. (2012) identified four profiles in Finnish kindergarten classrooms. These profiles were named: 1) *Highest quality,* 2) *Medium quality,* 3) *Medium quality with lower emotional support,* and 4) *Lowest quality.* Thus, there were two profiles representing the highest and lowest overall quality of teacher–child interactions and two profiles that represented the average overall quality but differed in the quality of emotional support dimensions. In other countries, four (China; Hu, Fan, LoCasale-Crouch et al., 2016) to five (United States; LoCasale-Crouch et al., 2007) profiles of teacher–child interactions have been identified in ECE settings. Differences in the number of the identified profiles might be due to cultural

differences, differences in the age of the children in the classrooms, or differences in the sample sizes of the studies.

In addition to identifying teacher–child interaction profiles, differences among the profiles have been examined in terms of children's academic achievement (Curby et al., 2009; Salminen et al., 2018), teacher and classroom characteristics (Hu, Fan, LoCasale-Crouch et al., 2016; LoCasale-Crouch et al., 2007; Salminen et al., 2012), and teachers' occupational well-being (Lerang et al., 2021; Paschal et al., 2022; Virtanen et al., 2019). However, person-centered research investigating the link between teachers' occupational well-being and teacher–child interactions has been scarce and conducted only in classrooms with under 5-year-old children (Jeon et al., 2016; Paschal et al., 2022) or in lower secondary school classrooms (Lerang et al., 2021; Virtanen et al., 2019). Hence, more research with versatile occupational well-being measures in kindergarten and elementary school classrooms is needed to add our understanding of the individual differences in the quality of teacher-child interactions and in teachers' occupational well-being (see chapter 3.2.3).

3 TEACHERS' OCCUPATIONAL WELL-BEING

3.1 Constructs of occupational well-being

Teachers' occupational well-being has seen growing interest in educational research (see Cumming, 2017), and its role on the quality of teacher–child interactions has been increasingly examined (e.g., Friedman-Krauss et al., 2014; Jennings, 2015; Sandilos et al., 2015). Occupational well-being can be broadly defined as the absence of negative experiences, such as stress and burnout, and the presence of positive experiences, such as job satisfaction (Baldschun, 2015). In the present study, three negative aspects (i.e., teachers' stress, emotional exhaustion, and depressive symptoms) that reflect the challenges in occupational well-being and one positive aspect (i.e., work engagement) which reflects favorable occupational well-being are examined to obtain a versatile picture of Finnish kindergarten and first grade teachers' occupational well-being.

Stress. Kyriacou (2001, p. 28) defines teachers' stress as "the experience by a teacher of unpleasant, negative emotions, such as anger, anxiety, tension, frustration, or depression, resulting from some aspect of their work as a teacher." In this thesis, two aspects of teachers' stress are examined: general stress and teaching-related stress. General stress refers to the negative feelings described by Kyriacou (2001), resulting from any aspect of the teaching job, whereas teaching-related stress refers to feelings of guilt and inadequacy specifically resulting from teaching the children (for previous research, see Pakarinen, Kiuru et al., 2010; Pakarinen, Lerkkanen et al., 2010; Virtanen et al., 2018).

Teaching is considered a stressful occupation (Herman et al., 2018; Johnson et al., 2005). In 2021, 42% of Finnish teachers reported experiencing work-related stress quite often or very often (Golnick & Ilves, 2022). Teachers' experiences of stress have been associated with lower job satisfaction (Klassen & Chiu, 2010), lower self-efficacy, lower professional commitment, and higher quitting

intentions (Klassen & Chiu, 2011). Furthermore, teachers' higher stress has been related to kindergarteners' lower motivation (Pakarinen, Kiuru et al., 2010).

Emotional Exhaustion. Prolonged stress can lead to burnout characterized by emotional exhaustion, cynicism, and inefficacy (Maslach et al., 2001). As Maslach et al. (2001) stated, burnout can be a severe threat to one's occupational well-being, and emotional exhaustion is a key element in it. Salmela-Aro et al. (2011) described emotional exhaustion as the emotional component of burnout; When teachers experience emotional exhaustion, they feel strain and fatigue caused by work. They may also have sleeping problems because of work-related worries (Salmela-Aro et al., 2011).

In 2021, 44% of Finnish teachers reported feeling quite often or very often remarkably tired (Golnick & Ilves, 2022). When Salmela-Aro et al. (2020) identified profiles based on Finnish teachers' occupational well-being at the beginning of the COVID-19 pandemic, 37% of the teachers were at risk of burnout and 9.8% at risk of severe burnout. Teachers' high level of emotional exhaustion has been associated, for example, with quitting intentions (Schaack et al., 2020; Skaalvik & Skaalvik, 2016) and elementary school children's lower academic achievement (Arens & Morin, 2016; Klusmann et al., 2016).

Depressive Symptoms. Besides emotional exhaustion, prolonged stress can be associated with depressive symptoms (Gluschkoff et al., 2016; Steinhardt et al., 2011). Depressive symptoms include feelings of fatigue, guilt, and disappointment in oneself (Beck, 1961). They are linked to levels of energy, motivation, and challenges in concentrating and decision-making (American Psychiatric Association, 2013). In the United States, the percentage of teachers experiencing depressive symptoms has varied in different reports from 7% to 24% (Roberts et al., 2016; Whitaker et al., 2015, respectively). Teachers' depressive symptoms have been negatively associated with, for example, the quality of the classroom-learning environment and children's growth in math skills (McLean & Connor, 2015).

Work Engagement. Schaufeli et al. (2002, p. 74) defined work engagement as a "positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption." The first component of work engagement, vigor, refers to experiences of energy, resilience, and persistence (Schaufeli et al., 2002). A teacher with high vigor wants to put effort into their teaching. The second component, dedication, consists of emotions such as pride, enthusiasm, and inspiration. A highly dedicated teacher finds their job meaningful and significant. The last component, absorption, involves feelings of concentration and engrossment. A teacher with high absorption might feel that "time flies" while teaching.

Teachers typically experience relatively high work engagement compared with other professionals (Hakanen et al., 2019). However, there has been a decline in Finnish teachers' work engagement over recent years (Golnick & Ilves, 2022). One reason for this might be the COVID-19 pandemic and the challenges it caused for teachers (see Pöysä, Pakarinen, & Lerkkanen, 2021, 2022; Sainio et al., 2022). In 2021, 66% of Finnish teachers reported they enjoyed being absorbed in

work very often or quite often (Golnick & Ilves, 2022). In the same survey, 63% of the teachers noted they were very often or quite often excited about their job. High work engagement is beneficial as it is associated, for example, with higher job satisfaction (Høigaard et al., 2012; Klassen et al., 2012), organizational commitment (Hakanen et al., 2006), job meaningfulness (Pöysä et al., 2022), and lower intention to quit the job (Høigaard et al., 2012; Klassen et al., 2012).

3.2 Associations between teachers' occupational well-being and the quality of teacher–child interactions

3.2.1 Theoretical models

In their *model of the prosocial classroom*, Jennings and Greenberg (2009) described how teachers' social-emotional competence and well-being lead to positive child outcomes via healthy teacher–child relationships, effective classroom management, effective social–emotional learning implementation, and healthy classroom climate. Thus, in the prosocial classroom model, it is assumed that emotionally and socially competent teachers with the preferred well-being have the personal resources to develop supportive and warm relationships with children, show empathy, take children's strengths into account when planning learning activities, be proactive while managing child behavior, and act as a role model in desirable social and emotional behavior. These behaviors, in turn, support children's development of social, emotional, and academic skills (Jennings & Greenberg, 2009).

In the present thesis, examination of well-being is focused on teachers' occupational well-being, and instead of examining teacher–child relationships, classroom management, and classroom climate separately, the quality of teacher–child interactions is examined as conceptualized in the TTI framework (Hamre et al., 2013). Thus, besides factors such as positive climate, positive relationships, and effective behavior management, factors also related to the quality of instructional support are examined in relation to teachers' occupational well-being. Based on the prosocial classroom model (Jennings & Greenberg, 2009), it could be assumed that teachers' high occupational well-being (as part of their general well-being) enables them to provide high-quality teacher–child interactions which enhance children's development of different skills, such as academic skills and social competence.

Another theoretical model describing the association between occupational well-being and performance in work, is the *model of work engagement* developed by Bakker and Demerouti (2008). In this model, Bakker and Demerouti suggest that job resources (e.g., autonomy, collegial and supervisor support) and personal resources (e.g., optimism, resilience) together or independently predict a person's work engagement, which again positively predicts a person's performance. The model further suggests that high work engagement and work performance can then create more resources, establishing a positive cycle.

According to the model of work engagement (Bakker & Demerouti, 2008), it is possible that highly engaged teachers perform better in their work, thus, the quality of teacher–child interactions is higher in classrooms where a teacher experiences a higher work engagement.

3.2.2 Empirical research: variable-oriented approach

Both the prosocial classroom model (Jennings & Greenberg, 2009) and the model of work engagement (Bakker & Demerouti, 2008) suggest that teachers' occupational well-being and the quality of teacher–child interactions could be related. Several studies have empirically examined this assumption in ECE, especially when it comes to the indicators of low occupational well-being, such as stress, emotional exhaustion, and depressive symptoms.

In terms of stress, Friedman-Krauss et al. (2014) reported a nonlinear association between ECE teachers' stress and the quality of emotional support. In their study, moderate stress was associated with highest quality of emotional support, whereas lower and higher stress was associated with a lower quality of emotional support. Regarding emotional exhaustion, two studies have reported a negative association between ECE teachers' emotional exhaustion and the quality of teacher–child interactions (Ansari et al., 2022; Jennings et al., 2015). In the study by Ansari et al. (2022), emotional exhaustion was negatively related to all three domains of teacher–child interactions, whereas in Jennings's study (2015), emotional exhaustion was related to a lower quality of emotional support. Finally, two studies have reported a negative association between teachers' depressive symptoms and the quality of teacher–child interactions in ECE classrooms (Jennings, 2015; Sandilos et al., 2015). In the study by Jennings (2015), depressive symptoms were negatively related with all three domains of teacher–child interactions, whereas in the study by Sandilos et al. (2015), depressive symptoms were related to a lower quality of classroom organization and instructional support.

When it comes to the positive aspect of teachers' occupational well-being - work engagement - less research has been conducted. First studies in the field investigated teachers' work engagement in relation to student-rated interaction quality in secondary schools (Klusmann et al., 2008) and teachers' self-rated job-performance in primary schools (Bakker & Bal, 2010). Among the first to examine observed quality of interactions in relation to teachers' work engagement, Nislin et al. (2016) showed that ECE teachers' high work engagement is associated with higher sensitivity in transitions and higher predictability with schedules. In sum, earlier research on the role of teachers' work engagement on interactions in the classroom has been scant and conducted mostly based on secondary school student (Klusmann et al., 2008) or primary school teacher ratings (Bakker & Bal, 2010). Thus, teachers' work engagement in relation to the observed quality of teacher–child interactions conceptualized and measured as in the TTI framework has remained unstudied. Therefore, in the present study, the role of teachers' work engagement in the observed quality of teacher–child interactions is examined in kindergarten and first grade classrooms.

Furthermore, although the role of teachers' stress, emotional exhaustion, and depressive symptoms on teacher–child interactions has been examined fairly comprehensively, many of these studies have been cross-sectional (e.g., Ansari et al., 2022; Jennings, 2015) and, thus, have not been able to examine longitudinal or reciprocal associations. Therefore, it has not been entirely clear what the direction of the association is: does teachers' occupational well-being predict quality of teacher–child interactions or vice versa – or are the associations reciprocal. Moreover, most of the earlier studies have been conducted in classrooms with under 5-year-old children (Ansari et al., 2022; Friedman-Krauss et al., 2014; Jennings et al., 2015; Sandilos et al., 2015), and less is known about the associations in kindergarten or elementary school classrooms. For these reasons, reciprocal associations between teachers' occupational well-being and the quality of teacher–child interactions in kindergarten and first grade classrooms are examined in the present study.

3.2.3 Empirical research: person-centered approach

A limited number of studies have taken a person-centered approach in examining the relation between ECE teachers' occupational well-being and the quality of teacher–child interactions. The few exceptions in the field include studies by Jeon et al. (2016) and Paschall et al. (2022). In the first study, which was conducted in classrooms with under 5-year-old children, Jeon et al. (2016) identified three profiles based on teachers' professional background, observed quality of teacher–child interactions, and teachers' job attitudes (i.e., stress, job satisfaction, and quitting intentions). The identified profiles were: 1) Less experienced, lower quality, and more positive attitudes, 2) Less experienced, average quality, and less positive attitudes, and 3) More experienced, better quality and mixed attitudes. Thus, the highest quality of teacher–child interactions was related to mixed attitudes including higher stress but also higher job satisfaction and lower quitting intentions. The lowest quality of teacher–child interactions was related with lowest stress and highest job satisfaction, whereas average quality was related with highest stress and lowest job satisfaction (Jeon et al., 2016).

A more recent study, also conducted in under 5-year-old children's education, identified five profiles based on the quality of emotional support and instructional support, and the amount of closeness and conflict in teacher–child relationships (Paschall et al., 2022). The identified profiles were characterized by: 1) highest quality of teacher–child interactions with low conflict, 2) moderate quality of teacher–child interactions with more conflict, 3) moderate quality of teacher–child interactions with less conflict, 4) lower quality of teacher–child interactions with more conflict, and 5) lowest quality of teacher–child interactions with less conflict. Among the profiles, teachers in profiles 3 and 5 experienced less emotional exhaustion than teachers in the other profiles (Paschall et al., 2022). Together, these results (Jeon et al. 2016; Paschall et al., 2022) indicate that the associations between teachers' occupational well-being and the quality of teacher–child interactions might be individually constructed and that

utilizing a person–centered approach can expand the understanding of these associations. However, as there is a limited number of previous ECE studies (Jeon et al., 2016; Paschall et al., 2022), more research with various measures for teachers' occupational well-being is needed. Moreover, both previous studies (Jeon et al., 2016; Paschall et al., 2022) were conducted in classrooms with under 5-year-old children whereas research conducted in kindergarten or during first elementary school years has thus far been missing. Therefore, in the present study, profiles based on teacher–child interactions in kindergarten classrooms were identified and compared in terms of teachers' stress, emotional exhaustion, and depressive symptoms.

4 CHILDREN'S SOCIAL COMPETENCE

4.1 Defining children's social competence

When examining children's social competence development, various terms, such as social skills (e.g., Burchinal et al., 2010), behavior problems (e.g., Broekhuizen et al., 2016), and externalizing behaviors (e.g., Friedman-Krauss et al., 2014) have been used. Social competence not only focuses on the absence of negative indicators, such as externalizing or antisocial behaviors, but also on the presence of positive indicators, that is, prosocial behaviors. In the present study, children's social competence is defined as the presence of prosocial behaviors and the absence of antisocial behaviors (Junttila et al., 2006). Prosocial behaviors include socially desirable behaviors, such as showing empathy and sharing, helping, comforting, and cooperating with peers (Junttila et al., 2006). Hence, socially competent children have the skills to engage in positive interactions with peers (Denham, 2006). Antisocial behaviors include socially undesirable behaviors that are impulsive and disruptive (Junttila et al., 2006). Socially competent children are able to regulate their expression of emotions (Denham, 2006; Raver & Zigler, 1997). Children's displays of prosocial behaviors have been associated with several positive outcomes, such as later academic achievement (Caprara et al., 2000) and social preference by peers (Caprara et al., 2000; Ladd et al., 1999), whereas antisocial behaviors have been related to negative outcomes such as peer rejection (Ladd et al., 1999). Moreover, both the absence of prosocial behaviors and presence of antisocial behaviors (i.e., poor social competence) have predicted later loneliness and social anxiety (Junttila et al., 2012).

4.2 Social competence in relation to teacher–child interactions and teachers' occupational well-being

In the prosocial classroom model (Jennings & Greenberg, 2009), it is assumed that teachers' well-being helps them to create healthy teacher–child relationships and a healthy classroom climate and to manage the classroom effectively. In this way, teachers support children in developing academic, social, and emotional skills. According to the model of the prosocial classroom, it is possible that teachers' occupational well-being is associated with the quality of teacher–child interactions, which is again associated with child outcomes such as social competence. Empirical research has supported the model by showing that high-quality emotional support and classroom organization can support the development of children's social competence (Broekhuizen et al., 2016).

In Finnish kindergarten classrooms, high-quality instructional support has been associated with more empathy (one subscale of prosocial behavior) and less disruptiveness (one subscale of antisocial behavior) (Siekkinen et al., 2013). However, it should be noted that most of the studies have examined only if the quality of teacher–child interactions contributes to children's social competence (Brock & Curby, 2014; Broekhuizen et al., 2016; Burchinal et al., 2010; Curby et al., 2013; Siekkinen et al., 2013). Less research has investigated if children's social competence might also play a role in the quality of teacher–child interactions. In fact, a recent study by Pakarinen et al. (2020) showed that there was a reciprocal association between children's empathy and the quality of emotional support in kindergarten classrooms; high-quality emotional support in fall predicted more empathy in spring, and children's empathy in fall predicted higher quality of emotional support in spring. In the same study, children's impulsivity in fall predicted lower quality of emotional support in spring. Thus, it appears that the direction of association might also be from children's social competence to the quality of teacher–child interactions – not only vice versa.

When it comes to the associations between children's social competence and teachers' occupational well-being, the research is scarce and has focused on the negative aspects of occupational well-being, namely, stress. This research has shown that kindergarten teachers' stress is associated with less prosocial and more antisocial behaviors in the classroom (Herman et al., 2018; Siekkinen et al., 2013). However, these two studies did not examine reciprocal associations and for this reason, it is not clear if children's low social competence predicts challenges in teachers' occupational well-being or if teachers' stress is reflected in children's social competence. To the best of my knowledge, no prior research has examined children's social competence in relation to the positive aspect of teachers' occupational well-being, that is, work engagement.

4.3 Teacher, classroom, and child characteristics

When examining the associations among the quality of teacher–child interactions, teachers' occupational well-being, and children's social competence, the role of different teacher, classroom, and child characteristics has also been considered. One of the commonly examined factors is teachers' work experience. However, the findings have been mixed; in some countries, teachers' work experience has been positively related to the quality of teacher–child interactions, such as in the Netherlands (Slot et al., 2015) and the United States (Li Grining et al., 2010). At the same time, in some countries, such as in Finland, the association has been negative (Pakarinen, Lerkkanen et al., 2010) or non-significant as in Germany and Portugal (Slot et al., 2015). In terms of teachers' occupational well-being, in Turkey, experienced teachers have reported higher levels of stress (Erdiller & Doğan, 2015), whereas in Canada, there has been no significant association between work experience and teachers' stress (Wagner et al., 2013). Similarly, the associations between teachers' work experience and work engagement have differed among the countries (see Klassen et al., 2012).

Classroom characteristics that have been examined in relation to teacher–child interactions and teachers' occupational well-being include, for example, group size. In some countries, group size has been negatively associated with the quality of teacher–child interactions, such as in China (Wang et al., 2020) and the Netherlands (Slot et al., 2015), whereas in other countries, group size and the quality of teacher–child interactions have not been statistically significantly associated, as in Finland (Pakarinen, Lerkkanen et al., 2010), Germany, and Portugal (Slot et al., 2015). Regarding teachers' occupational well-being, group size has been positively associated with stress (Friedman-Krauss et al., 2014). It is also possible that not only group size, but the number of children who need support in terms of learning, language (see Hoglund et al., 2015), or behavior (see Partee et al., 2019) could be associated with the quality of teacher–child interactions.

When it comes to child-related factors, many studies have shown that there are gender differences in children's social competence; girls, on average, display more prosocial behavior and less antisocial behavior than boys (Junttila et al., 2006; Pakarinen et al., 2018; Siekkinen et al., 2013). Because there is evidence that teacher and classroom characteristics might be associated with the quality of teacher–child interactions and teachers' occupational well-being – at least in some countries and educational contexts – teachers' work experience and group size are controlled in analyses of the present dissertation. In addition, the number of children in the group needing support for learning, language, or behavior, was controlled for in sub-study 2, and children's gender was controlled in sub-study 3.

5 AIMS OF THE THESIS

This thesis aimed to expand our understanding of the dynamics between teacher–child interactions and teachers' occupational well-being in Finnish kindergarten and first grade classrooms. As presented in the theoretical background, earlier research has primarily examined associations between teacher–child interactions and negative aspects of teachers' occupational well-being, such as stress, emotional exhaustion, and depressive symptoms, and most of this research has been cross-sectional (e.g., Ansari et al., 2022; Jennings, 2015). Moreover, only a few studies have taken a person-centered approach in identifying individual differences in ECE teachers' occupational well-being in relation to teacher–child interaction (Jeon et al., 2016; Paschall et al., 2022). To address these gaps, the present thesis aimed to examine teacher–child interactions in relation to four distinct aspects of teachers' occupational well-being: teachers' stress, emotional exhaustion, depressive symptoms, and work engagement. Moreover, reciprocal associations were examined (sub-studies 1 and 3), and a person-centered approach was utilized (sub-study 2). Finally, this thesis aimed to exploring how teacher–child interactions, teachers' occupational well-being, and children's social competence are interrelated (sub-study 3).

The research questions answered in this thesis are:

1. To what extent are the quality of teacher–child interactions and teachers' occupational well-being associated (sub-studies 1 and 3)?
2. What type of interaction profiles can be identified among kindergarten teachers and to what extent does teachers' occupational well-being differ among the profiles (sub-study 2)?
3. To what extent are the quality of teacher–child interactions and teachers' occupational well-being associated with children's social competence (sub-study 3)?

6   METHODS

6.1   Participants and Procedure

The participants of this thesis were involved in a larger follow-up study: Teacher and Student Stress and Interaction in Classroom (TESSI; Lerkkanen & Pakarinen, 2016–2022). The TESSI study is a longitudinal research project investigating associations among the quality of teacher–child interactions, teachers' occupational well-being, and different child outcomes. Teachers, children, principals, and guardians from kindergartens and elementary schools in Central Finland participated in the study.

Data used in this thesis were collected from 54 kindergarten classrooms during the academic year 2016–2017 (sub-studies 1 and 2) and from 54 first grade classrooms during the academic year 2017–2018 (sub-study 3). A sample of 47 kindergarten teachers was used in sub-study 1, a sample of 54 kindergarten teachers in sub-study 2 (including three teachers from the pilot study conducted in spring 2016), and a sample of 51 first-grade teachers in sub-study 3. In addition, data of 815 children from the first-grade classrooms were used in sub-study 3. An overview of the methods used in the three sub-studies is presented in Table 2.

Both kindergarten and first grade teachers completed a questionnaire about their occupational well-being twice during the school year: fall (T1) and spring (T2). First grade teachers also rated the social competence of the children in their classrooms at both time points. To assess the quality of teacher–child interactions, video recordings were conducted in all participating classrooms during one regular school day in fall and spring.

Prior to data collection, an ethical statement from the Ethical Committee of the University of Jyväskylä was received. Permission to conduct the study was requested from the municipalities, day-care center directors, and school principals. After receiving the permissions, all kindergarten and first grade

teachers in the participating municipalities (five in the kindergarten phase and eight in the first-grade phase) were contacted and informed of the opportunity to take part in the TESSI study. If the teacher was willing to participate in the study, all children's guardians in the classroom were contacted and informed about the study. Written consent forms were collected from all participating teachers and children's guardians. Participation in the study was voluntary for both teachers and children.

TABLE 2   Overview of the methods used in the thesis.

	Sub-study 1	**Sub-study 2**	**Sub-study 3**
Topic	*Relations between kindergarten teachers' occupational well-being and the quality of teacher–child interactions*	*The quality of teacher–child interactions and teachers' occupational well-being in Finnish kindergartens: A person-centered approach*	*Reciprocal associations among the quality of teacher–child interactions, teachers' work engagement, and children's social competence*
Sample	47 kindergarten teachers	54 kindergarten teachers	51 first-grade teachers and 815 first-grade children
Variables	Teacher–child interactions; teaching-related stress; work engagement	Teacher–child interactions; teaching-related stress; general stress; emotional exhaustion, depressive symptoms	Teacher–child interactions; work engagement; children's social competence
Statistical methods	Path analysis (four nested models compared with the Satorra–Bentler scaled chi-square test)	Latent profile analysis; Kruskal–Wallis test; Mann–Whitney *U* test	Multilevel modeling

6.2   Measures

6.2.1   Quality of teacher–child interactions

The quality of teacher–child interactions was measured with the CLASS Pre-K (Pianta et al., 2008a) in sub-studies 1 and 2 and with the CLASS K-3 (Pianta et al., 2008b) in sub-study 3. The CLASS Pre-K version was used for observing teacher–child interactions in the kindergarten data and CLASS K-3 in the first-grade data. Both versions of the CLASS conceptualize teacher–child interactions under three domains: emotional support, classroom organization, and instructional support. These domains consist of three or four more specific dimensions which again consist of several indicators and behavioral markers (see Table 3). Domains, dimensions, indicators, and behavioral markers are described in detail in the coding manuals (Pianta et al., 2008a, 2008b), which guide the assessment of teacher–child interactions on a scale from 1 to 7. Scores of 1–2 represent low

quality, 3–5 medium quality, and 6–7 high quality of teacher–child-interactions (Pianta et al., 2008a, 2008b).

In the TESSI study, the quality of teacher–child interactions was assessed from video recordings. In kindergarten classrooms, approximately 2.0–2.5 hours of teacher–child interactions were video recorded and divided into three to seven cycles (M_{fall} = 4.65, SD_{fall} = 1.03, M_{spring} = 4.49, and SD_{spring} = 0.92). The average duration of one cycle was 20.50 minutes (SD = 3.96). In first-grade classrooms, 3–4 lessons (45 min) were video recorded and divided into five to nine cycles (M_{fall} = 6.82, SD_{fall} = 1.18, M_{spring} = 5.90, and SD_{spring} = 0.73). The average duration of one cycle was 18.5 minutes (SD = 3.0). CLASS codings were conducted by 12 certified coders in the kindergarten phase and six certified coders in the first-grade phase. At least 20% of the cycles were double coded (i.e., individually coded by two coders) to calculate inter-rater reliabilities which are reported in the sub-studies. Validity of the CLASS Pre-K in Finnish kindergarten classrooms has been reported by Pakarinen, Lerkkanen, et al. (2010).

TABLE 3   CLASS domains, dimensions, indicators, and behavioral markers. Modified from Pianta et al. (2008a, 2008b).

Domain	Dimensions	Example of indicator	Example of behavioral marker
Emotional support	Positive climate	Positive affect	Smiling
	Negative climate	Negative affect	Irritability
	Teacher sensitivity	Responsiveness	Provides comfort and assistance
	Regard for student perspective	Flexibility and student focus	Follows students' lead
Classroom Organization	Behavior management	Clear behavior expectations	Clarity of rules
	Productivity	Maximizing learning time	Choice when finished
	Instructional learning formats	Effective facilitation	Teacher involvement
Instructional support	Concept development	Analysis and reasoning	*Why* and/or *how* questions
	Quality of feedback	Prompting thought processes	Asks students to explain thinking
	Language modeling	Frequent conversation	Back-and-forth exchanges

6.2.2   Teachers' occupational well-being

Teachers' occupational well-being was assessed using teachers' self-ratings on five different occupational well-being measures: teaching-related stress, general stress, emotional exhaustion, depressive symptoms, and work engagement.

Teaching-Related Stress. Teachers' teaching-related stress was measured with a modified version of the Parental Stress Inventory originally developed by Gerris et al. (1993). Modification included changing the context of the inventory

from parenting to teaching and translating the items from English into Finnish. After the modification, the measure had three items that captured teachers' stress related specifically to teaching and working with the children (e.g., "I often feel guilty or inadequate when thinking about what kind of teacher I am."). Teachers rated the items with a 5-point Likert scale (1 = hardly describes me; 5 = describes me very well), and the mean score of the three items was used in the analyses. In the sample of 47 kindergarten teachers (sub-study 1), Cronbach's alpha for the measure was .75 in fall and .68 in spring. In the sample of 54 kindergarten teachers (sub-study 2), Cronbach's alpha for the measure was .69. This inventory has been previously used to measure kindergarten teachers (Pakarinen, Kiuru et al. 2010; Pakarinen, Lerkkanen et al., 2010; Siekkinen et al., 2013) and elementary school teachers' (Virtanen et al., 2018) teaching-related stress.

General Stress. Teachers' general stress was measured with one item ("Stress means a situation in which a person feels tense, restless, nervous, or anxious, or is unable to sleep at night because their mind is troubled all the time. Do you feel this kind of stress these days?") which is part of the Occupational Stress Questionnaire (Elo et al., 2003). Teachers rated the item with a 6-point Likert scale (1 = not at all; 6 = very much). Elo et al. (2009) previously reported on the validity of the single-item measure among Finnish workers.

Emotional Exhaustion. Teachers' emotional exhaustion was measured with the exhaustion subscale that is part of the shortened version of Bergen Burnout Inventory (BBI; Salmela-Aro et al., 2011). The subscale consists of three items (e.g., "I am snowed under with work.") that capture teachers' workload, sleep problems resulting from work, and an uneasy conscience from neglecting friends and relatives because of work. Teachers rated the items with a 6-point Likert scale (1 = strongly disagree; 6 = strongly agree) and the mean score of the three items was used in the analyses. In the sample of 54 kindergarten teachers (sub-study 2), Cronbach's alpha for the measure was .76. Validity of the measure among Finnish workers has been reported by Salmela-Aro et al. (2011).

Depressive Symptoms. Teachers' depressive symptoms were measured with four items modified from the Beck Depression Inventory (Beck et al., 1961). Items (e.g., "I get tired more easily than I used to.") capture teachers' fatigue, depression, guilt, and disappointment in oneself. Teachers rated the items with a 5-point Likert scale (1 = not true at all; 5 = completely true), and the mean score of the four items was used in the analyses. In the sample of 54 kindergarten teachers (sub-study 2), Cronbach's alpha for the measure was .72. Short versions of Beck Depression Inventory have been previously used to measure Finnish adults' depressive symptoms (Aalto et al., 2012; Elovainio et al., 2020).

Work Engagement. Teachers' work engagement was measured with the Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2002). The UWES consists of nine items that fall into three subscales: vigor, dedication, and absorption. These subscales capture teachers' energy at work (e.g., "At my work, I feel bursting with energy."), feelings of pride and enthusiasm in work (e.g., "My job inspires me."), and concentration while working (e.g., "I am immersed in my work."). Teachers rated the items with a 7-point Likert scale (1 = never; 7 = daily),

and the mean score of the nine items was used in the analyses. In the sample of 47 kindergarten teachers (sub-study 1), Cronbach's alpha for the measure was .91. In the sample of 51 first-grade teachers (sub-study 3), Cronbach's alpha for the measure was .87 in fall and .93 in spring. UWES validity among Finnish teachers was previously reported by Seppälä et al. (2009).

6.2.3 Children's social competence

Children's social competence was measured with the Multisource Assessment of Children's Social Competence Scale (MASCS; Junttila et al., 2006). With this measure, teachers rated the frequency of children's prosocial and antisocial behaviors in their classrooms. Prosocial behaviors consist of two subscales: empathy (3 items, e.g., "Shows acceptance of other students") and cooperating skills (5 items, e.g., "Effectively participates in group activities"). The empathy subscale captures children's sensitivity, acceptance of other children, and friendship skills. The cooperation skills subscale captures children's participation in group activities, help offers, and conversation starters. Similarly, antisocial behaviors consist of two subscales: disruptiveness (4 items, e.g., "Argues and quarrels with peers") and impulsivity (3 items, e.g., "Has temper outbursts or tantrums"). The disruptiveness subscale captures children's arguing with other children and annoying and teasing other children. The impulsivity subscale captures children's temper outbursts and irritation. Teachers rated the items with a 4-point Likert scale (1 = never; 4 = very frequently), and the mean scores for prosocial behavior (8 items) and antisocial behavior (7 items) were used in the analyses. Validity of the measure among Finnish elementary school children has been reported by Junttila et al. (2006).

6.2.4 Teacher, classroom, and child characteristics

Teachers reported their work experience, group size, and the number of children in the group needing special support in terms of learning, language, or behavior, on questionnaires. These teacher and classroom characteristics, in addition to child gender, were used as control variables in the data analyses. An overview of all the measures used in the thesis is shown in Table 4.

TABLE 4   Measures used in the three sub-studies.

Measure	Sub-study 1	Sub-study 2	Sub-study 3
Quality of teacher–child interactions			
CLASS Pre-K	X	X	
CLASS K-3			X
Teachers' occupational well-being			
Teaching-related stress	X	X	
General stress		X	
Depressive symptoms		X	
Emotional exhaustion (BBI)		X	
Work engagement (UWES)	X		X
Children's social competence			
Prosocial and antisocial behavior (MASCS)			X
Teacher, classroom, and child characteristics			
Teachers' work experience	X	X	X
Group size	X	X	X
Percentage of children needing support		X	
Child gender			X

Note: CLASS Pre-K = Classroom Assessment Scoring System Pre-K; CLASS K-3 = Classroom Assessment Scoring System K-3; BBI = Bergen Burnout Inventory; UWES = Utrecht Work Engagement Scale; MASCS = Multisource Assessment of Children's Social Competence Scale

6.3   Statistical methods

Sub-study 1. In sub-study 1, four nested models were constructed using Mplus version 8 (Muthén & Muthén, 1998–2017) and compared with the Satorra–Bentler (Satorra & Bentler, 2001) scaled chi-squar test to examine which model would best represent the associations between teaching-related stress and teacher–child interactions. Models were constructed separately for the three domains of teacher–child interactions. Teachers' work experience and group size were controlled in the models. To examine the associations between teachers' work engagement and teacher–child interactions, separate path models for each domain of teacher–child interactions were again constructed, and teachers' work experience and group size were controlled for. However, different nested models were not constructed because teachers' work engagement was measured only once, thus it was not possible to examine reciprocal associations.

Sub-study 2. In sub-study 2, profiles based on the quality of the 10 teacher–child interaction dimensions were identified through LPA using Mplus version 8 (Muthén & Muthén, 1998–2017). The number of the profiles was evaluated according to the following statistical criteria: log likelihood (logL), Akaike's information criterion (AIC), adjusted Bayesian information criterion (aBIC), entropy, Vuong–Lo–Mendell–Rubin (VLMR) test, Lo–Mendell–Rubin (LMR) test, and parametric bootstrapped likelihood ratio (BLRT) test. After identifying the profiles, differences among the profiles in terms of teachers' occupational well-being and background factors (i.e., work experience, group size, and number of

children needing support) were examined using the Kruskal–Wallis test in IBM SPSS Statistics 24. The Mann–Whitney U test was used for the group comparisons. Non-parametric tests were selected due to the small sample and profile sizes.

Sub-study 3. In sub-study 3, multilevel models were conducted with Mplus version 8 (Muthén & Muthén, 1998–2017). At the between-level of the models, reciprocal associations among teacher–child interactions, teachers' work engagement, and children's social competence in fall and spring were examined. At the within-level, associations between social competence in fall and in spring were examined. At the between-level, teachers' work experience and group size were controlled for, and at the within-level, child gender was controlled for. Models were constructed separately for the three domains of teacher–child interactions and two domains of children's social competence. Thus, altogether six models were constructed. Before conducting the multilevel models, intraclass correlation coefficients (ICCs) were calculated with Mplus to investigate if there were differences among classrooms in children's social competence or gender.

6.4   Context of the study

The data for the study were collected from Finnish kindergarten (i.e., pre-primary education) and grade 1 classrooms. In Finland, kindergarten education is mandatory and free for all children. Children enter kindergarten the year that they turn six years old. Kindergarten education aims at enhancing children's development, learning, social competence, and positive self-image by providing child-centered activities, possibilities for play, interaction, and exploration (Finnish National Agency of Education, 2016a).

Requirements for kindergarten education in Finland are as follows: kindergarten time is approximately four hours a day (Finnish National Agency for Education, n.d.), and there must be the availability of early childhood education services after the kindergarten time (Basic Education Act, 1998/628). Kindergarten teachers are required to have at least a bachelor's degree in education (Asetus opetustoimen henkilöstön kelpoisuusvaatimuksista [Decree on the qualifications required of teaching staff], 1998/986), and municipalities are responsible for arranging kindergarten education for children (Basic Education Act, 1998/628). Kindergarten education can be provided in schools, in day-care centers or in other suitable surroundings (Finnish National Agency for Education, n.d.). In day-care centers, kindergarten group sizes are regulated by the Finnish Early Childhood Education Act (Varhaiskasvatuslaki, 2018/540). In schools, kindergarten group sizes are recommended not to exceed 13 children if there is one kindergarten teacher and 20 children if there is another teacher or children's nurse in the group (Finnish National Agency for Education, n.d.).

After kindergarten, children begin elementary school in the year that they turn seven years old. During the first school year, the main emphasis is on learning skills that are needed in school: children learn to be self-directive, co-operate with peers, and to take responsibility for their schoolwork (Finnish

National Agency of Education, 2016b). Moreover, they learn basic academic skills such as reading, writing, and math. Teaching involves play, stories, and learning-by-doing (Finnish National Agency of Education, 2016b).

Requirements for first-grade education in Finland are as follows: at least 20 hours of teaching per week needs to be provided and the maximum length of one school day is five lessons. Elementary school teachers are required to have a master's degree in education (Asetus opetustoimen henkilöstön kelpoisuusvaatimuksista [Decree on the qualifications required of teaching staff], 1998/986), and there are no national regulations for group sizes. In 2019, average group size in Finnish first-grade classrooms was 18 children (Finnish Ministry of Education and Culture, n.d.).

7 OVERVIEW OF THE ORIGINAL STUDIES

7.1 Sub-study 1: Relations between kindergarten teachers' occupational well-being and the quality of teacher–child interactions

The aim of the sub-study 1 was to examine to what extent the quality of teacher–child interactions and two aspects of teachers' occupational well-being (i.e., teaching-related stress and work engagement) are associated in kindergarten classrooms. To assess the quality of teacher–child interactions, video recordings were conducted in 47 kindergarten classrooms. Moreover, teachers assessed their teaching-related stress and work engagement in questionnaires. The quality of teacher–child interactions and teachers' teaching-related stress were measured in two time points: in kindergarten in fall and spring. Teachers' work engagement was only measured in kindergarten in spring.

Comparison of the four nested path models showed that for emotional support, the stress-driven model fitted the data best. In this model, stability paths and cross-lagged paths from stress to emotional support were estimated. Results of the path model showed that teaching-related stress in fall negatively predicted the quality of emotional support in spring. Both teaching-related stress and the quality of emotional support were rather stable across the kindergarten year. In terms of control variables (i.e., group size and teachers' work experience), group size was negatively associated with the teachers' stress in spring.

The stress-driven model also fitted the data best for classroom organization. Results of the path model showed that teaching-related stress in fall negatively predicted the quality of classroom organization in spring. For instructional support, the stability model fitted the data best. In this model, teaching-related stress and the quality of instructional support were predicted by their preceding values. Thus, teaching-related stress and the quality of instructional support were not associated.

Separate cross-lagged path models were conducted to examine the associations between teachers' work engagement and the quality of teacher–child interactions. Nested models were not constructed and compared because teachers' work engagement was only measured at one time point. The results of the cross-lagged path analyses indicated that work engagement only had associations with the instructional support domain. In this model, teachers' work engagement in spring was positively associated with the quality of instructional support measured at the same point.

To conclude, sub-study 1 showed that teaching-related stress and work engagement were associated with different domains of teacher–child interactions: teachers' stress was negatively associated with subsequent quality of emotional support and classroom organization, whereas teachers' work engagement was positively associated with the quality of instructional support. Thus, it seems important to examine both the positive and negative aspects of teachers' occupational well-being. Overall, the results suggest that it is important to support teachers in their occupational well-being to enhance the quality of teacher–child interactions.

7.2 Sub-study 2: The quality of teacher–child interactions and teachers' occupational well-being in Finnish kindergartens: A person-centered approach

The aim of the sub-study 2 was to examine what kind of interaction profiles can be identified among kindergarten teachers and to what extent teachers in these profiles differ in their occupational well-being (i.e., teaching-related stress, general stress, emotional exhaustion, and depressive symptoms) and teacher and classroom characteristics (teacher's work experience, group size, and number of children in the group needing special support). To assess the quality of teacher–child interactions, video recordings were conducted in 54 kindergarten classrooms. Moreover, teachers assessed their teaching-related stress, general stress, emotional exhaustion, and depressive symptoms. The quality of teacher–child interactions and teachers' occupational well-being were both measured in kindergarten in spring. The majority of the teachers (n = 51) participated in the study in spring 2017 and three teachers in spring 2016.

First, using LPA, four profiles of teacher–child interactions were identified: *Highest quality* (20.4%), *Moderate quality* (50%), *Lower quality with limited negativity* (16.7%), and *Lower quality with moderate negativity* (13%). Profiles represented the differences in teachers' CLASS scores in the 10 dimensions. Second, results of the Kruskal–Wallis test showed statistically significant differences among the profiles in teachers' teaching-related stress, general stress, and depressive symptoms. Furthermore, there was a marginally significant difference among the profiles in teachers' levels of emotional exhaustion. The Mann–Whitney U test further showed that *Moderate quality* profile teachers experienced less teaching-

related stress than teachers belonging to the two lower quality profiles. *Moderate quality* teachers also experienced less general stress than teachers belonging to *Highest quality* and *Lower quality with moderate negativity* profiles. Finally, *Moderate quality* teachers experienced fewer emotional exhaustion and depressive symptoms than *Highest quality* teachers. There were no statistically significant differences among the profiles with respect to the teacher and classroom characteristics.

To conclude, it seems that kindergarten teachers shared some similar patterns of teacher–child interactions and that among these patterns, teachers scoring near the sample mean in their quality of teacher–child interactions reported the most favorable occupational well-being. By recognizing individual differences in both quality of teacher–child interactions and teachers' occupational well-being, it is possible to target pre- and in-service training in an appropriate manner to best serve the needs of individual teacher students and teachers.

7.3   Sub-study 3: Reciprocal associations among teacher–child interactions, teachers' work engagement, and children's social competence

The aim of the sub-study 3 was to examine reciprocal associations among the quality of teacher–child interactions, teachers' work engagement, and children's social competence during first grade. To assess the quality of teacher–child interactions, video recordings were conducted in 51 first-grade classrooms. Moreover, teachers reported their work engagement in questionnaires and assessed the social competence (prosocial and antisocial behavior) of the children (n = 815) in their classrooms. The quality of teacher–child interactions, teachers' work engagement, and children's social competence were measured at two time points: first grade fall and spring.

The results of the multilevel models showed that teachers' work engagement positively predicted the subsequent quality of all three domains of teacher–child interactions. Moreover, the models showed multiple associations between the quality of teacher–child interactions and children's social competence. First, the results showed a reciprocal association between the quality of instructional support and children's prosocial behavior: the quality of instructional support positively predicted subsequent prosocial behavior in the classroom and vice versa. Quality of instructional support also predicted negatively subsequent antisocial behavior in the classroom. Moreover, children's prosocial behavior was positively associated with subsequent quality of emotional support. In addition, quality of classroom organization was positively associated with subsequent prosocial behavior. However, these last two associations were only marginally significant.

Multilevel models further showed significant associations between teachers' work engagement and children's social competence. Teachers' high work engagement in fall predicted less antisocial behavior in spring, and children's prosocial behavior in fall predicted teachers' higher work engagement in spring. To conclude, the results not only showed associations from the quality of teacher–child interactions and teachers' occupational well-being to children's social competence but also vice versa. In particular, children's prosocial behavior predicted teachers' work engagement and interactions with children. For this reason, it is important to support children in showing empathy and displaying cooperative behaviors.

8   GENERAL DISCUSSION

It is known that the quality of teacher–child interactions plays an important role in children's academic skills (Cash et al., 2019; Hu et al., 2019, 2020; Leyva et al., 2015; Rankin et al., 2022), social competence (Burchinal et al., 2010; Luckner & Pianta, 2011; Pakarinen et al., 2020; Siekkinen et al., 2013), and motivation (Pakarinen, Kiuru et al., 2010). At the same time, it is evident that teachers, who are responsible for providing high-quality interactions in their classrooms, are experiencing increasing challenges to their occupational well-being. In Finland, teachers are reporting an increase in their stress levels (Golnick & Ilves, 2022; Kauppi et al., 2022) and a decrease in their work engagement (Golnick & Ilves, 2022). Around the world, teachers are among the most stressed occupational groups (Johnson et al., 2005). Challenges in teachers' occupational well-being are concerning because there is evidence that, for example, teachers' emotional exhaustion (Ansari et al., 2022; Jennings, 2015) and depressive symptoms (Jennings, 2015; Sandilos et al., 2015) are negatively associated with the quality of teacher–child interactions. However, not enough is known about the direction of the association or how positive aspects of well-being, such as work engagement, are related with the observed quality of teacher–child interactions. Similarly, we are far from understanding the effect of children's social competence on teacher–child interactions and teachers' occupational well-being. Finally, person-centered studies that recognize individual differences in the construction of teacher–child interactions and teachers' occupational well-being are scarce.

To address these gaps in the existing literature, this thesis aimed to examine the associations between the quality of teacher–child interactions and teachers' occupational well-being from three different viewpoints: 1) direction of the association between the quality of teacher–child interactions and teachers' occupational well-being, 2) profiles of teacher–child interactions and possible differences in teachers' occupational well-being across the profiles, and 3) children's social competence in relation to teacher–child interactions and teachers' occupational well-being.

The results of the thesis showed, first, that teachers' occupational well-being predicts the subsequent quality of teacher–child interactions. Second, the results

showed differences in teachers' occupational well-being across the four identified interaction profiles. Third, the results revealed several associations between children's social competence and the quality of teacher–child interactions and teachers' occupational well-being. Together, these findings increase our understanding of the relations among the quality of teacher–child interactions, teachers' occupational well-being, and children's social competence.

8.1 Associations between the quality of teacher–child interactions and teachers' occupational well-being

The primary aim of this dissertation was to examine to what extent quality of teacher–child interactions and teachers' occupational well-being are associated in kindergarten and in first-grade classrooms. To investigate this question, teachers' occupational well-being was examined in terms of teaching-related stress (sub-study 1) and work engagement (sub-studies 1 and 3). The results showed that, in accordance with the prosocial classroom model (Jennings & Greenberg, 2009), teachers' occupational well-being predicted subsequent quality of teacher–child interactions. First, higher teaching-related stress in kindergarten fall predicted lower quality of emotional support and classroom organization in kindergarten spring. In the earlier studies, reciprocal associations remained unstudied, and for that reason, it has not been made clear what the direction of the association is. This dissertation suggests that teachers' occupational well-being is reflected in the quality of teacher–child interactions, not vice versa. Thus, it seems that teachers' stress might diminish teachers' resources to provide high-quality emotional support and classroom organization, as suggested in the prosocial classroom model (Jennings & Greenberg, 2009).

To guarantee high-quality teacher–child interactions in the classrooms, it would be important to find tools to reduce teachers' stress. This is highly relevant because teachers' stress has been on the increase and work engagement on the decrease in Finland (Golnick & Ilves, 2022). Ways to reduce teachers' stress in ECE and in primary schools could be increasing collegial support and collaboration among colleagues (Hoglund et al., 2015; McLean et al., 2017; Schaack et al., 2020), increasing trust between teachers and supervisors (McLean et al., 2017), reducing teachers' time pressure (Skaalvik & Skaalvik, 2016), having a reasonable workload (Desouky & Allam, 2017; Ferguson et al., 2012), and providing teachers with enough breaks during the workday (Virtanen et al., 2021). Furthermore, it is useful for teachers to identify a few personal coping strategies that are effective for them in reducing stress (Aulén et al., 2021).

In terms of the positive aspect of teachers' occupational well-being, the results of the present study showed that teachers' high work engagement in kindergarten in spring was associated with high-quality instructional support at the same time point (sub-study 1). In first-grade classrooms, teachers' work engagement positively predicted the subsequent quality of emotional support,

classroom organization, and instructional support (sub-study 3). It should be noted that until now, the relation between teachers' work engagement and observed quality of teacher–child interactions has remained largely unstudied. Together, the results of sub-studies 1 and 3 are in line with the earlier studies in which teachers' work engagement has been positively associated with quality of interactions assessed by secondary school students (Klusmann et al., 2008) or by teachers themselves (Bakker & Bal, 2010). Results of the present study contribute to the field, first, by showing that teachers' work engagement is also associated with the quality of teacher–child interactions when it is assessed using well-known observational measure (i.e., CLASS; Pianta et al., 2008a, 2008b). Second, the results showed that the direction of association is from work engagement to the quality of teacher–child interactions, as suggested in the model of work engagement (Bakker & Demerouti, 2008). Thus, in addition to reducing teachers' stress, also enhancing their work engagement could be beneficial for the quality of teacher–child interactions. Ways to support teachers' work engagement include increasing supervisor support (Bakker & Bal, 2010; Bakker et al., 2007; Nislin et al., 2015; Skaalvik & Skaalvik, 2016), possibilities for autonomy (Bakker & Bal, 2010; Skaalvik & Skaalvik, 2014), and possibilities for professional development (Bakker & Bal, 2010).

8.2 Differences in teachers' occupational well-being across the identified profiles of teacher–child interactions

The second aim of this thesis was to examine the differences in kindergarten teachers' occupational well-being across identified profiles of teacher–child interactions. The results of the person-centered sub-study 2 differ from previous variable-oriented studies which have shown that high-quality teacher–child interactions are associated, for example, with lower emotional exhaustion (Ansari et al., 2022; Jennings et al., 2015) and depressive symptoms (Jennings, 2015; Sandilos et al., 2015). In the present study, teachers who scored near the sample mean in all 10 dimensions of CLASS, indicating average quality of teacher–child interactions, reported the fewest challenges in their occupational well-being. At the same time, teachers with above or below the sample mean quality of teacher–child interactions reported more challenges in their occupational well-being. Somewhat similarly, in a recent person-centered study by Paschall et al. (2022), teachers in profiles characterized by low conflict and highest quality of emotional and instructional support experienced more emotional exhaustion than teachers in profiles characterized by either low conflict and moderate quality of emotional and instructional support or low conflict and lowest quality of emotional and instructional support. However, the results are not fully comparable because in the study by Paschall et al. (2022), the profiles were identified not only based on the quality of teacher–child interactions, but also on the closeness and conflict in teacher–child relationships.

Moreover, the profile identification was conducted on domain-level (emotional support and instructional support), not on a more specific dimension-level as in the present study.

Based on the results documented in present dissertation, it seems that in terms of the challenges to their occupational well-being, the teachers in the *Highest quality* and in the two lower quality profiles (*Lower quality with limited negativity* and *Lower quality with moderate negativity*), their reports differed. Teachers who had challenges in their interactions with children reported more stress related to teaching and working with the children (i.e., teaching-related stress), whereas teachers who were observed as having high-quality interactions with children reported other indicators of low occupational well-being, not teaching-related stress. However, sub-study 2 was not longitudinal, so it is not possible to say if teachers in the two lower quality profiles reported teaching-related stress because they felt that they did not have proper skills to guide the children, or if the stress they experienced decreased their ability to provide high-quality teacher–child interactions. Similarly, it is not possible to say if the *Highest quality* teachers were exhausted because they aimed at providing high-quality teacher–child interactions. Nevertheless, based on the current results, it seems that in respect to occupational well-being, it might be better to aim at an average quality of teacher–child interactions instead of the highest quality.

By recognizing individual differences among the teachers, it is possible to target suitable interventions for the teachers (Halpin & Kieffer, 2015). For example, on the one hand, it would be important to target interventions that aim at enhancing the quality of teacher–child interactions for those teachers who were observed to have lower-quality interactions with children (*Lower quality with limited negativity* and *Lower quality with moderate quality* profiles). On the other hand, it would be important to find ways for teachers with high-quality teacher–child interactions (*Highest quality* profile) to cope with the stress so that aiming at high quality teacher–child interactions would not be associated with challenges in occupational well-being. Interventions that have been recognized as effective in improving the quality of teacher–child interactions include, for example, video-based professional development programs such as My Teaching Partner and Making the Most of Classroom Interactions (see Early et al., 2017). Also, intervention that supports teachers' occupational well-being has been, for example, mindfulness-based professional development program CARE for Teachers (see Jennings et al., 2017).

In sum, together with the earlier person-centered studies (Jeon et al., 2016; Paschall et al., 2022), these results broaden the understanding of the relation between teachers' occupational well-being and the quality of teacher–child interactions by showing that there are individually constructed profiles of teacher–child interactions and that across these profiles, teachers differ in their occupational well-being. Earlier research on the role of teachers' occupational well-being in teacher–child interactions has mostly been variable-oriented and showed different associations than those of the person-centered studies. The results of the present study emphasize the importance of examining individual

differences in the quality of teacher–child interactions and in teachers' occupational well-being, in addition to the variable-oriented research.

8.3 Children's social competence in relation to the quality of teacher–child interactions and teachers' occupational well-being

The third aim of this thesis was to examine to what extent quality of teacher–child interactions and teachers' work engagement are associated with children's social competence. The results showed a reciprocal association between children's prosocial behavior and the quality of instructional support during the first-grade school year (sub-study 3). Moreover, quality of instructional support negatively predicted subsequent antisocial behavior in the classroom. Thus, it seems that teachers can support children's social competence with high-quality instructional support. In practice, this means, for example, scaffolding, asking open-ended questions and follow-up questions, giving detailed feedback, using versatile language, and connecting teaching to children's lives (Pianta et al., 2008b).

Although instructional support seems to be important for children's social competence, quality of instructional support is usually lowest among the three domains of teacher–child interactions (Cadima et al., 2014; Leyva et al., 2015; Pakarinen, Lerkkanen et al., 2010). To enhance the quality of instructional support, it would be important to pay special attention to the instructionally supportive interactions, such as language modeling and feedback-giving, in teacher education. One possibility to teach high-quality teacher–child interactions for teacher-students is the Vuorovaikutus osana opettajan arviointiosaamista (VOPA) program (see Ketonen et al., 2022; Lehesvuori et al., 2021), which has been developed in Finland based on the TTI framework and My Teaching Partner program. In the VOPA-program, student teachers observe their interactions in the classroom during their teaching practice period and focus on one specific aspect of interaction (such as feedback) at a time (Pöysä, Pakarinen, Ketonen et al., 2021).

It is important to note that in the present study, the association between prosocial behavior and instructional support was not only from instructional support to prosocial behavior but also from prosocial behavior to instructional support. It has not been a common tradition to examine if children's social competence predicts quality of teacher–child interactions. However, in line with the transactional models of development (Smirnoff, 2009), which suggest that children's characteristics and behaviors can have an evocative effect on teacher emotions and behaviors in a classroom (for a meta-analysis, see Nurmi, 2012), at least one earlier study examined reciprocal associations between children's social competence and quality of teacher–child interactions in kindergarten classrooms. Results of the study (Pakarinen et al., 2020) showed that children's empathy

positively predicted, and impulsivity negatively predicted subsequent quality of emotional support (Pakarinen et al., 2020). Together with the present thesis, these two studies indicate that children's social competence and especially prosocial behaviors might play a role in the quality of teacher–child interactions, not only vice versa. For this reason, supporting children in showing empathy and displaying cooperative behaviors is of high importance and should be emphasized in early childhood and primary education. To help teachers in enhancing children's social competence, there are various social and emotional learning programs (for a review, see Durlak et al., 2011).

In terms of teachers' occupational well-being, teachers' work engagement negatively predicted subsequent antisocial behavior in the classroom (sub-study 3), indicating that teachers' occupational well-being is not only important for the quality of teacher–child interactions (sub-studies 1 and 3), but also for children's social competence. Therefore, finding tools to support teachers' occupational well-being in ECE and primary school settings should be considered. Results of the present study further showed an evocative effect of children's prosocial behavior on teachers' work engagement (sub-study 3). Earlier research has indicated that early childhood education teachers experience fewer depressive symptoms and higher job satisfaction if children's social and emotional learning is supported (Zinsser et al., 2016). Similarly, the results of the current study suggest that children's social competence and especially prosocial behavior plays a positive role in teachers' occupational well-being and should therefore be supported.

To the best of our knowledge, no other study has examined the relationship between teachers' work engagement and children's social competence. Instead, earlier research has suggested that teachers' stress is associated with children's lower social competence (Siekkinen et al., 2013). Because teachers' work engagement covers positive emotions related to work (Schaufeli et al., 2002), it is understandable that work engagement is associated with higher social competence – unlike stress that includes negative work-related emotions (Kyriacou, 2001). In sum, the results discussed in this thesis emphasize the importance of examining both positive and negative aspects of teachers' occupational well-being in relation to teacher–child interactions and children's social competence.

8.4   Ethical considerations

This study was conducted in line with the ethical guidelines provided by Finnish National Board on Research Integrity (TENK, 2019). Consistent with the guidelines, the dignity and autonomy of participants was respected, and the research was conducted so that no significant harm, risk, or damage would be caused for research participants or participating schools. The data used in this thesis were collected in a larger follow-up study, Teacher and Student Stress and Interaction in Classroom (TESSI; Lerkkanen & Pakarinen, 2016–2022), which

received an ethical statement from the ethical committee of the University of Jyväskylä before the data collection. In line with the ethical guidelines (TENK, 2019), participation in the study was voluntary for the teachers and for the children in their classrooms. Teachers were informed about the study first orally and then in written form. As advised by TENK (2019), consent forms that were sent for teachers and guardians included information about the content of the study, processing of personal data, and practical information about conduction of the study. All participants (teachers and children's guardians) signed a written consent form to participate in the study and were informed that they could withdraw their participation at any point of the study. If guardians forbad their child's participation and/or the video recording, the child was either placed in another classroom during the video recording or their image was blurred in the video tapes. In accordance with ethical guidelines of TENK (2019), special attention was given to the sensitive treatment of children as they were only six to eight years old while collecting the data. After collecting the data, they were anonymized by removing all participant names, school names, municipality names, and other identifying information. The data have been stored safely according to the guidelines of the University of Jyväskylä. Finally, anonymity of the participants has been guaranteed while reporting the results.

8.5   Limitations and future directions

The following limitations need to be considered when interpreting the results of the current thesis. First, the sample sizes of all sub-studies were limited with the number of teachers varying from 47 (sub-study 1) to 54 (sub-study 2). For this reason, the statistical power of the statistical analysis was also limited. Considering the small sample sizes, caution is needed when interpreting the results. Second, the longitudinal data used in sub-studies 1 and 3 only included two time points during one school year. Thus, although directions of associations were examined, it is not possible to draw conclusions on causality. Therefore, in addition to larger sample sizes, longitudinal research designs with more time points during several school years are needed in future studies to examine the associations between teacher-child interactions, teachers' occupational well-being, and children's social competence.

Third, there are some limitations related to the measures used in the thesis. In the kindergarten data used in sub-studies 1 and 2, inter-rater reliabilities for the CLASS concept development dimension were not ideal. For this reason, more attention was given for this dimension when raters were trained to code the first-grade data used in sub-study 3. Because instructional support dimensions are commonly the most difficult dimensions for the CLASS coders (see Bell et al., 2014), special attention for the instructional support dimensions is also recommended in other future studies. Moreover, although five different measures for teachers' occupational well-being were used in the study, only one of the measures (i.e., work engagement) reflected positive occupational well-

being, while others (i.e., teaching-related stress, general stress, emotional exhaustion, and depressive symptoms) reflected challenges in occupational well-being. In the future, more measures for the positive indicators of teachers' occupational well-being will be needed when examining the associations between occupational well-being and quality of teacher–child interactions.

Although the group size was controlled for in all sub-studies, the data on adult-child ratio in the classrooms was not available. In future research studying the relation between the quality of teacher-child interaction, teacher well-being and child outcomes, it would be important to control adult-child ratio in addition to the number of children in the classrooms. Furthermore, in sub-study 3, parents' educational level was not controlled for in the data analyses because of missing data. Finally, in sub-study 3, teachers rated the social competence of children in their classrooms which might have caused bias in the ratings. It is, for example, possible that teachers' occupational well-being could have affected the ratings. In future studies, it would be beneficial to also collect peer and parent ratings of children's social competence, as suggested by Junttila et al. (2006).

These limitations considered, the present thesis broadens the picture of the associations among the quality of teacher–child interactions, teachers' occupational well-being, and children's social competence. In the future, more research is needed to further understand the mechanisms behind these associations and to determine if there are other factors that can contribute to the quality of teacher–child interactions. For example, in addition to children's social competence, child personality could be associated with the quality of teacher–child interactions (see Smidt & Embacher, 2023). Finally, to also gain knowledge about the interactions that individual children have in the classroom – not only about the classroom-level teacher–child interactions – using measures such as inCLASS (Downer et al., 2010) could provide beneficial information in future studies.

9   CONCLUSIONS

This dissertation has three main conclusions. First, by examining cross-lagged associations, this study showed that teachers' occupational well-being contributes to the quality of teacher–child interactions – teachers' stress negatively and work engagement positively. For this reason, improving teachers' occupational well-being should be considered in kindergartens and schools and in teacher training. Second, four profiles of teacher–child interactions were identified using a person-centered approach, and the results indicated that teachers with an average quality of teacher–child interactions reported the most favorable occupational well-being. Thus, it seems that aiming at good, but not the highest, quality of interactions could be associated with the most favorable occupational well-being. Such information is important to note in pre- and in-service teacher training when aiming at enhancing the quality of teacher–child interactions.

Finally, this study showed insightful associations among children's social competence, teachers' work engagement, and the quality of teacher–child interactions. On the one hand, the results emphasized the importance of supporting children's prosocial behavior which seems to drive teachers' work engagement and quality of instructional support. On the other hand, the results suggested that children's social competence can be supported with high-quality instructional support and that teachers' work engagement plays a role in the amount of antisocial behavior in the classroom.

Together, the findings of the present study increase our knowledge of the diverse associations among the quality of teacher–child interactions, teachers' occupational well-being, and children's social competence. They highlight the role of teachers' occupational well-being in both the quality of teacher–child interactions and children's social competence. Furthermore, they emphasize the importance of children's social competence, especially in terms of prosocial behavior. Based on these findings, it is suggested that both teachers' occupational well-being and children's prosocial behavior should be considered central aspects to support in early ECE and in schools in general.

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YHTEENVETO

Ohjausvuorovaikutuksen laatu on yksi varhaiskasvatuksen ja perusopetuksen laatua määrittävistä tekijöistä (esim. Ishimine & Tayler, 2014; Pianta ym., 2020). Korkealaatuinen ohjausvuorovaikutus on yhteydessä niin lasten sosiaalisten (esim. Broekhuizen ym., 2016; Luckner & Pianta, 2011; Pakarinen ym., 2020) kuin akateemisten (esim. Ansari & Pianta, 2018; Hu ym. 2019; Rankin ym., 2022) taitojen kehitykseen sekä motivaatioon (Pakarinen, Kiuru ym., 2010). Vuorovaikutuksen avulla oppimisen mallissa (Teaching through Interactions – TTI; Hamre ym., 2013; suomennos Lehtinen ym., 2016; Lerkkanen & Pakarinen, 2018) ohjausvuorovaikutus jaetaan kolmeen osa-alueeseen: tunnetukeen, toiminnan organisointiin sekä ohjaukselliseen tukeen. Korkealaatuinen tunnetuki sisältää muun muassa ryhmän myönteiseen ilmapiiriin, opettajan sensitiivisyyteen ja lasten näkökulmien huomioonottamiseen liittyviä tekijöitä. Korkealaatuinen toiminnan organisointi koostuu esimerkiksi ennakoivasta lasten käyttäytymisen ohjaamisesta, tehokkaasta ajankäytöstä ja innostavista opetusmenetelmistä ja materiaaleista. Ohjauksellinen tuki puolestaan sisältää muun muassa oppilaiden ajattelun tukemista avoimilla kysymyksillä, keskusteluilla ja palautteen annolla (Hamre ym., 2013).

Viimeisimmässä opetusalan työolobarometrissa vuonna 2021, 42 % suomalaisista opettajista raportoi kokevansa työhön liittyvää stressiä melko usein tai erittäin usein (Golnick & Ilves, 2022). Aiempi tutkimus on antanut viitteitä siitä, että opettajien heikko työhyvinvointi voi olla yhteydessä matalampaan ohjausvuorovaikutuksen laatuun (esim. Ansari ym., 2022, Jennings, 2015; Sandilos ym., 2015). Jenningsin ja Greenbergin (2009) luoman mallin mukaan hyvinvoivilla opettajilla on resursseja luoda ryhmäänsä myönteinen ilmapiiri ja suhde ryhmän lapsiin sekä hyvä ryhmänhallinta. Vastavuoroisesti haasteet hyvinvoinnissa voivat heikentää opettajien mahdollisuuksia tukea lasten oppimista ja kehitystä (Jennings & Greenberg, 2009). Yhteys opettajien heikon työhyvinvoinnin ja matalan ohjausvuorovaikutuksen laadun välillä onkin huolestuttava. Viime vuosina opettajien työhyvinvointi on vielä heikentynyt Suomessa niin uuden opetussuunnitelman käyttöönoton (Kauppi ym., 2022) kuin koronapandemian (Golnick & Ilves, 2022) johdosta.

Vaikka opettajien työhyvinvointia on tutkittu enenevissä määrin ympäri maailmaa (ks. Cumming, 2017), selkeää määritelmää työhyvinvoinnin käsitteelle ei ole. Opettajien työhyvinvointia ovat kuvanneet erilaiset kielteiset ja myönteiset indikaattorit. Heikosta työhyvinvoinnista kertovat esimerkiksi opettajien kokema stressi (esim. Kyriacou, 2001), työuupumus (esim. Chang, 2009) ja masennusoireet (esim. Gluschkoff ym., 2016). Myönteisiä työhyvinvoinnin kuvaajia ovat esimerkiksi opettajien kokema työn imu (mm. Hakanen ym., 2006) ja työtyytyväisyys (esim. Klassen & Chiu, 2010). Tässä väitöstutkimuksessa opettajien työhyvinvointia tarkastellaan opettajien kokemaan stressin ja työn imun lisäksi opettajien uupumusasteisen väsymyksen ja masennusoireiden kautta.

Yksi keskeisistä esi- ja alkuopetuksen opetussuunnitelman tavoitteista kohdentuu lasten sosiaalisen kompetenssin vahvistamiseen (Finnish National

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Agency of Education, 2016a; 2016b). Aiemmissa tutkimuksissa on havaittu, että korkealaatuinen ohjausvuorovaikutus on yhteydessä lasten korkeampaan sosiaaliseen kompetenssiin (esim. Broekhuizen ym., 2016; Siekkinen ym., 2013), mutta siitä, missä määrin lasten sosiaalinen kompetenssi on yhteydessä ohjausvuorovaikutuksen laatuun, tiedetään vähemmän. Tuore tutkimus kuitenkin indikoi, että lasten sosiaalinen kompetenssi voi olla merkityksellistä ohjausvuorovaikutuksen laadulle esiopetuksessa (Pakarinen ym., 2020). Tiedetään vielä varsin vähän myös opettajien työhyvinvoinnin ja lasten sosiaalisen kompetenssin välisestä yhteydestä. On viitteitä siitä, että opettajien kokema stressi on yhteydessä lasten heikompaan sosiaaliseen kompetenssiin (esim. Siekkinen ym., 2013). Sen sijaan opettajien työn imun yhteyttä ohjausvuorovaikutuksen laatuun ei ole aiemmin tarkasteltu.

Saman suuntaisia rajoitteita liittyy myös aiempiin tutkimuksiin työhyvinvoinnin ja ohjausvuorovaikutuksen laadun välisistä yhteyksistä. Vaikka ohjausvuorovaikutuksen laadun ja opettajien työhyvinvoinnin välisiä yhteyksiä on tutkittu jonkin verran, ei ole selvää, mikä on yhteyden suunta: ennustaako työhyvinvointi ohjausvuorovaikutuksen laatua vai ohjausvuorovaikutuksen laatu työhyvinvointia? Lisäksi aiempi tutkimus on keskittynyt lähinnä työhyvinvoinnin kielteisiin puoliin kuten uupumusasteiseen väsymykseen ja masennusoireisiin (Ansari ym. 2022; Jennings, 2015; Sandilos ym., 2015) kun taas myönteisten indikaattorien, kuten työn imun, yhteyttä ohjausvuorovaikutuksen laatuun ei ole aiemmin juuri tarkasteltu.

Tämän väitöstutkimuksen tavoitteena oli selvittää ohjausvuorovaikutuksen laadun ja opettajien työhyvinvoinnin välisiä yhteyksiä sekä stressin että työn imun osalta. Lisäksi tutkittiin, millaisia ristikkäisiä yhteyksiä ohjausvuorovaikutuksen laadulla, opettajien työn imulla ja lasten sosiaalisella kompetenssilla on. Tutkimus on toteutettu esi- ja alkuopetuksen kontekstissa ja se koostuu kolmesta osatutkimuksesta, joiden aineisto on osa laajempaa "Teacher and Student Stress and Interaction in Classroom" (TESSI; Lerkkanen & Pakarinen, 2016–2022) -tutkimushanketta. TESSI-tutkimuksessa ohjausvuorovaikutuksen laatua on havainnoitu ja arvioitu the Classroom Assessment Scoring System (CLASS; Pianta et al. 2008a, 2008b) -menetelmän avulla. CLASS-havainnointimenetelmässä opettajan ja lasten välistä vuorovaikutusta tarkastellaan kolmen osa-alueen kautta: tunnetuki, toiminnan organisointi ja ohjauksellinen tuki. Lisäksi opettajat ovat itsearvioineet omaa työhyvinvointiaan sekä ryhmänsä lasten sosiaalista kompetenssia the Multisource Assessment of Children's Social Competence Scale (MASCS; Junttila ym., 2006) -mittarin avulla.

Väitöskirjan ensimmäisessä osatutkimuksessa tarkasteltiin, missä määrin esiopettajien työhyvinvointi on yhteydessä ohjausvuorovaikutuksen laatuun. Ohjausvuorovaikutuksen laatua arvioitiin CLASS Pre-K -menetelmällä (Pianta ym., 2008a) esiopetusryhmissä ($n = 47$) tehdyiltä videonauhoituksilta. Lisäksi esiopettajat arvioivat kokemansa stressin (Gerris ym., 1993) ja työn imun (UWES; Schaufeli ym., 2002) määrää kyselylomakkeilla. Sekä ohjausvuorovaikutuksen laatu että esiopettajien työhyvinvointi mitattiin ensin esiopetusvuoden syksyllä

ja toisen kerran esiopetusvuoden keväällä. Ristiviiveanalyysi osoitti, että esiopettajien syksyllä kokema stressi ennusti matalampaa tunnetuen ja toiminnan organisoinnin laatua keväällä. Lisäksi esiopettajien keväällä kokema työn imu oli myönteisesti yhteydessä keväällä mitattuun ohjauksellisen tuen laatuun.

Toisessa osatutkimuksessa pyrittiin sekä tunnistamaan esiopettajien ohjausvuorovaikutusprofiileja että selvittämään, eroavatko profiilit esiopettajien kokeman työhyvinvoinnin suhteen. Samoin kuin ensimmäisessä osatutkimuksessa, ohjausvuorovaikutuksen laatua arvioitiin CLASS Pre-K -havainnointimenetelmällä (Pianta ym., 2008). Lisäksi esiopettajat arvioivat kokemansa yleisen stressin (Elo ym., 2003), lasten ohjaamiseen liittyvän stressin (Gerris ym., 1993), uupumusasteisen väsymyksen (BBI; Salmela-Aro ym., 2011) ja masennusoireiden (Beck ym., 1961) määrää. Toisen osatutkimuksen aineisto kerättiin esiopetusvuoden keväällä. Latentin profiilianalyysin ja profiiliratkaisujen vertailun avulla tunnistettiin neljä ohjausvuorovaikutusprofiilia: *Korkein laatu* (20,4 %), *Keskimääräinen laatu* (50 %), *Matalampi laatu ja vähäinen kielteisyys* (16,7 %) sekä *Matalampi laatu ja keskimääräinen kielteisyys* (13 %). Profiilien vertailu Kruskall-Wallisin ja Mann-Whitney U -testien avulla osoitti, että *Keskimääräinen laatu* – profiilin opettajat raportoivat vähemmän opettamiseen liittyvää stressiä kuin *Matalampi laatu ja vähäinen kielteisyys* ja *Matalampi laatu ja keskimääräinen kielteisyys* profiilien opettajat sekä vähemmän yleistä stressiä kuin *Korkein laatu* ja *Matalampi laatu ja keskimääräinen kielteisyys* profiilien opettajat. Lisäksi *Keskimäärinen laatu* – profiilin opettajat raportoivat vähemmän uupumusasteista väsymystä ja masennusoireita kuin *Korkein laatu* – profiilin opettajat.

Kolmannessa osatutkimuksessa selvitettiin ohjausvuorovaikutuksen laadun, opettajien työn imun ja lasten sosiaalisen kompetenssin välisiä yhteyksiä ensimmäisellä luokalla. Ohjausvuorovaikutuksen laatua arvioitiin CLASS K-3 -havainnointimenetelmällä (Pianta ym., 2008b) luokkahuoneissa toteutetuilta videonauhoituksilta. Opettajat itsearvioivat kokemansa työn imun (UWES: Schaufeli ym., 2002) määrää kyselylomakkeilla. Lisäksi opettajat arvioivat luokkansa lasten sosiaalista kompetenssia eli prososiaalista ja antisosiaalista käyttäytymistä (MASCS; Junttila ym., 2006). Ohjausvuorovaikutuksen laatu, opettajien työn imu ja lasten sosiaalinen kompetenssi mitattiin sekä ensimmäisen luokan syksyllä että keväällä. Monitasomallinnuksen tulokset osoittivat ensinnäkin, että opettajien syksyllä kokema työn imu ennusti myönteisesti kaikkia kolmea ohjausvuorovaikutuksen laadun osa-aluetta keväällä. Lisäksi opettajien syksyllä kokema työn imu ennusti lasten vähäisempää antisosiaalista käyttäytymistä keväällä. Lasten prososiaalinen käyttäytyminen syksyllä puolestaan ennusti opettajien korkeampaa työn imua keväällä. Lisäksi oppilaiden prososiaalisen käyttäytymisen ja ohjauksellisen tuen laadun välillä oli vastavuoroinen yhteys: lasten prososiaalinen käyttäytyminen syksyllä ennusti korkeampaa ohjauksellisen tuen laatua keväällä ja korkealaatuinen ohjauksellinen tuki syksyllä ennusti myönteisesti lasten prososiaalista käyttäytymistä keväällä. Korkealaatuinen ohjauksellinen tuki syksyllä ennusti myös lasten vähäisempää antisosiaalista käyttäytymistä keväällä.

Väitöstutkimuksen tulokset laajensivat ymmärrystä työhyvinvoinnin ja ohjausvuorovaikutuksen laadun välisistä yhteyksistä esi- ja alkuopetuksessa. Tulokset antoivat uutta tietoa työhyvinvoinnin ja ohjausvuorovaikutuksen laadun välisestä yhteydestä osoittamalla, että opettajien kokema stressi ennusti kielteisesti ja työn imu myönteisesti ohjausvuorovaikutuksen laatua. Lisäksi tunnistettiin erilaisia vuorovaikutusprofiileja, jotka erosivat opettajien työhyvinvoinnin suhteen. Lopuksi tulokset osoittivat yhteyksiä opettajien työn imun ja ohjausvuorovaikutuksen laadun sekä lasten sosiaalisen kompetenssin välillä. Kokonaisuudessaan väitöstutkimuksen tulokset korostavat toisaalta työhyvinvoinnin merkitystä sekä ohjausvuorovaikutuksen laadulle että lasten sosiaaliselle kompetenssille ja toisaalta lasten prososiaalisen käyttäytymisen merkitystä opettajien työn imulle ja ohjausvuorovaikutuksen laadulle. Tulosten pohjalta näyttää tärkeältä tukea sekä opettajien työhyvinvointia että lasten prososiaalista käyttäytymistä ryhmässä.

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ORIGINAL PAPERS

I

RELATIONS BETWEEN KINDERGARTEN TEACHERS' OCCUPATIONAL WELL-BEING AND THE QUALITY OF TEACHER–CHILD INTERACTIONS

by

Viola Penttinen, Eija Pakarinen, Antje von Suchodoletz, & Marja-Kristiina Lerkkanen, 2020

Relations between kindergarten teachers' occupational well-being and the quality of teacher-child interactions

Abstract

Research Findings: The aim of this study was to examine associations between two aspects of teachers' occupational well-being, i.e., teaching-related stress and work engagement, and the quality of teacher–child interactions in Finnish kindergarten classrooms. Participants were 47 kindergarten teachers with their classrooms of 6-year-old children. Teacher–child interactions (i.e., emotional support, classroom organization, and instructional support) were observed twice during the kindergarten year (fall and spring), using the Classroom Assessment Scoring System (CLASS). In addition, teachers completed questionnaires on stress and work engagement. The results indicated that teaching-related stress negatively predicted the quality of emotional support and classroom organization while teacher's work engagement was positively associated with the quality of instructional support. *Practice or Policy:* The findings can be used to inform teacher education and professional development in order to promote in- and pre-service teachers' occupational well-being and support them in their work with children in the classroom.

Keywords: occupational well-being, teacher stress, work engagement, teacher–child interactions, kindergarten

Relations between kindergarten teachers' occupational well-being and the quality of teacher-child interactions

Recent years have seen a renewing interest in teachers' occupational well-being in the field of educational research (Cumming, 2017). Yet, the definition of teachers' occupational well-being is not entirely clear and various concepts have been used to describe this diverse phenomenon, including job satisfaction, mental health, stress, and emotional exhaustion to name a few (Cumming, 2017). This study focuses on two aspects of teachers' occupational well-being, i.e., teaching-related stress and work engagement, and their associations with teacher-child interactions. Daily interactions between teachers and children are a key factor in determining the quality of education and enhancing children's academic and social skills development (e.g., Ansari & Pianta, 2018; Broekhuizen, Mokrova, Burchinal, Garrett-Peters, & The Family Life Project Key Investigators, 2016; Hoglund, Klingle, & Hosan, 2015). However, teachers need to cope with a number of challenges and demands in their classrooms that may threaten their occupational well-being and, as a result, negatively impact on their ability to create a positive learning environment and engage in supportive interactions with children (Buettner, Jeon, Hur, & Garcia, 2016; Friedman-Krauss, Raver, Morris, & Jones, 2014). In their model of the prosocial classroom, Jennings and Greenberg (2009) proposed that teachers who lack the social and emotional competence to manage student misbehavior, experience stress that can negatively affect their ability to create and maintain supportive teacher–child interactions and a positive classroom climate, and their ability to manage the classroom effectively. Indeed, teaching is a highly stressful occupation compared to many other professions (Johnson et al., 2005; Kyriacou, 2001). For example, 78% of teachers in the United States (US) often feel physically and emotionally exhausted (American Federation of Teachers, 2015). In Finland, where the data of the present study were collected, 43% of teachers experience stress very often or quite often (Länsikallio,

Kinnunen & Ilves, 2018). At the same time, teachers typically report a high level of work

engagement (Eldor & Shoshani, 2017; Nislin, Sajaniemi, Sims, Suhonen, Maldonado,

Hyttinen, & Hirvonen 2016; Schaufeli, Bakker, & Salanova, 2006). In a recent representative

study of Finnish teachers, 67% were excited about their work very often or quite often

(Länsikallio et al., 2018). Such findings are encouraging as engaged teachers have higher job

satisfaction and job performance and less intention to leave the profession (Bakker & Bal,

2010; Høigaard, Giske, & Sundsli, 2012; Klassen et al., 2012). To date, a large body of

research has investigated teacher–child interactions and, to a lesser extent, associations

between teachers' stress and teacher-child interactions. However, thus far, only very few

studies have examined the relationship between work engagement and the observed quality of

teacher–child interactions. To gain a better understanding of the determinants of teacher–

child interactions, the aim of this study is therefore to investigate how two aspects of

teachers' occupational well-being, namely, stress and work engagement contribute to the

quality of teacher–child interactions.

Teachers' Occupational Well-Being

Teachers' occupational well-being is a topic the importance of which has

increasingly been recognized in research (Cumming, 2017). In her review, Cumming (2017)

highlighted the complexity of the construct that is evident in differing conceptual, contextual

and methodological approaches to the study of teachers' occupational well-being.

Acknowledging the fragmentation of research it is, therefore, important to first define the

elements of teachers' occupational well-being that are addressed in the present study:

teachers' stress, reflecting negative emotions aroused from work, and teachers' work

engagement, reflecting positive and fulfilling thoughts about work. Traditionally stress and

work engagement have been seen as opposites of the same dimension but today they are

understood as more diverse concepts (Schaufeli & Salanova, 2011), and researchers have

increasingly investigated both stress and work engagement of teachers at the same time (e.g.,

Amini Faskhodi & Siyyari, 2018; Nislin, Sajaniemi, Sims, Suhonen, Maldonado, Hyttinen, & Hirvonen, 2016). In the present study, two elements of well-being, a positive and a negative one, are investigated to get a versatile picture of the phenomenon.

Teachers' stress is broadly defined as teachers' experiences of negative emotions (e.g., anxiety, frustration, tension, etc.) that result from their job (Cumming, 2017; Kyriacou, 2001). More specifically, the focus of this study is teaching-related stress which refers to teachers' feelings of stress, guilt and inadequacy connected to guiding the children (for previous research, see Pakarinen, Kiuru et al., 2010; Pakarinen, Lerkkanen et al., 2010; Virtanen et al., 2018). Higher levels of teachers' stress are related to lower job satisfaction (Klassen & Chiu, 2010), and in the long-term, it can lead to burnout, a syndrome of which one critical aspect is emotional exhaustion (Maslach, Schaufeli, & Leiter, 2001). Furthermore, prolonged stress is related to their intention to quit the profession (Buettner et al., 2016; Klassen & Chiu, 2011).

It is, therefore, important to investigate teachers' stress as it may have consequences not only for teachers and their occupational well-being but also for students with whom they interact daily. Research has shown that there is a negative association between teachers' stress and students' academic achievement in elementary school (Arens & Morin, 2016; Klusmann, Richter, & Lüdtke, 2016). In kindergarten, teachers' stress has been shown to be negatively related to children's cooperation skills, empathy (Siekkinen et al., 2013), and motivation (Pakarinen, Kiuru et al., 2010), and positively related to children's disruptiveness (Siekkinen et al., 2013).

Another aspect of teachers' occupational well-being is work engagement, which refers to a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption (Schaufeli, Salanova, González-Romá, & Bakker, 2002). Highly engaged teachers have energy in work and willingness to devote themselves to teaching even

when faced with challenges (vigor). Furthermore, they find significance, inspiration, and pride in their work (dedication), are concentrated and feel that their time passes quickly when they work (absorption). Teachers with high work engagement are persistent, enthusiastic, and engrossed as a teacher.

Bakker and Demerouti (2008) have presented a model of work engagement. In this model, they propose that person's job-related and personal resources affect his or her work engagement, which again predicts person's job performance. Thus, the resources teachers have enhance their work engagement that again can promote their teaching. Furthermore, work engagement is an important part of teachers' occupational well-being since highly engaged teachers are more satisfied with their jobs, do not intend to quit the profession (Høigaard et al., 2012; Klassen et al., 2012) and are more committed to their organization (Hakanen, Bakker, & Schaufeli, 2006).

The Quality of Teacher–Child Interactions

According to Bronfenbrenner and Morris' (2006) bioecological model, proximal processes (i.e., regular interactions with parents, teachers, and significant others) are a central driver for children's development. Based on the bioecological model and other theoretical and empirical research, the Teaching Through Interactions (TTI) framework conceptualizes the interactions between teachers and children with three different domains: emotional support, classroom organization, and instructional support (Hamre et al., 2013). These interactions can be assessed as low, moderate, or high quality using an observational instrument, the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2008).

High-quality *emotional support* refers to a positive tone in interactions and teacher's support of children's social, emotional, and academic needs in the classroom (Pianta et al., 2008). The theoretical background for the importance of emotional support is based on attachment theory and self-determination theory (Hamre et al., 2013). Attachment theory

underlines the importance of children's safe, predictable, and emotionally supportive relationships with adults for them to become self-reliant and to have the courage to take risks when exploring unfamiliar situations (Ainsworth, Belehar, Waters, & Wall, 1978; Bowlby, 1969). According to self-determination theory, supporting children's intrinsic psychological needs for relatedness, competence, and autonomy is essential for their motivation and engagement (Ryan & Deci, 2000; Skinner & Belmont, 1993). Emotionally supportive interactions have been shown to be important for children's social competence and behavior (Burchinal, Vandergrift, Pianta, & Mashburn, 2010; Curby et al., 2009; Mashburn et al., 2008) as well as their academic skills (Curby, Brock, & Hamre, 2013).

High-quality *classroom organization* refers to clear rules and routines in a classroom as well as teachers' support of children's behavior, interest, and attention for learning (Pianta et al., 2008). The theoretical foundation for this domain lies in research focusing on classroom management (see Emmer & Stough, 2001). High-quality classroom organization predicts kindergarten children's behavioral and cognitive self-control, positive work habits, engagement in learning, and time spent on tasks (Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009). In addition to self-regulation, the role of classroom organization is central to children's development of motivation (Pakarinen, Kiuru et al., 2010) and academic skills (Cadima, Leal, & Burchinal, 2010; Maier, Vitiello, & Greenfield, 2012).

High-quality *instructional support* refers to teachers' support of children's language and conceptual development as well as enhancing their understanding of concepts, instead of rote memorization and merely learning facts (Pianta et al., 2008). According to Hamre et al. (2013), the theoretical background for instructional support mostly consists of research on children's cognitive and language development and the role of adult-provided support, such as scaffolding to enhance these skills. High-quality instructional support is typically related with children's better academic skills, such as language, reading, and literacy skills

(Burchinal et al., 2010; Cash, Ansari, Grimm, & Pianta, 2019; Mashburn et al., 2008) as well as math reasoning (Burchinal et al., 2010) and problem solving (Mashburn et al., 2008). Moreover, the quality of instructional support is associated with children's social skills: high-quality instructional support is related to less disruptiveness and more empathy (Siekkinen et al., 2013).

Teachers' Occupational Well-Being and the Quality of Teacher-Child Interactions

According to the prosocial classroom model (Jennings & Greenberg, 2009), lacking the social and emotional competence to manage student misbehavior can cause teachers stress that might lead to burnout and weaken their ability to create and maintain supportive teacher–child interactions and teacher-child relationships. Indeed, research has shown that teachers' stress is negatively related to their relationships with students (Yoon, 2002). For example, Whitaker, Dearth-Wesley, and Gooze (2015) have reported that stressed early childhood education teachers have more conflict in their relationship with children than teachers with lower stress.

Previous studies concerning the role of teachers' stress in the quality of teacher–child interaction have mainly focused on connections between stress and two first domains of interaction quality, emotional support and classroom organization, and only part of the studies (Hoglund et al., 2015; Jennings, 2015; Lhospital, 2011; Virtanen et al., 2018) have investigated all three domains of interaction quality in relation to teachers' stress. For example, Zinsser, Bailey, Curby, Denham, and Basset (2013) examined preschool teachers' emotional support and stress in the U.S. They reported that in preschool teachers experiencing more stress had lower quality and more variability in their emotional support. Similarly, in a study by Jennings (2015), teachers' burn out was negatively associated with emotional support. Friedman-Krauss et al. (2014) also examined the quality of emotional support and found that preschool teachers with low or high levels of stress had lower quality

of emotional support in their classrooms than teachers with moderate levels of stress.
However, in one study (Li Grining et al., 2010) work stressors did not predict the quality of
emotional support in early childhood education.

In their middle-school study, Braun, Roeser, Mashburn, and Skinner (2019) reported
teachers' burnout being negatively related to the quality of both emotional support and
classroom organization. Moreover, in Finnish Grade 6 classrooms, teaching-related stress and
emotional exhaustion were found to be negatively related to classroom organization
(Virtanen et al., 2018), whereas in a Canadian study with teachers from kindergarten to Grade
3, burn out was positively related to classroom organization (Hoglund et al., 2015). In terms
of secondary school teachers, Lhospital (2011) has reported that teachers' stress in fall was
negatively associated with the quality of emotional support and classroom organization in
spring and not associated with the quality of instructional support. Because of these
inconsistent findings, more research is needed on the role that teachers' stress plays in the
quality of teacher–child interactions. Moreover, although earlier research has examined the
relationship between teachers' stress and the quality of teacher-child interactions, possible
bidirectionality and direction of effect has remained somewhat unclear due to the mostly
cross-sectional research. The present study aims to contribute to the existing literature by
investigating the direction of the effect between teachers' stress and the quality of teacher-
child interactions by testing different nested models: the stability models without any cross-
lagged paths between stress and interaction quality, stress-driven models with cross-lagged
paths from stress to interaction quality (for related research, see Lhospital, 2011), interaction-
driven models with cross-lagged paths from interaction quality to stress (for related research,
see Spilt, Koomen, & Thijs, 2011), and full reciprocal models with all cross-lagged paths
between stress and interaction quality. Testing of possible bidirectionality extends the

existing literature by contributing to a better understanding of the factors related to teachers' ability to provide high-quality interactions in daily classroom settings.

In terms of other aspect of occupational well-being, work engagement, previous research has shown that engaged teachers rate their job performance higher than teachers with lower work engagement (Bakker & Bal, 2010). However, the role of work engagement in teacher–child interactions remains somewhat unclear since only a few studies have examined the associations between teachers' work engagement and the observed quality of teacher–child interactions. According to Nislin, Sajaniemi, Sims, Suhonen, Maldonado, Hirvonen, and Hyttinen (2016), engaged teachers are more sensitive in transitions and predictable with schedules in daycare centers. In secondary schools, students rated teachers with high work engagement as more supportive, giving better cognitive activation, and having a more convenient pace in their interactions and instruction (Klusmann, Kunter, Trautwein, Lüdtke, & Baumert, 2008). However, to our knowledge, none of the previous studies in the field has linked work engagement to quality of teacher-child interactions measured by the CLASS tool.

Kindergarten Education in Finland

In Finland, all 6-year-olds obtain free kindergarten education for one year before starting their nine-year career of comprehensive school in the year the child turns seven. Kindergarten education lasts a minimum of four hours per day, and there is an opportunity for day care before or after class (Hartonen, 2014). Kindergarten education can be provided within daycare centers, which is the most common way (80%; Hartonen, 2014), or within schools. The field is female dominated, and kindergarten teachers have at least a bachelors' degree in education. The Ministry of Education and Culture recommends a maximum of 13 children in one kindergarten classroom or 20 if another educated adult is present. Kindergarten education is child-centered, and the focus is on learning through play to foster children's growth, personal and social development, and learning (Finnish National Board of

Education, 2016). Content areas are integrated in playful activities, and time is also allotted for free play and outdoor activities during the kindergarten day.

The Aim of the Present Study

The aim of the current study is to examine the role of two aspects of teachers' occupational well-being, i.e., teaching-related stress and work engagement, in the quality of teacher–child interactions (emotional support, classroom organization, and instructional support). With regard to teaching-related stress, it is more specifically investigated (see Figure 1 for tested models) whether teaching-related stress and interaction quality predicts their subsequent values across time (stability models), teaching-related stress predicts interaction quality (stress-driven models), interaction quality predicts teaching-related stress (interaction-driven models), or are teaching-related stress and interaction quality reciprocally related (reciprocal models). Thus, the following research questions are examined:

1) To what extent does teaching-related stress predict the quality of teacher–child interactions in kindergarten classrooms and vice versa? As teachers' stress has been shown to be negatively related to the quality of teacher–child interactions (Jennings, 2015; Virtanen et al., 2018), we expected that teaching-related stress would negatively predict the quality of teacher–child interactions measured with the CLASS (Hypothesis 1).

2) To what extent is work engagement associated with the quality of teacher–child interactions in kindergarten classrooms? As teachers' work engagement has previously been associated with their job performance (Bakker & Bal, 2010), it was assumed that work engagement would be positively related to the quality of teacher–child interactions (Hypothesis 2).

Method

Participants and Procedure

The data used in the present study were collected within a larger project (Lerkkanen & Pakarinen, 2016-2017), in 2016–2017. The ethical approval from the ethical committee of the university was received prior to commencing the study. Participants were recruited from five municipalities in Central Finland by contacting either the daycare center director or the kindergarten teacher directly. Participation in the study was voluntary, and all participants (teachers and children's guardians) gave written consent for their own or their child's participation. The initial sample consisted of 54 Finnish kindergarten teachers with their kindergarten classrooms ($n = 536$ children) from 33 units (20 municipality-owned daycare centers, 7 private daycare centers, and 6 schools). The participating units represent the overall situation in the five municipalities.

The final sample of the present study consisted of 47 teachers (46 female, 1 male), who participated in classroom observations and returned the questionnaire at two time points. The teachers' mean age was 44 years ($SD = 9.44$), and their working experience in kindergarten or school varied from 1–5 years to more than 15 years (mode = more than 15 years). Every teacher was qualified as a kindergarten teacher and had at least a bachelor's degree.

The data were collected twice during the kindergarten year in fall and spring. The teachers were asked to fill in a questionnaire about their occupational well-being and background factors at both measurement points. In addition, teacher–child interactions were video-recorded on one regular kindergarten day at both measurement points for approximately 2–2.5 hours usually in the morning. In fall, video recordings were conducted from mid-September until mid-December, and in spring, from mid-February until mid-May. The approximate time between the two video recordings was five months.

Measures

Teachers' Occupational Well-Being

Teaching-related stress. In order to measure teachers' stress, a modified version of

Gerris' Parental Stress Inventory (Gerris et al., 1993) was used at both measurement points.

The modification included changing the context from home to kindergarten. The modified

measure has been used previously in Finland with kindergarten (Pakarinen, Kiuru et al. 2010;

Pakarinen, Lerkkanen et al. 2010) and elementary school teachers (Virtanen et al. 2018). The

inventory included three items reflecting the stress and guilt related to guiding children: "I

have a lot more problems in guiding the children than I expected", "I often feel guilty or

inadequate when thinking about what kind of teacher I am", and "I sometimes feel that

guiding children is an overwhelming task for me". Items were rated with a 5-point Likert

scale (1 = *hardly describes me*; 5 = *describes me very well*). The mean score of the three

items was used in the analyses. Reliability information, i.e. Cronbach's alphas for all

measures is presented in Table 1. More information of the development, reliability and

validity of the teaching-related stress measure has been reported by Pakarinen, Lerkkanen et

al. (2010).

Work engagement. Teachers' work engagement was only measured in the spring with

the Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2002). Validity of the measure

with sample from Finland has been reported by Seppälä et al. (2009). The UWES consists of

9 items tapping into the three dimensions of work engagement: vigor (e.g., "At my work, I

feel bursting with energy"), dedication (e.g., "I am enthusiastic about my job"), and

absorption (e.g., "I get carried away when I am working"). Items were rated with a 7-point

Likert scale (1 = *never*; 7 = *daily*). The mean score of the items was used in the analyses.

Reliability information for the measure is presented in Table 1.

The Quality of Teacher–child Interactions

The CLASS Pre-K (Pianta et al., 2008) was used to assess the quality of teacher–child

interactions. The instrument has been validated in Finland (Pakarinen, Lerkkanen et al.,

2010). In the CLASS, teacher–child interactions are divided into 10 dimensions within three

domains: emotional support, classroom organization support, and instructional support. The

dimensions consist of more specific behavioral indicators, which are described in detail in the

CLASS manual (Pianta et al., 2008). Certified coders (n = 12) coded the quality of teacher–

child interactions on a scale from one to seven (1–2 *low*, 3–5 *moderate*, and 6–7 *high*),

according to the manual. All coders participated in two-day training by a certified trainer and

passed the required reliability test before starting the coding (i.e., scored 80% of codes within

one scale-point from master codes in the test). Coders were two post-doctoral researchers,

three doctoral students and seven research assistants (bachelor or master students) in the field

of education and psychology.

About five cycles (*M* = 4.53*, SD* = 0.99) were assessed per teacher, with an

approximate duration of 21 minutes for one cycle (*M* = 20.50, *SD* = 3.96). A mean score of

all cycles per one teacher for emotional support, classroom organization, and instructional

support were used in the analysis. Twenty percent of the video recordings were double coded

to calculate inter-rater reliability. Inter-rater reliabilities were calculated with adjacent

agreement, which measures the percentage of scores that are within one scale-point of each

other (Pianta et al., 2008) and is typically used measure of inter rater agreement when using

the CLASS instrument. These percentages were between 70% (quality of feedback) and

100% (positive climate, negative climate, and behavior management) in fall and between

37.5% (concept development) and 100% (negative climate) in spring. In addition, as the

raters and ratees were selected randomly from the sample, inter-rater reliabilities in terms of

intraclass correlation coefficients were calculated using two-way random model with absolute

agreement (Landers, 2015), and they were between .26 (quality of feedback) and .81

(language modeling) in fall and between .18 (positive climate) and .60 (regard for student

perspectives) in spring.

Data Analysis

First, Pearson correlations between the study variables were calculated with IBM SPSS Statistics 24. As a second step, four nested models were constructed to test which model would best represent the associations between teaching-related stress and teacher–child interactions (see Figure 1). The models were constructed with Mplus version 8 (Muthén & Muthén, 1998-2017) and compared with the Satorra-Bentler (Satorra & Bentler, 2001) scaled chi-squared difference test to identify the model that provided the best fit to the data for each of the three domains of teacher–child interactions (see Table 2). 1) In the stability models (M_1 without any cross-lagged paths; see Figure 1), teaching-related stress and each domain of teacher–child interactions were predicted by their preceding values across time. 2) In the stress-driven models (M_2), stability paths and cross-lagged paths from teaching-related stress to each domain of teacher–child interactions were estimated. 3) In interaction-driven models, (M_3), stability paths and cross-lagged paths from each domain of teacher–child interactions to teaching-related stress were estimated. 4) In full reciprocal models (M_4), all cross-lagged paths were estimated. One-tailed testing of significance was used because we had hypotheses on the direction of the associations. In the final models, teachers' work experience in kindergarten and school as well as group size were controlled. In addition, all variables measured at the same measurement point were allowed to correlate with each other. The goodness-of-fit of the estimated models was evaluated by the following indicators: χ^2 test, comparative fit index (CFI), Tucker Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). The cut-off values for good-fitting models were as follows: χ^2 = ns ($p > .05$), CFI and TLI >.95, RMSEA and SRMR < .05 (Byrne, 2012).

Location of *Figure 1*. The investigated models.

In addition, separate path models were specified to examine the extent to which work engagement is associated with each domain of teacher–child interactions. Since the teachers'

work engagement was only measured at one time point, different nested models (see Figure 1) were not specified. Teachers' work experience in kindergarten and school as well as group size were controlled for, and all the variables measured at the same measurement point were allowed to correlate with each other in the models. One-tailed testing of significance was used for the hypothesized associations.

Results

Table 1 presents Cronbach alpha reliabilities, descriptive statistics, and correlations between the study variables. As shown in Table 1, the kindergarten teachers in the present sample experienced relatively low teaching-related stress and high work engagement. The quality of emotional support and classroom organization was in the mid-to-high range, and the quality of instructional support at the low end of moderate quality.

[Location of Table 1. *Descriptive Statistics and Correlations between Study Variables*]

[Location of Table 2: *Model Fit Indices of the Nested Models*]

Teaching-Related Stress and the Quality of Teacher–Child Interactions

First, the associations between teaching-related stress and emotional support were examined. The model comparison with the Satorra-Bentler scaled chi-squared difference test (Satorra & Bentler, 2001) indicated that the stress-driven model with stability paths and the path from teaching-related stress to emotional support best fit the data (see Table 2). The results of the final model, including the control variables (Figure 2), showed that teaching-related stress negatively predicted subsequent emotional support when controlling for previous levels of teaching-related stress and emotional support. Thus, teachers who experienced more teaching-related stress in fall had a lower quality of emotional support in their classroom in spring. The results also showed that both emotional support and teaching-related stress remained relatively stable from fall to spring. Furthermore, group size was negatively related to teaching-related stress: teachers who had less children in their group experienced more teaching-related stress in spring.

[Location of *Figure 2*. Stress-driven model: teaching-related stress and emotional support. Standardized estimates. Significant associations in bold.]

Second, the associations between teaching-related stress and classroom organization were examined. The model comparison indicated that the stress-driven model with stability paths and the path from teaching-related stress to classroom organization best fit the data (see Table 2). The results of the final model, including the control variables (Figure 3), demonstrated that teaching-related stress negatively predicted subsequent classroom organization when controlling for previous levels of teaching-related stress and classroom organization: teachers who experienced more teaching-related stress in fall had a lower quality of classroom organization in their classroom in spring. Moreover, teachers' work experience negatively predicted the quality of classroom organization. Thus, the quality of classroom organization was lower for teachers with more teaching experience. Finally, the results indicated that classroom organization was not stable from fall to spring.

[Location of *Figure 3*. Stress-driven model: teaching-related stress and classroom organization. Standardized estimates. Significant associations in bold.]

Third, the associations between teaching-related stress and instructional support were examined. The model comparison indicated that the stability model in which teaching-related stress and instructional support were predicted by their preceding values across time best fit the data (see Table 2). The results of the final model, including the control variables (Figure 4), indicated that instructional support was not stable from fall to spring and there were no significant predictors of instructional support.

[Location of *Figure 4*. Stability model: teaching-related stress and instructional support. Standardized estimates. Significant associations in bold.]

Work Engagement and the Quality of Teacher–Child Interactions

Separate path models were constructed to examine the associations between work engagement and the three domains of teacher–child interactions. Since work engagement only had significant associations with the instructional support domain, the only model presented is one that includes work engagement and instructional support. As shown in Figure 5, work engagement was positively associated with instructional support when controlling for the previous level of instructional support: teachers who experienced more work engagement had a higher quality of instructional support in their classroom.

[Location of *Figure 5*. Cross-lagged path model: work engagement and instructional support. Standardized estimates. Significant associations in bold.]

Discussion

The present study examined the role of teachers' occupational wellbeing, assessed as teaching-related stress and work engagement, in the quality of teacher–child interactions in kindergarten classrooms. The current paper is among the first to investigate cross-lagged associations between teacher-child interactions measured with the CLASS tool and teachers' stress and work engagement. This study extends the current literature by suggesting that different aspects of teachers' occupational well-being were differentially related to the three domains of teacher–child interactions: teaching-related stress negatively predicted the quality of emotional support and classroom organization, whereas work engagement was positively associated with the quality of instructional support. The results emphasize the importance of teachers' occupational well-being in high-quality teacher–child interactions.

Teaching-Related Stress and the Quality of Teacher–Child Interactions

First, the relation between teaching-related stress and the quality of teacher–child interactions was examined. Model comparisons revealed that the pattern of associations differed, depending on the domain of teacher–child interactions: the stress-driven model was supported by the data for emotional support and classroom organization, whereas the stability

model was a better indicator of instructional support. Partly as hypothesized (Hypothesis 1), the results showed that teachers who experienced more teaching-related stress in the fall had lower quality emotional support and classroom organization in the spring. However, teaching-related stress did not predict subsequent instructional support. Earlier findings on teachers' stress and the quality of teacher–child interactions have not been consistent (for contradictory results, see Hoglund et al., 2015; Li Grining et al., 2010). The results of this study support the negative association between teachers' stress and the quality of teacher–child interactions in line with Buettner et al. (2016), Jennings (2015), and Virtanen et al. (2018). Similar to the results of the present study, in a secondary school study from the US, teachers' stress in fall predicted the quality of emotional support and classroom organization in spring but not the quality of instructional support (Lhospital, 2011). The results might reflect that when feeling stressed, tired, or exhausted, teachers might be less sensitive and responsive in their interactions, which affects the quality of emotional support. When experiencing stress, teachers might also spend less time planning activities and may be more reactive rather than proactive when managing child behavior, which is reflected in the quality of their classroom organization.

The role of teachers' stress in the quality of teacher–child interactions is alarming in the sense that teaching is considered a highly stressful occupation and teacher–child interactions contribute to children's learning and the development of their social skills (see, e.g., Burchinal et al., 2010; Schmitt, Pratt, Korucu, Napoli, & Schmerold, 2018). To describe the vicious circle combining teachers' occupational well-being and teacher–child interactions, Jennings and Greenberg (2009) used the term "burnout cascade." When the teacher does not have the competence or capacity to manage student misbehavior, misbehavior increases and the classroom climate changes to less optimal. The teacher, in turn, becomes exhausted in

trying to manage the classroom and fails to use proactive classroom management that could promote students' self-regulation.

In the models of the present study, teachers' work experience and group size were controlled for. In contrast with previous studies (e.g., Braun et al. 2019; Li Grining et al., 2010), teachers' work experience negatively predicted the quality of classroom organization. Moreover, it was somewhat surprising that teachers with smaller group size experienced more teaching-related stress in the spring. A possible explanation for this might be that some of the smaller groups (less than 14–15 children) had fewer children because some had different academic, behavioral, or social challenges and thus needed more support from the teacher.

Work Engagement and the Quality of Teacher–Child Interactions

Second, the relationship between work engagement and the quality of teacher–child interactions was examined. The results partly supported Hypothesis 2 by showing that teachers with higher levels of work engagement had a higher quality of instructional support in their kindergarten classrooms. This finding is in accordance with previous research that demonstrated the role of work engagement in teachers' self-rated job performance among novice primary school teachers (Bakker & Bal, 2010) and cognitive activation among mathematics teachers in secondary schools (Klusmann et al., 2008). Teachers experiencing vigor, dedication and absorption, i.e., three dimensions of work engagement, feel energetic, persistent, enthusiastic, inspired, immersed and happy in their work (Schaufeli et al, 2002). One possible explanation for the relation between teachers' work engagement and the quality of instructional support might be that instructional support requires more planning of activities and an extra effort to enhance children's learning and understanding which might be more likely for teachers who are enthusiastic and persistent in their work. Thus, it could be that engaged teachers, who are excited about their work and who are dedicated, want to

invest in their work and to do it as well as possible, which might then be reflected in the quality of instructional support in the classroom.

Together, our results suggest that teachers' stress and work engagement are not related to all three but different domains of teacher–child interactions because they reflect different aspects of teachers' occupational well-being. It seems that teachers' stress is reflected in their emotional and organizational behaviors, such as positive climate in the classroom, sensitivity, behavioral management and time management whereas work engagement is reflected in the instructional aspect of teaching, such as scaffolding children's learning through feedback. However, more research is needed to better understand the underlying mechanisms of these different associations.

Limitations and Future Directions

This study has some limitations that need to be acknowledged. First, the small sample size limited the statistical power of the statistical analysis and the generalizability of the results. Therefore, more research is needed with larger sample sizes to validate these results. Second, teaching-related stress was based on self-ratings, and the measure only involved three items. However, the same measure of teaching-related stress has been used earlier in the Finnish context, and it has shown meaningful relationships with observed classroom organization and child outcomes (see Pakarinen, Kiuru et al., 2010; Virtanen et al., 2018). Nevertheless, more research with diverse stress measures is required to further confirm the association between teachers' stress and the quality of teacher–child interactions. Third, teachers' work engagement was only measured at one measurement point. For this reason, it was not possible to examine whether work engagement predicted the quality of teacher–child interactions when controlling for teachers' previous level of work engagement. Future research can extend the current study with longitudinal study designs measuring both teachers' stress and work engagement at several time points over multiple years.

Fourth, in terms of observed interaction quality, inter-rater reliability for the dimension of concept development in spring was rather low and for this reason, results regarding instructional support should be interpreted with cautious. Lower inter-rater reliability for concept development might be due to the coders' different backgrounds (education and psychology) and amount of experience in kindergarten education. This is, however, in line with previous studies which have reported that coders have difficulties in rating dimensions of instructional support domain (e.g., Bell et al., 2014). In the future, more attention needs to be paid in training coders in this particular dimension. Fifth, caution should be warranted in making conclusions of the negative association between group size and teachers' stress since the number of adults in the classroom was not controlled. Future studies should consider of using adult-child ratio when investigating the effect of group size in the teachers' occupational well-being and the quality of teacher-child interactions. Finally, participation in the study was voluntary. It is possible that most stressed teachers were too exhausted to participate in the study. This is an important issue for future research on teachers' stress.

Implications

It is important to support teachers' in their occupational well-being since it seems to be reflected in the quality of teacher-child interactions. The results of this study suggest that support is especially relevant for those teachers who experience stress already in the beginning of the school year: it is important to reduce stress from the very beginning of the academic year, provide support for teachers to stay engaged in their work, and encourage them toward self-reflection and stress awareness. One possible way to buffer the negative association between teachers' stress and interaction quality is by providing professional development interventions on teacher-child interactions (Sandilos, Goble, Rimm-Kaufman, & Pianta, 2018). For example interventions providing teachers with training for behavior

management strategies and stress management, can promote both teachers' occupational

well-being (Zhai, Raver, & Li-Grining, 2011) and the quality of teacher-child interactions

(Raver et al. 2008). Furthermore, supporting teachers' occupational well-being with

mindfulness-practices seems to be a promising way to diminish stress and at the same time

enhance the quality of emotional support in the classroom (Braun et al., 2019; Jennings et al.,

2017).

To understand more deeply how teachers' stress can be reduced it is useful to

investigate the causes of stress that teachers face in their work. Research has shown that

chaotic childcare environments, poor working conditions, child misbehavior and low

professional development opportunities are antecedents of early childhood educators' stress

and exhaustion (Jeon, Buettner, & Grant, 2018). Moreover, a negative school climate can be

a threat for teachers' occupational well-being (Collie, Shapka, & Perry, 2012; McLean, Abry,

Taylor, Jimenez, & Granger, 2017). Above results suggest that teachers' occupational well-

being can be supported with good relationships and trust between colleagues and with

supervisors (McLean et al., 2017), appropriate resources (Collie et al., 2012), assistance in

enhancing child behavior (Jeon et al., 2018) and by providing professional development

activities (Jeon et al., 2018) and a possibility to participate in the decision making in the

school (Collie et al., 2012).

In addition to diminishing teachers' stress, support should be focused on teachers'

work engagement, which was related to the quality of instructional support in the present

study. According to the previous studies, job-related and personal resources are important

factors that promote work engagement (e.g., Xanthopoulou, Bakker, Demerouti, & Schaufeli,

2009). Job-related resources that support teachers' work engagement are experiences of

autonomy, self-efficacy, supervisor support, and opportunities for professional development

(Bakker & Bal, 2010; Hakanen et al., 2006; Skaalvik & Skaalvik, 2014). Thus, providing

teachers with opportunities for autonomy and professional development may enhance their

vigor, dedication, and absorption, and could thereby be reflected in the quality of daily

classroom interactions.

Conclusion

This study is among the first attempts to explore the bidirectionality in the

associations between teachers' stress and the quality of the teacher-child interactions over the

course of a school year. Furthermore, this study is among the first ones to examine the

relationship between teachers' work engagement and observed interaction quality. The results

of the present study suggest that teachers' stress may diminish the quality of teacher–child

interactions in terms of emotional support and classroom organization whereas work

engagement seems to be important for a high-quality instructional support to occur. These

findings can contribute to the better understanding of the protective and risk factors for

teachers' ability to provide high-quality interactions with children in their classroom.

Table 1

Descriptive Statistics and Correlations between Study Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Kindergarten fall											
1. Emotional support T1											
2. Classroom organization T1	.65***										
3. Instructional support T1	.56***	.64***									
4. Teaching-related stress T1	-.30*	-.23	-.14								
Kindergarten spring											
5. Emotional support T2	.42**	.26†	.15	-.34*							
6. Classroom organization T2	.24	.11	.01	-.34*	.74***						
7. Instructional support T2	.10	.09	.11	-.19	.51***	.59***					
8. Teaching-related stress T2	-.21	-.20	-.11	.65***	-.27†	-.45**	-.31*				
9. Work engagement T2	0.18	.18	.14	-.24	.09	.07	.28†	-.17			
Control variables											
10. Group size	-.12	-.26†	-.08	.18	-.16	.10	.01	-.08	-.10		

11. Work experience[a]	-.02	.18	.10	.08	-.19	-.24	-.07	.04	.19	-.22

Descriptive statistics

Mean	5.47	5.57	3.11	2.04	5.57	5.38	3.31	2.13	6.25	12.13	3.69
Std. deviation	0.50	0.45	0.67	0.67	.51	0.51	0.76	0.62	0.63	4.00	1.50
Minimum	3.5	4.53	1.56	1.00	4.31	3.92	2.11	1	3.67	6	0
Maximum	6.15	6.50	4.80	3.33	6.45	6.17	5.42	3.33	7.00	25	5
α	.67	.80	.82	.75	.70	.78	.89	.68	.91		

Note: T1 = kindergarten fall, T2 = kindergarten spring. N=47, except for 10. and 11. N = 45. [a]Work experience measured: 0 = none, 1 = less than a year, 2 = 1–5 years, 3 = 6–10 years, 4 = 11–15 years, 5 = more than 15 years

Table 2

Model Fit Indices of the Nested Models

	χ^2	*df*	*p*-value	CFI	RMSEA	SRMR	Comparison	ΔS-B χ^2	Δdf	*p*-value	ΔCFI
Emotional Support											
M1: Stability model	4.193	2	.123	.923	.147	.073	-	-	-	-	-
M2: Stress-driven	0.025	1	.875	1.00	.000	.004	M1 vs. M2	4.333	1	.037	.077
M3: Interaction-driven	3.333	1	.068	.918	.214	.072	M1 vs. M3	0.050	1	.824	.005
M4: Fully reciprocal	.00	0	.000	1.00	.000	.000	M2 vs. M4	0.025	1	.875	.000
	-	-	-	-	-	-	M3 vs. M4	3.333	1	.068	.082
	-	-	-	-	-	-	M1 vs. M4	4.193	2	.123	.077
Classroom Organization											
M1: Stability model	6.178	2	.046	.862	.202	.112	-	-	-	-	-
M2: Stress-driven	0.152	1	.697	1.00	.000	.013	M1 vs. M2	7.289	1	.007	.138
M3: Interaction-driven	6.947	1	.008	.803	.341	.107	M1 vs. M3	0.311	1	.577	.197
M4: Fully reciprocal	.00	0	.000	1.00	.000	.000	M2 vs. M4	0.152	1	.697	.000
	-	-	-	-	-	-	M3 vs. M4	6.947	1	.008	.197
	-	-	-	-	-	-	M1 vs. M4	6.178	2	.046	.138
Instructional Support											
M1: Stability model	3.272	2	.195	.954	.112	.073	-	-	-	-	-
M2: Stress-driven	0.008	1	.929	1.00	.000	.002	M1 vs. M2	3.216	1	.073	.046
M3: Interaction-driven	3.472	1	.062	.910	.087	.073	M1 vs. M3	0.002	1	.964	.044

M4: Fully reciprocal	.00	0	.000	1.00	.000	.000	M2 vs. M4	0.008	1	.929	.000
	-	-	-	-	-	-	M3 vs. M4	3.472	1	.062	.009
	-	-	-	-	-	-	M1 vs. M4	3.272	2	.195	.046

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II

THE QUALITY OF TEACHER–CHILD INTERACTIONS AND TEACHERS' OCCUPATIONAL WELL-BEING IN FINNISH KINDERGARTENS: A PERSON-CENTERED APPROACH

by

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The quality of teacher-child interactions and teachers' occupational well-being in Finnish kindergartens: A person-centered approach

Abstract

Research Findings: The aim of the present study was to identify profiles of kindergarten teachers based on the observed quality of interactions with the children in their classrooms and to explore possible differences between the profiles in terms of teachers' occupational well-being and teacher and classroom characteristics. Participants were 54 Finnish kindergarten teachers whose interactions with children were observed with the Classroom Assessment Scoring System (CLASS Pre-K). The teachers also completed a questionnaire about their occupational well-being. Four interaction profiles were identified: Highest Quality, Moderate Quality, Lower Quality with Limited Negativity, and Lower Quality with Moderate Negativity. Differences between the profiles were found in teachers' teaching-related stress, general stress, and depressive symptoms. Furthermore, the profiles differed, albeit marginally significantly, in terms of teachers' emotional exhaustion. Overall, teachers in the Moderate Quality profile reported the most favorable occupational well-being, whereas teachers in the Highest Quality and the two lower quality profiles reported challenges to their occupational well-being. The profiles did not differ in terms of teacher and classroom characteristics. *Practice or Policy:* Results suggest that teachers' professional development opportunities should focus on both improving the quality of classroom interactions and enhancing teachers' occupational well-being by reducing their stress.

Introduction

The quality of teacher-child interactions plays an important role in children's academic development, social skills development, and motivation already during the early childhood education (ECE) years (Ansari & Pianta, 2018; Broekhuizen et al., 2016; Curby et al., 2013; Hu et al., 2020; Pakarinen, Kiuru, et al., 2010). However, the quality of interactions between teachers and children is not only important for children with whom teachers interact but also for the teachers themselves. Earlier research suggested that the quality of teacher-child interactions is related to different aspects of teachers' occupational well-being, such as stress, emotional exhaustion, and depressive symptoms (e.g., Jennings, 2015; Penttinen et al., 2020). Although prior research found associations between teachers' occupational well-being and the quality of teacher-child interactions, studies have not reached consensus on whether high-quality teacher-child interactions relate to low (Jennings, 2015; Penttinen et al., 2020; Sandilos et al., 2015), moderate (Friedman-Krauss et al., 2014), or high (Hoglund et al., 2015) levels of teachers' stress, emotional exhaustion, or depressive symptoms.

Furthermore, even though teachers are not a homogeneous group, most prior studies have been variable-oriented in examining the association between domains of teacher-child interactions (most prominently, emotional support, classroom organization, instructional support) and aspects of teachers' occupational well-being (e.g., stress, emotional exhaustion, or depressive symptoms) (e.g., Friedman-Krauss et al., 2014; Hoglund et al., 2015; Jennings, 2015; Penttinen et al., 2020). In order to better understand teachers' unique patterns of interactions and how teachers' occupational well-being differs among these interaction patterns or profiles, this study used a person-centered approach. A person-centered approach has the advantage that it allows researchers and teacher educators to identify profiles based on the observed quality of

teacher-child interactions in the classroom (Halpin & Kieffer, 2015). More specifically, this study used ten dimensions (e.g., positive climate, behavior management, and language modeling; see Figure 1) that the Teaching through Interactions (TTI) framework suggested as particularly relevant to high-quality teacher-child interactions (Hamre et al., 2013). Identified interaction profiles represent different groups of teachers whose interactions with children show similar patterns within a group but different patterns across groups (Halpin & Kieffer, 2015): For example, some teachers might display high-quality interactions in some dimensions but lower-quality interactions in other dimensions (see e.g., Virtanen et al., 2019). Thus, interaction profiles are profiles that represent groups of teachers who share similar quality of teacher-child interactions across the ten dimensions of the TTI framework. Interaction profiles can be identified with latent profile analysis (LPA; see Halpin & Kieffer, 2015).

To date, only a few studies have examined teachers' occupational well-being in relation to profiles based on the observed quality of teacher-child interactions (see Jeon et al. 2016; Virtanen et al., 2019). These studies have shown interesting associations between the interaction profiles and teachers' occupational well-being in the U.S. preschool (Jeon et al., 2016) and Norwegian secondary school classrooms (Virtanen et al., 2019). However, to our knowledge, no such person-centered approach has been taken to study these associations in kindergarten or elementary school classrooms, and earlier profiling studies at younger or older grade levels were limited by the small number of occupational well-being measures that have been examined in relation to the patterns. Addressing these gaps, the present study focuses on identifying profiles of kindergarten teachers based on the observed quality of teacher-child interactions in the classroom. Furthermore, this study explores the relationships between teachers' interaction profiles and their occupational well-being (i.e., general stress, teaching-related stress, emotional

exhaustion, and depressive symptoms) and the commonly used teacher and classroom

characteristics (i.e., teachers' work experience, group size, and number of children needing

support in the group). Hence, this study aims at increasing our understanding of ECE teachers'

unique patterns of teacher-child interactions and individual experiences of occupational well-

being. Such knowledge has important implications for providing targeted support for teachers in

that it may help to enhance both the quality of teacher-child interactions and occupational well-

being.

Conceptual Framework of Teacher-Child Interactions: Teaching through Interactions

In the present study, the "Teaching through Interactions" (TTI; Hamre et al., 2013)

framework is used to conceptualize teacher-child interactions in classrooms. The framework has

its roots in Bronfenbrenner and Morris' (2006) bioecological model which proposes that children

develop in their daily interactions with significant others such as teachers, and peers (see

Appendix for Figure A1). These interactions TTI differentiates under three domains of teacher-

child interactions: emotional support, classroom organization, and instructional support, each of

which consists of three to four dimensions (see Figure 1). The emotional support domain is based

on attachment theory (Ainsworth et al., 1978; Bowlby, 1969) and self-determination theory

(Ryan & Deci, 2000; Skinner & Belmont, 1993), emphasizing the importance of emotionally

supportive relationships and interactions for a child's development and engagement. In

emotionally supportive classrooms, warmth, respect, and enjoyment are evident and there is little

negativity (Hamre et al., 2013). In addition, teacher is responsible regarding children's academic

and emotional needs and takes children's interests into account in activities and interactions.

Dimensions of emotional support include positive climate, negative climate, teacher sensitivity,

and regard for student perspectives. Studies have shown that high-quality emotional support is

associated with, for example, children's higher levels of engagement (Castro et al., 2017) and social competence (Burchinal et al., 2010; Pakarinen et al., 2020).

Figure 1.

Three Domains and Ten Dimensions of the TTI Framework. Based on Hamre et al. (2013).
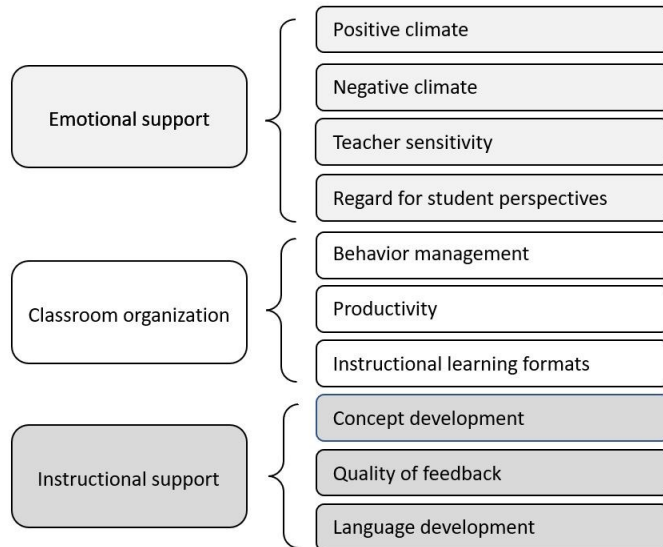
The domain of classroom organization relies on classroom management research (see Emmer & Stough, 2001), highlighting the importance of teachers' proactive behavior management, well-established routines, and effective instructions in maintaining children's attention and interest in learning. In well-organized classrooms, there are clear expectations for child behavior and the strategies used to manage child behavior are proactive rather than reactive (Hamre et al., 2013). Moreover, the teacher has clear plans, and their time management is efficient. Dimensions of classroom organization include behavior management, productivity, and instructional learning formats. Research has indicated that high-quality classroom organization is related to, for example, children's higher levels of motivation (Pakarinen, Kiuru et al., 2010),

higher levels of academic skills (Cadima et al., 2010), fewer behavior problems, and more cooperative behavior with peers (Luckner & Pianta, 2011).

Instructional support stems from research on children's cognitive and language development (e.g., Bransford et al., 2000; Mayer, 2002; Taylor et al., 2003), which underscores the importance of teachers placing an emphasis on supporting children's understanding, instead of having children only learn facts, by prompting thought processes, giving specific feedback, and using effective language modeling techniques. In instructionally supportive classrooms, the teacher promotes children's higher-order thinking skills, gives high-quality feedback to support children's learning and participation and uses language-stimulation techniques (Hamre et al., 2013). Dimensions of instructional support include concept development, quality of feedback, and language modeling. Studies have shown that high-quality instructional support is associated with children's academic skills such as math- and literacy-related skills (Bartholo et al., 2022; Burchinal et al., 2010; Hu et al., 2020). Quality of teacher-child interactions within the three domains and the dimensions under them can be assessed with an observational measure, The Classroom Assessment Scoring System (CLASS; Pianta, La Paro et al., 2008).

Teacher-Child Interactions in Relation to Teachers' Occupational Well-Being

In this section, first, the phenomenon of teachers' occupational well-being is introduced. Second, it is discussed how teacher-child interactions and teachers' occupational well-being are related. It is known that teaching is considered a highly stressful occupation (Herman et al., 2018; Skaalvik & Skaalvik, 2015) and, as a consequence, teachers are at risk of low occupational well-being characterized by high levels of work-related stress, emotional exhaustion, and depressive symptoms (for a review on ECE teachers' occupational well-being, see Cumming, 2017). Indeed, research has shown that teachers typically report more stress (Johnson et al.,

2005) and poorer mental health (Stansfeld et al. 2011; Whitaker et al., 2013) when compared to other occupations. Teacher stress is defined as teachers' experiences of negative emotions, such as anxiety, frustration, or tension, caused by work-related stressors (Kyriacou, 2001). In the long term, stress can lead to emotional exhaustion (Maslach et al., 2001) or experiences of depressive symptoms (Gluschkoff, 2017; Steinhardt et al., 2011). Exhaustion is defined as the emotional component of burnout, which reflects the strain that is caused by an overtaxing job (Salmela-Aro et al., 2011). Depressive symptoms refer to teachers' experiences of fatigue, guilt, inferiority, and disappointment in themselves (Beck et al., 1961). Comorbidity of indicators of low occupational well-being is common. For example, if teachers experience stress or burnout, they are more likely to also experience depressive symptoms (Desouky & Allam, 2017; Jeon et al., 2019; Papastylianou et al., 2009; Shin et al. 2013).

In Finland where the present study was conducted, 42% of teachers reported in a recent national survey experiencing stress often or quite often (Golnick & Ilves, 2022). In the U.S., 73% of teachers reported experiencing stress frequently (Doan et al., 2022). The high percentage of exhausted ECE teachers is alarming, since teachers' stress is related to children's lower motivation (Pakarinen, Kiuru, et al., 2010), and social competence (Siekkinen et al., 2013).

Jennings and Greenberg (2009) propose in their Prosocial Classroom model that teachers' social-emotional competence and well-being enhance teacher-child relationships, effective classroom management and effective social-emotional curriculum implementation which, together, contribute to a healthy classroom climate and thereby to children's social, emotional, and academic outcomes. Thus, in their model, they suggest that teachers with high social-emotional competence and occupational well-being are better able to respond to children's individual needs, show empathy, be proactive rather than reactive, manage child behavior

effectively, and support children's interest in learning. In line with the Prosocial Classroom model, research has shown that teachers who experience stress, emotional exhaustion and depressive symptoms are more likely to display negative reactions with children (Buettner et al., 2016). Furthermore, there is evidence that teachers who experience stress are more likely to have conflictual relationships with children (Whitaker et al., 2015). Regarding observed quality of teacher-child interactions, studies have further supported the Prosocial Classroom model by showing that teachers' stress is associated with lower quality of emotional support and classroom organization (Penttinen et al., 2020) and teachers' emotional exhaustion with a lower quality of emotional support (Jennings, 2015).

Research on caregivers' depressive symptoms has traditionally focused on maternal depression and its relation with parenting behavior (see e.g., Lovejoy, Graczyk, O'Hare, & Neuman, 2000). However, recent research has also been interested in the role of teachers' depressive symptoms in the quality teacher-child interactions. These studies have, in line with the Prosocial Classroom model, shown that teachers who experience depressive symptoms are more likely to show less closeness and more conflict in teacher-child relationships (Whitaker et al., 2015) and lower-quality teaching practices (i.e., individualized instruction, organization/planning, and warmth/responsiveness) (McLeon & Connor, 2015). Moreover, teachers experiencing depressive symptoms are more likely to be less sensitive with children, withdraw from interactions, and have negative interactions with children (Hamre & Pianta, 2004). With respect to the TTI framework, teachers' depressive symptoms have been negatively associated with all three domains of teacher-child interactions (Jennings, 2015).

Although many studies have indicated that teachers' low levels of occupational well-being are associated with a lower quality of teacher-child interactions, stress is not unequivocally

a threat for the quality of teacher-child interactions in the classroom. In fact, a moderate amount of stress can act as a motivator, which enhances teachers' work performance whereas too little stress (boredom) and too much stress (burnout) can weaken performance (Gmelch, 1983). Indeed, one study in early childhood education reported that both preschool teachers' high and low stress levels were related to a lower quality of emotional support, whereas moderate levels of stress were related to higher quality of emotional support (Friedman-Krauss et al., 2014). Additionally, in one study, higher levels of burnout among kindergarten to Grade 3 teachers have been associated with higher-quality classroom organization (Hoglund et al., 2015).

Approaches to the Study of Teacher-Child Interactions: Variable-Oriented vs. Person-Centered

In the preceding two sections, mostly variable-oriented studies examining either teacher-child interactions, teachers' occupational well-being or the relationship between these two, were introduced. In this section, two research approaches – variable-oriented and person-centered – are compared. Most previous studies on teacher-child interactions using the TTI framework have been variable-oriented, providing information about the average teacher's quality of teacher-child interactions (for exceptions, see, e.g., Hu et al., 2016; LoCasale-Crouch et al., 2007; Salminen et al., 2012). Moreover, in most of the previous studies, the three domains and their associations with, for example, teachers' occupational well-being have been examined separately (e.g., Jennings, 2015; Sandilos et al., 2015). In contrast, a person-centered approach can facilitate recognition of inter-individual differences in a sample, thereby providing relevant information about different patterns of teachers' actual practices in their classrooms (Halpin & Kieffer, 2015).

When examining variations in the quality of individual teachers' interactions with children, groups of teachers can be identified based on similar patterns of interactions with children in their classrooms. in the present study, the TTI framework (Hamre et al., 2013) that describes ten dimensions of teacher-child interactions was used to identify groups of individuals who shared similarities in their scores of observed categorical variables drawn from the TTI. However, although earlier research has shown that individual teachers' scores on each of the ten dimensions are highly related (e.g., Hamre et al., 2013; Pakarinen, Lerkkanen et al., 2010), the challenges that highly correlated variables can cause (i.e., that changes in one dimension are associated with shifts in another dimension), suggests the need for an approach that aims at identifying groups of individuals who share similarities in their scores of observed categorical variables. A person-centered approach (Lanza et al., 2007) enables the examination of the dimensions simultaneously not separately (McCutcheon, 2002), thus making it possible to get detailed information about the complexity of interactions where different dimensions of interactions occur at the same time.

Previous studies examining profiles based on the observed quality of teacher-child interactions in ECE have identified four to five profiles with two extremes — high quality and low quality (Hu et al., 2016; LoCasale-Crouch et al., 2007; Salminen et al., 2012). For example, LoCasale-Crouch et al. (2007) identified five profiles among U.S. pre-kindergarten teachers through cluster analysis: 1. Highest quality; 2. Positive emotional climate, high instructional quality; 3. Positive emotional climate, mediocre instructional climate; 4. Mediocre emotional climate, low instructional quality; and 5. Poorest quality. After LoCasale-Crouch et al. (2007), Salminen et al. (2012) and Hu et al. (2016) have identified four profiles through latent profile analysis. In Chinese preschool classrooms (Hu et al., 2016), the identified profiles were: 1. High

quality, 2. Medium quality with higher instructional support, 3. Medium quality with lower instructional support, and 4. Low quality. In Finnish kindergarten classrooms (Salminen et al., 2012), the identified profiles were: 1. Highest quality, 2. Medium quality, 3. Medium quality with lower emotional support, and 4. Lowest quality. Thus, besides the two extreme profiles with highest and lowest quality of teacher-child interactions, both Salminen et al. (2012) and Hu et al. (2016) identified two profiles of moderate quality of interactions. However, in Finland (Salminen et al., 2012), the moderate quality profiles differed in the quality of emotional support dimensions, whereas in China (Hu et al., 2016), the two moderate quality profiles differed in the quality of several dimensions across the domains. Overall, the three studies (Hu et al., 2016; LoCasale-Crouch et al., 2007; Salminen et al., 2012) differed in the number and content of the remaining profiles that fall between the two extreme profiles (see Appendix for Figure A2). Because of these inconsistent results, more research is needed in the context of ECE.

In terms of the association between the quality of teacher-child interactions and teachers' occupational well-being, there are only a few previous person-centered studies. In their study of preschool classrooms, Jeon et al. (2016) expanded profiles beyond the quality of teacher-child interactions to include teachers' work experience, and teachers' job attitudes (i.e., work-related stress, job satisfaction, and professional commitment). Of the three identified profiles, teachers in the profile, "Less experienced, lower quality, and more positive attitude," experienced less work-related stress, more job satisfaction, and more professional commitment than did teachers in the profile, "Less experienced, average quality, less positive attitudes." Teachers in the third profile, "More experienced, better quality, and mixed attitudes," experienced slightly more than average work-related stress but also more job satisfaction and professional commitment. These results indicate that teachers with average quality of teacher-child interactions reported less job

satisfaction and professional commitment than did teachers with the highest quality of interactions. Furthermore, teachers with the lowest quality of teacher-child interactions reported the lowest amount of stress, whereas teachers with average quality of interactions experienced the highest amounts of stress. The authors (Jeon et al., 2016) suggested that teachers with the lowest quality of teacher-child interactions might not recognize their challenges in providing a high-quality classroom environment in ECE, and for this reason, they do not feel stressed. Overall, these results indicate that profile analysis can increase our understanding of the relationship between the quality of interactions and teachers' occupational well-being. However, more research across different educational levels and in different cultural contexts is needed to identify important areas in pre- and in-service teacher training that could support teachers' professional learning. Given the importance of high-quality teacher-child interactions (e.g., Burchinal et al., 2010; Hu et al., 2020) and teachers' occupational well-being (e.g., Arens & Morin, 2016; Pakarinen, Kiuru et al., 2010; Siekkinen et al., 2013) for children's academic skills, social skills, and motivation, it is important to recognize practices which increase the quality of teacher-child interactions and enhance teachers' occupational well-being.

Other Factors Related to the Quality of Teacher-Child Interactions

Besides the relation between the quality of teacher-child interactions and teachers' occupational well-being, earlier research has examined the role of different teacher and classroom characteristics in the quality of teacher-child interactions. Especially teachers' work experience has been associated with the observed quality of teacher-child interactions in both variable-oriented (e.g., Pakarinen, Lerkkanen et al., 2010) and person-centered (e.g., Hu et al., 2016; Salminen et al., 2012) studies. Person-centered studies have reported teachers in the low-quality profiles having the least work experience (Hu et al., 2016; Salminen et al., 2012).

Variable-oriented studies, in contrast, have not reached a consensus on whether teachers' work experience is positively (Li Grining et al., 2010) or negatively (Pakarinen, Lerkkanen et al., 2010) related to the quality of teacher-child interactions.

In terms of group size, research findings have also been mixed: In an earlier person-centered study teachers in different interaction profiles did not differ with regard to group size (Salminen et al., 2012) whereas some variable-oriented studies have reported a negative association between quality of teacher-child interactions and group size (Friedmann-Krauss et al., 2014; Wang et al., 2020). Furthermore, it might not only be group size but also number of children who need support in terms of learning, language, or behavior, which has an association with the quality of teacher-child interactions. Variable-oriented studies have indicated that quality of teacher-child interactions has declined in classrooms with a higher number of children with behavior problems (Partee et al., 2019) or children from different ethnic backgrounds (Hoglund et al., 2015). Thus, there is evidence to show that teacher and classroom characteristics such as teachers' work experience, group size, and number of children needing support for example in behavior, can — alongside teachers' occupational well-being — contribute to the quality of teacher-child interactions. However, the information regarding the associations is somewhat mixed. For this reason, more research is needed on the role of teacher and classroom characteristics in the observed quality of teacher-child interactions in the ECE classrooms.

Kindergarten Education in Finland

In Finland, compulsory and free kindergarten education (cf. preschool in UK and kindergarten in US) is provided for 6-year-old children for one year before they begin 9 years of comprehensive school. According to the Finnish national core curriculum for pre-primary education (Finnish National Board of Education, 2016), children learn through interactions with

peers and teachers. In addition, guided and free play is a very important pedagogical approach in kindergarten education. Teaching practices are typically child-centered, developmentally appropriate for early childhood education and take into account children's own interests (Lerkkanen et al., 2012). The curriculum further highlights the importance of providing feedback that encourages children in their learning and supports their positive self-concept as a learner. Activities and the curriculum of Finnish kindergarten more closely resemble those in U.S. preschools than practices in U.S. kindergartens.

In Finland, kindergarten teachers are required to have at least a bachelor's degree in ECE. Teachers have high levels of autonomy related to how they might implement the curriculum (Finnish National Board of Education, 2016). The kindergarten curriculum builds on the ECE curriculum, both with a focus on supporting children's comprehensive development during the early childhood years (Finnish National Board of Education, 2016; 2019). Importantly, instruction and learning activities are integrated in thematic learning and play throughout the day.

Kindergarten activities provided by the teacher last approximately four hours per day, including time for outdoor activities, free play, and meals. Kindergarten classrooms can be located in either daycare centers or schools. Regardless of the location, there is an opportunity for additional care after the kindergarten hours (Hartonen, 2014). Group sizes vary but the maximum group size recommended by The Ministry of Education and Culture (Finnish National Agency for Education, n.d.) is 13 children or 20 if another kindergarten teacher or day care worker is present in the group.

The Present Study

The aim of the present study is to examine teachers' interaction profiles and, further, to explore whether teachers with these profiles differ with regard to their occupational well-being and to both teacher and classroom characteristics. More specifically, the following research questions are investigated:

1. What kinds of profiles can be identified among Finnish kindergarten teachers based on the observed quality of their interactions with children in the classroom?

As teachers have been shown to vary in the quality of teacher-child interactions (Hamre et al., 2013) and earlier research has identified meaningful patterns of interactions (e.g., LoCasale-Crouch et al., 2007), we expect to find different profiles of teacher-child interactions. Based on previous person-centered studies in early childhood education (Hu et al., 2016; Salminen et al., 2012), we expect to identify four profiles showing the observed quality of teacher-child interactions: one with higher quality, one with lower quality, and two with medium quality and differences between the two in some dimensions of teacher-child interactions (Hypothesis 1).

2. To what extent do kindergarten teachers' interaction profiles differ in terms of their occupational well-being (i.e., teaching-related stress, general stress, emotional exhaustion, and depressive symptoms) and teacher and classroom characteristics (i.e., work experience, group size, number of children in need of special support)?

Because earlier variable-centered research has shown that the quality of teacher-child interactions is associated with teachers' stress (e.g., Friedman-Krauss et al., 2014), emotional exhaustion (e.g., Jennings, 2015), and depressive symptom (e.g., Sandilos et al., 2015), we expect to find differences in teachers' occupational well-being across the different interaction profiles. However, studies have shown inconsistent findings regarding whether teachers'

occupational well-being has been positively (e.g., Jennings, 2015) or negatively (e.g., Hoglund et al., 2015) associated with the quality of teacher-child interactions. Based on the Prosocial Classroom model (Jennings & Greenberg, 2009), we expect that teachers in the high-quality profile will report most-favorable levels of occupational well-being (i.e., less stress, emotional exhaustion, and depressive symptoms; Hypothesis 2a).

Furthermore, in line with earlier research reporting associations between the quality of teacher-child interactions and teachers' work experience (see Hu et al., 2016; Salminen et al., 2012), group size (see Friedmann-Krauss et al., 2014; Wang et al., 2020) and number of children who need support in terms of learning, language, or behavior (see Hoglund et al., 2015; Partee et al., 2019), we expect that teachers belonging to different interaction profiles would differ also with regard to these teacher and classroom characteristics. More specifically, we expect that teachers in the low quality profile will have the least work experience, largest group sizes, and most children needing support in terms of learning, socioemotional skills or behavior, and Finnish language (Hypothesis 2b).

Method

Participants and Procedures

The participants of this study were 54 kindergarten teachers with their classrooms of 6-year-old children from Central Finland, participating in a larger longitudinal study (Lerkkanen & Pakarinen, 2016–2022). The teachers' mean age was 44.4 years ($SD = 9.95$), and most of them ($N = 53$) were female. They were relatively experienced: 59.3% of the teachers had worked more than 15 years in ECE or in primary school, 5.6% 11–14 years, 18.5% 6–10 years, and 14.8% 1–5 years. All teachers had at least a bachelor's degree in ECE. The sizes of their groups varied from

6 to 25 children (M = 12.11, SD = 4.04), and the classrooms were located either in a daycare center (87%) or in a school (13%). The study received ethical approval from the ethics committee of the university prior to commencing the study. Participation in the study was voluntary and all participants gave written consent.

Three teachers participated in the pilot study in spring 2016, and 51 teachers in the second phase of the study in spring of 2017. Importantly, for all teachers across both phases of the study, the procedures were similar. Classrooms were video recorded for approximately 2–2.5 hours during one kindergarten day to observe teacher-child interactions. Video recordings were conducted between mid-February and mid-May of each year. Moreover, teachers completed a questionnaire about their occupational well-being between March and June. Two occupational well-being measures (general stress and depressive symptoms) were added to the questionnaire after the pilot study and are therefore not available for the three teachers participating in the pilot study.

Measures

The quality of teacher-child interactions. The quality of teacher-child interactions in kindergarten classrooms was measured with the CLASS Pre-K (Pianta, La Paro, et al., 2008), which has been validated in Finland (Pakarinen, Lerkkanen, et al., 2010). The Pre-K version of the CLASS was used because the Finnish kindergarten curriculum and teaching practices resemble U.S. preschool practices. The CLASS tool assesses quality of teacher-child interactions in terms of 3 domains and 10 dimensions: emotional support (dimensions: positive climate, negative climate, teacher sensitivity, and regard for student perspectives); classroom organization (dimensions: behavior management, productivity, and instructional learning formats); and instructional support (dimensions: concept development, quality of feedback, and instructional

learning formats). The quality of the dimensions is rated as low (1–2), mid (3–5), or high (6–7),

according to the coding manual instructions (Pianta, La Paro, et al., 2008).

In the present study, approximately four ($M = 4.48$, $SD = .91$) 20-minute ($M = 19.80$, $SD = 3.67$) cycles per classroom and teacher were coded by 12 research assistants certified as

CLASS Pre-K observers. In order to calculate inter-rater reliability, 20% of the video recordings

were double coded. Inter-rater reliabilities with regard to adjacent agreement (i.e., agreement

within one point; Pianta, La Paro, et al., 2008) varied from 84.6% (positive climate) to 100%

(negative climate) for emotional support, from 69.2% (instructional learning formats) to 88.5%

(productivity) for classroom organization, and from 46.2% (concept development) to 75%

(quality of feedback) for instructional support dimensions. Inter-rater reliabilities were further

examined with intraclass correlation coefficients which were calculated using a two-way random

model with absolute agreement (Landers, 2015). Intraclass correlations varied between .18

(positive climate) and .60 (regard for student perspectives) (see Koo & Li, 2016 for more

information regarding intraclass correlations). The mean scores of all cycles for each dimension

were used in the analysis.

Teachers' occupational well-being. Four aspects that threaten teachers' occupational

well-being—teaching-related stress, general stress, emotional exhaustion, and depressive

symptoms—were self-rated by the teachers.

Teaching-related stress. A modified version of the Parental Stress Inventory (Gerris et

al., 1993) was used to measure teaching-related stress. The inventory was modified by changing

the context from parenting to teaching and translating the items into Finnish. This modified

version of the inventory has been used in previous studies with kindergarten (Pakarinen, Kiuru,

et al. 2010; Pakarinen, Lerkkanen et al. 2010) and elementary school teachers (Virtanen et al.,

2018). The inventory consists of three items (e.g., "I have a lot more problems in guiding the children than I expected") which teachers rated on a scale from 1 ("hardly describes me") to 5 ("describes me very well"). The reliability of the measure with three items was acceptable ($\alpha =$ .69).

General stress. Teachers' general stress was measured with a question that is part of the Occupational Stress Questionnaire: "Stress means a situation in which a person feels tense, restless, nervous, or anxious, or is unable to sleep at night because his/her mind is troubled all the time. Do you feel this kind of stress these days?" (Elo et al., 2003). This single-item stress measure has been verified as acceptable for measuring variances in occupational well-being (Elo et al., 2003). The teachers answered the question on a scale from 1 (not at all) to 6 (very much).

Emotional exhaustion. The exhaustion dimension of Bergen Burnout Inventory (Salmela-Aro et al., 2011) was used to measure teachers' emotional exhaustion. The dimension consists of three items (e.g., "I am snowed under with work"), rated on a scale from 1 (strongly disagree) to 6 (strongly agree). A mean score of the three items was used in the analysis. The reliability of the measure was good ($\alpha = .76$).

Depressive symptoms. Teachers' depressive symptoms were measured with four questions modified from the Beck Depression Inventory (Beck et al., 1961). The items (e.g., "I get tired more easily than I used to") were translated into Finnish, and the teachers were asked to rate them on a scale from 1 (not true at all) to 5 (completely true). A mean score of the items was used in the analysis. The reliability of the measure was acceptable ($\alpha = .72$).

Teacher and classroom characteristics. The teachers reported their work experience and the number of children in their groups who needed support in the areas of: 1) learning, 2)

socioemotional skills or behavior, and 3) language, if their native language was not Finnish. The

teachers also reported their group size. For analysis, the number of children who needed support

in each group was divided by the group size to get percentages of the children needing support

for learning, socioemotional skills or behavior, and the Finnish language.

Data Analysis

In order to identify interaction profiles based on teachers' mean scores of the CLASS

Pre-K dimensions, a latent profile analysis (LPA) was conducted with Mplus version 8 (Muthén

& Muthén, 1998–2017). Halpin and Kieffer (2015) recommend using LPA when examining

teacher-child interactions for three reasons: first, it provides item-level diagnostic information

about teacher-child interactions; second, it provides estimates of measurement error; and third,

the results are easy to interpret. The following criteria were used to evaluate the number of

profiles in the LPA: log likelihood (logL), Akaike's information criterion (AIC), adjusted

Bayesian information criterion (aBIC), entropy, Vuong-Lo-Mendell-Rubin test (VLMR), Lo-

Mendell-Rubin test (LMR), and parametric bootstrapped likelihood ratio test (BLRT). Good fit

of the model is indicated by a high log likelihood value and small AIC and aBIC (Nylund,

Asparouhov, & Muthén, 2007), whereas an entropy value close to 1 indicates distinct groups. If

the *p*-values of the VLMR, LMR, and BLRT statistical tests are statistically significant, the

current number of classes is better than the previous solution with one less class (Lo et al., 2001;

McLahlan & Peel, 2000). In addition to the statistical criteria, also evaluated was whether the

profile solutions were useful (e.g., the number of participants in each class was sufficient for

further analysis) and made sense in relation to earlier research. Due to the small overall sample

size as well as the relatively small profile group sizes, the Kruskal-Wallis test was used to

examine differences between profiles in terms of teachers' occupational well-being and teacher

and classroom characteristics in IBM SPSS Statistics 24. The group comparisons were conducted

using the Mann-Whitney U test.

Results

Profile Identification

The first aim of the study was to investigate what kinds of interaction profiles could be

identified in kindergarten classrooms based on the 10 dimensions of the CLASS instrument. The

goodness-of-fit indices of the LPA, particularly the AIC index and the BLRT tests, suggested

that the four-profile solution fitted the data best (see Table 1). In this solution, smaller AIC and

aBIC values, and higher logL value indicated better fit of the model than in the two- or three-

profile solution. Moreover, although the aBIC value decreased again in the five-profile solution

and the logL increased in both the five- and six-profile solutions, the p-values of BLRT were not

significant for these solutions, whereas for the four-profile solution, the BLRT p-value was

significant. Thus, according to the BLRT test, the five-profile solution was not better than four-

profile solution, and the four-profile solution was better than the three-profile solution.

Moreover, in profile solutions three, five, and six, there was one very small group with only five

teachers whereas in the four-profile solution, the smallest group was 7 teachers. For these

reasons, the four-profile solution was selected as the final one.

Location of Table 1. Goodness-of-fit Statistics and Group Sizes for the Estimated Unconditional
Latent Profiles

Identified Interaction Profiles

The differences across profiles in terms of the 10 interaction dimensions were further

examined with the Kruskal-Wallis test. As shown in Table 2, the differences between profiles

were statistically significant with regard to the 10 dimensions, indicating empirical support for

the profile solution. Based on the patterns and mean differences, the four interaction profiles (see

Figure 2 and Table 2) were labelled *Highest Quality* (20.4%), *Moderate Quality* (50%), *Lower

Quality with Limited Negativity* (16.7%), and *Lower Quality with Moderate Negativity* (13%). It

is important to note that although according to the CLASS manual, low quality of teacher-child

interactions is determined as CLASS ratings of 1–2, moderate quality 3–5, and high quality 6–7

(Pianta, La Paro, et al., 2008), the profiles are not named according to this determination but in

relation to the mean scores of the sample. Thus, the teachers in the *Highest Quality* profile had,

on average, the lowest scores in negative climate (meaning that there were few negative

interactions in the classroom) and the highest scores in the other nine CLASS dimensions. The

teachers in the *Moderate Quality* profile scored near to the sample mean (mean scores within 0.5

standard deviation from the sample mean) in all 10 CLASS dimensions. The teachers in the

Lower Quality with Limited Negativity profile scored below the sample mean in all interaction

dimensions. However, their scores for negative climate were, on average, only 0.2 standard

deviations from the sample mean, whereas the other dimensions ranged from 0.36 to 0.91

standard deviations below the sample mean. When compared to the *Moderate Quality* profile,

teachers in the *Lower Quality with Limited Negativity* profile scored lower in four dimensions:

teacher sensitivity, regard for student perspectives, behavior management, and quality of

feedback. The teachers in the *Lower Quality with Moderate Negativity* profile scored below the

sample mean in 8 of the 10 dimensions. These teachers had particularly high scores in negative

climate, indicating more negative interactions in these classrooms compared to the other profiles

(see Table 2).

Figure 2.

Identified Four Interaction Profiles
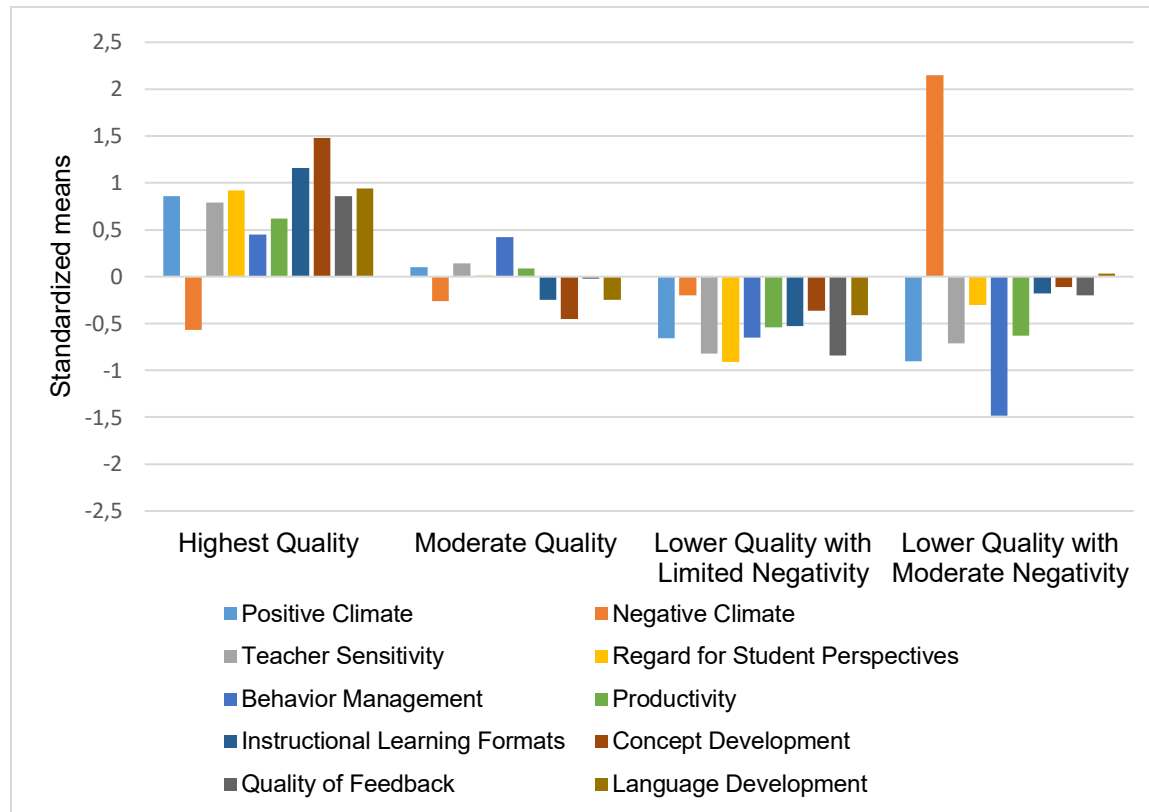
Location of Table 2. The Sample and Profile Means and Standard Deviations for the Investigated Variables

Differences Between Interaction Profiles in Teachers' Occupational Well-Being and Teacher and Classroom Characteristics

Teachers' occupational well-being. The second aim of the present study was to examine whether the teachers in the four interaction profiles differed according to their occupational well-being or teacher and classroom characteristics. The Kruskal-Wallis test (see Table 2) indicated that there were statistically significant differences between interaction profiles with regard to teaching-related stress, general stress, and depressive symptoms. Moreover, the profiles differed, albeit marginally significantly, with regard to emotional exhaustion. Group comparisons with the Mann-

Whitney U test further indicated that the teachers in the *Lower Quality with Limited Negativity* and *Lower Quality with Moderate Negativity* profiles experienced significantly more teaching-related stress compared to the teachers in the *Moderate Quality* profile. With regard to general stress, the teachers in the *Highest Quality* and *Lower Quality with Moderate Negativity* profiles experienced significantly more general stress than did the teachers in the *Moderate Quality* profile. In terms of emotional exhaustion, the teachers in the *Moderate Quality* profile were significantly less exhausted compared to those in the *Highest Quality* profile. Similar to emotional exhaustion, there was a significant difference in depressive symptoms between the *Moderate Quality* and *Highest Quality* profiles. The teachers in the *Moderate Quality* profile reported fewer depressive symptoms compared to the teachers in the *Highest Quality* profile.

Teacher and classroom characteristics. The Kruskal-Wallis test (see Table 2) indicated that there were no statistically significant differences between interaction profiles in relation to teacher and classroom characteristics (teachers' work experience, group size, and the number of children who need support in a) learning, b) socioemotional skills and behavior, or c) the Finnish language).

Discussion

The aim of this study was to identify interaction profiles in kindergarten classrooms in Finland and to explore differences among these profiles with regard to teachers' occupational well-being and teacher and classroom characteristics. First, four interaction profiles were identified: *Highest Quality* (20.4%), *Moderate Quality* (50%), *Lower Quality with Limited Negativity* (16.7%), and *Lower Quality with Moderate Negativity* (13%). Second, differences between the profiles with regard to teachers' occupational well-being were identified. Overall, by adopting a person-centered approach to teacher-child interactions, this study obtained a more

detailed understanding of individual differences between teachers in their quality of teacher-child interactions and in their occupational well-being.

The Four Interaction Profiles

Recent person-oriented research in kindergarten classrooms (Hu et al., 2016; Salminen et al., 2012) identified four interaction profiles. Although the number of profiles in the present study was similar to the findings from two previous studies, the patterns of interactions within the profiles were somewhat different. Thus, Hypothesis 1 was supported in terms of the number of profiles, whereas the patterns of interactions within the profiles partially differed from the expected profiles. In both Chinese (Hu et al., 2016) and earlier Finnish (Salminen et al., 2012) samples, one profile with low quality, one profile with high quality, and two profiles with medium quality of teacher-child interactions differing in either the dimensions of emotional support (Salminen et al., 2012) or in all three interaction domains (Hu et al., 2016), were identified. Interestingly, in the present study, one profile with higher quality, one profile with moderate quality, and two profiles with lower quality of teacher-child interactions were identified. More specifically, the two lower quality profiles differed in the negative climate dimension of the CLASS. Negative climate reflects the amount and intensity of disrespect, irritation, yelling, threats, and verbal or physical bullying in the classroom (Pianta, La Paro, et al., 2008). Similar to the present study, in another Finnish kindergarten sample, it was found that the amount of negative climate in classrooms is, on average, very low (Pakarinen, Lerkkanen, et al., 2010). Thus, the results of the present study indicate that the few teachers in the *Lower Quality with Moderate Negativity* (N = 13%) profile, who had more negative climates in their classrooms than other teachers, also had lower quality of teacher-child interactions in terms of the other CLASS dimensions. However, it should be noted that although there were significantly

more indicators of negative climate in the *Lower Quality with Moderate Negativity* profile classrooms, the amount of negative climate was still relatively low for all four profiles. Mean score for negative climate in the *Lower Quality with Moderate Negativity* profile was 1.61 (in a scale from 1 to 7) whereas the mean scores for negative climate in the other three profiles varied from 1.00 to 1.08.

There are a few possible explanations for the differences in the patterns of the interactions within the present study's profiles and those in previous research. When comparing the profiles of the present study to the Chinese profiling study, it needs to be acknowledged that Hu et al. (2016) had a larger sample than the present study (180 vs. 54 teachers, respectively). Moreover, the differences in the profiles might be due to the ages of the children in the classrooms. In the Chinese study, the participating classrooms were from three different grade levels with children 4–6 years of age, whereas the current study only included kindergarten classrooms with 6-year-old children. It might be that teachers have different kinds of interactions with younger children, and this is reflected in the interaction profiles. Furthermore, when comparing the profiles identified in the current study to the previous Finnish study (Salminen et al., 2012), it should be noted that the data of the latter one were collected 15 years ago when kindergarten was still voluntary for children in Finland, and the number of staff in classrooms was higher. It is possible that teaching practices and patterns of interactions in kindergarten classrooms have changed during this timeframe, as a new curriculum was implemented in Finland and the kindergarten year is now mandatory for every child. For these reasons, work in today's kindergarten classrooms might be more exhausting as group sizes are bigger and the demands on teachers have increased. Overall, the results of the current study extend previous research by providing more information on the diversity of the quality of teacher-child

interactions and variations in the interaction dimensions among teachers in kindergarten classrooms.

Differences Among Profiles in Teachers' Occupational Well-Being and Teacher and Classroom Characteristics

Teachers' occupational well-being. The results of the study indicate that Finnish kindergarten teachers with the highest-quality teacher-child interactions experience more challenges in their occupational well-being in terms of general stress, emotional exhaustion, and depressive symptoms, compared to teachers with moderate quality of teacher-child interactions. Thus, the results were not in line with Hypothesis 2a: teachers with the highest quality interactions did not report most favorable well-being. Although the Prosocial Classroom model (Jennings & Greenberg, 2009) argues that teachers' occupational well-being enhances classroom climate, behavior management, and teacher-child relationships, one earlier study has also reported a positive association between burnout and the quality of classroom organization (Hoglund et al., 2015) which is in line with the current results. This association is alarming in the sense that high stress is also related to certain illnesses, such as cardiovascular disease (Melamed et al., 2006), teachers' quitting intentions (Buettner et al., 2016; Klassen & Chiu, 2011), and children's lower motivation, academic skills, and social skills (Hoglund et al., 2015; Pakarinen, Kiuru, et al., 2010; Siekkinen et al., 2013).

Based on the current results, it is possible that aiming at high quality interactions with children is exhausting and may threaten a kindergarten teacher's occupational well-being. It has been previously shown that high-achieving women typically experience stress (Wolontis & Hoff, 2018). However, the results of this study are not longitudinal and for that reason, it is not possible to say whether high-quality interactions or stress, emotional exhaustion, and depressive

symptoms come first. Earlier research has indicated that a moderate amount of stress can act as a motivator in the workplace (Gmelch, 1983) and be associated with a high quality of teacher-child interactions (Friedman-Krauss et al., 2014). It is also typical that stress and depressive symptoms are experienced at the same time (e.g., Jeon et al., 2019; Shin et al. 2013).

The results of the current study further indicated that the Finnish kindergarten teachers in the *Lower Quality with Moderate Negativity* profile reported more general stress than did the teachers in the *Moderate Quality* profile. Moreover, teachers in both the *Lower Quality with Limited Negativity* and *Lower Quality with Moderate Negativity* profiles reported more teaching-related stress than did the teachers in the *Moderate Quality* profile. Interestingly, the teachers in these profiles did not differ from the teachers in the *Highest Quality* and *Moderate Quality* profiles in terms of emotional exhaustion and depressive symptoms. The measure of teaching-related stress reflects stress that is specifically related to guiding children, and that might be the reason why this specific aspect of teachers' occupational well-being is related to actual challenges in interacting with children in the classroom. An association between higher teaching-related stress and lower quality of teacher-child interactions has been reported in Finland in the elementary school context as well (Virtanen et al., 2018).

Overall, the results of the present study suggest that teachers with a moderate quality of interactions with children report higher occupational well-being than do teachers in the other three profiles. Possibly, the previous variable-centered research has not found this group of teachers who report high occupational well-being and have a sufficient quality of teacher-child interactions. This interesting result broadens the picture of the associations between the quality of teacher-child interactions and teachers' occupational well-being, supporting the interpretation that a person-centered approach provides new information on the relationship between teachers'

occupational well-being and observed quality of interactions. Still, it is not yet clear why teachers with a higher and a lower quality of teacher-child interactions have more challenges with their occupational well-being, compared to teachers with a moderate quality of interactions with children. For this reason, more research is needed on the causes of stress and the possible ways to cope with the demands of work as a teacher.

Teacher and classroom characteristics. Contrary to Hypothesis 2b, no statistically significant differences between interaction profiles in terms of teacher and classroom characteristics (i.e., work experience, group size, and number of children needing support) were found. This result might reflect the limited variations in the teacher and classroom characteristics of the present sample: the standard deviation in group sizes was relatively small, and almost 60% of the teachers had more than 15 years of teaching experience. In Finland, group sizes in kindergarten are also regulated, as The Ministry of Education and Culture (Finnish National Agency for Education, n.d.) recommends 13 children as a maximum group size with one teacher and 20 if there is another teacher or children's nurse in the group. Overall, the results of this study highlight the importance of considering teachers' occupational well-being, in addition to teacher and classroom characteristics, when aiming to enhance the quality of teacher-child interactions. However, caution is warranted in generalizing the findings as different educational contexts have different recommendations for adult-child ratios.

Practical Implications

By identifying interaction profiles and examining them more thoroughly in terms of teachers' occupational well-being, it is possible to recognize areas that should be emphasized in both pre-service and in-service teacher training programs to increase teachers' quality of teacher-child interactions and occupational well-being (Halpin & Kieffer, 2015). For example, the

current results demonstrate that in this sample, teachers in the two lower-quality profiles could benefit from an intervention aimed at enhancing the quality of teacher-child interactions. However, the interventions should focus on different aspects of teacher-child interactions, depending on whether the teacher has a limited or moderate negative climate in the classroom. It could be wise to raise the overall quality of interactions in classrooms that have lower general quality of teacher-child interactions but limited negative climates. In classrooms with moderate negativity, it might be good to start with reducing the negative climate. One option to support teachers in their interactions with children are video-based professional development programs such as My Teaching Partner (MTP), which has shown increases in the quality of the participants' teacher-child interactions (Early et al., 2017; Pianta, Mashburn, et al., 2008). In MTP, teachers video record their interactions with children and receive consultation and feedback guided by the CLASS dimensions to support their growth and development (Early et al., 2017; Pianta, Mashburn, et al., 2008). Based on the results of the present study, these interventions could be targeted so that teachers receive tools for professional development in the specific aspects of the interactions they find challenging in their teaching.

Furthermore, the results of the current study indicate that in this data set, teachers in the *Highest Quality* profile could benefit from an intervention that targets their occupational well-being, so that they do not tire themselves while aiming at high-quality interactions. Thus, it is important to not only aim for high-quality interactions at the expense of teachers' occupational well-being, but also to provide teachers with tools that help them cope with the stress. Earlier research has indicated that teachers experience less stress, emotional exhaustion, and depressive symptoms if their workload is reasonable (Ferguson et al., 2012; Hakanen et al., 2006), they have good relationships with colleagues and supervisors (Jeon et al., 2018; Schaack et al., 2020),

enough control over their job (Hakanen et al., 2006; Schaack et al., 2020), and enough

possibilities for professional development (Jeon et al., 2018). Hence, teachers' occupational

well-being can be supported in schools by taking into consideration, for example, the amount of

work and the time that teachers have to complete their work, supportive relationships between

the staff members, opportunities for professional development, and how much control teachers

have over their work. In Finland, teachers have high autonomy in their work and previous studies

have indicated that high autonomy is related to a more favorable occupational well-being

(Hakanen et al., 2006; Skaalvik & Skaalvik, 2014). In summary, given that both quality of

teacher-child interactions (e.g., Broekhuizen et al., 2016; Hu et al., 2020) and teachers'

occupational well-being (e.g., Arens & Morin, 2016; Roberts et al., 2016) are important to

optimally promote children's academic and social skills development, it is critical to support

teachers in both their interactions with children and their occupational well-being to guarantee

high-quality learning environments for all children.

Limitations and Future Directions

The study has some limitations that need to be acknowledged. First, the sample size of

the study was small, and this might be why not all the differences between the profiles were

statistically significant. Because of the small sample size, caution is warranted with interpreting

the results. In addition, it is possible that the results do not generalize beyond the present Finnish

sample and, thus, further studies with larger samples from different cultural contexts are needed

to draw conclusions about associations between interaction profiles and teachers' occupational

well-being internationally. Second, the measure of general stress consisted of only one item.

However, the content, criterion, and construct validity of this single-item measure has been

confirmed previously (Elo et al., 2003). Furthermore, measures of teaching-related stress,

emotional exhaustion, and depressive symptoms were used in the present study to gain a more

diverse understanding of teachers' occupational well-being. Third, although teaching-related

stress and emotional exhaustion were measured for all participants, the measures of general

stress and depressive symptoms were not available for the three teachers in the pilot study. In

future research, several measurement points with a wider variety of teachers' occupational well-

being are recommended. Fourth, both teachers' occupational well-being and children's need for

support were teacher-rated. In future, objective measures of children's needs for support should

be included. Fifth, inter-rater reliability for the quality of teacher-child interactions with regard to

concept development was relatively low although all coders were certified CLASS coders.

Earlier research has shown that dimensions of instructional support are usually the most difficult

to rate for CLASS coders (e.g., Bell et al., 2014). In the future, special attention should be paid to

training coders to rate the quality of instructional support and especially concept development.

Moreover, it would be important to further examine what causes stress for teachers in the

Highest Quality and *Lower Quality* profiles and which factors support the occupational well-

being of teachers in the *Moderate Quality* profile. To better support teachers in their

occupational well-being, interviews and other qualitative measures are also needed to gain a

deeper understanding of the phenomenon. Finally, to gain more detailed information of the

differences in the quality of teacher-child interactions among the interaction profiles, micro-level

analysis and qualitative analysis of video-recordings are needed.

Conclusion

This study provides new information on two issues. First, it broadens our understanding

of the diversity of teacher-child interactions in classrooms by examining interaction profiles

based on 10 observed dimensions of teacher-child interactions in Finnish kindergarten

classrooms. Second, the study extends the previous literature by examining the differences

between profiles with respect to Finnish kindergarten teachers' teaching-related stress, general

stress, emotional exhaustion, and depressive symptoms. The results of the study revealed

challenges in occupational well-being among teachers in both the highest-quality and lowest-

quality profiles. In contrast, the teachers in the moderate quality of teacher-child interactions

profile seemed to have the most favorable occupational well-being, suggesting that the well-

being of teachers should be at the center when aiming at enhancing the quality of teacher-child

interactions. These findings highlight the importance of taking a holistic approach, whereby the

quality of teacher-child interactions is examined together with teachers' occupational well-being.

Hopefully the results will encourage researchers to further explore the individual differences in

the associations between teacher-child interactions and teachers' occupational well-being in

different cultural and educational contexts.

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Table 1

Goodness-of-Fit Statistics and Group Sizes for the Estimated Unconditional Latent Profiles

No. of Profiles	logL	AIC	aBIC	Entropy	VLMR	LMR	BLRT	Group sizes
2	-363.306	836.611	773.213	0.977	0.3265	0.3328	0.0128	43/11
3	-319.627	795.254	705.343	0.991	0.6123	0.6163	0.0000	5/39/10
4	-289.560	781.119	664.696	0.984	0.7623	0.7623	0.0385	9/27/7/11
5	-268.336	784.672	641.736	0.974	0.2399	0.2399	1.0000	5/11/6/23/9
6	-267.875	829.749	660.302	0.974	0.6828	0.6831	0.3333	6/13/5/12/11/7

Note. logL = log likelihood, AIC = Akaike's information criterion, aBIC = adjusted Bayesian information criterion, VLMR = Vuong-Lo-Mendell-Rubin test, *p*-value; LMR = Lo-Mendell-Rubin test, *p*-value; BLTR = parametric bootstrapped likelihood ratio test, *p*-value.

Table 2

The Sample and Profile Means and Standard Deviations for the Investigated Variables

	Total sample (N = 54)		Profiles								
			Highest Quality (N = 11)		Moderate Quality (N = 27)		Lower Quality with Limited Negativity (N = 9)		Lower Quality with Moderate Negativity (N = 7)		
	M	SD	M	SD	M	SD	M	SD	M	SD	χ^2
Emotional support											
Positive climate	5.45	.80	6.13$_a$	.34	5.53$_b$	.75	4.92$_{b,c}$	.75	4.73$_c$	.56	18.98***
Negative climate	1.13	.23	1.00$_a$	.00	1.07$_b$	.11	1.08$_b$	.13	1.61$_c$	.23	27.62***
Teacher sensitivity	5.45	.71	6.00$_a$	.14	5.54$_b$	.64	4.87$_c$	.80	4.95$_c$	.63	18.33***
Regard for student perspectives	4.55	.82	5.30$_a$	.56	4.55$_b$	.74	3.80$_c$	.65	4.30$_{b,\,c}$	.68	16.65**
Classroom organization											
Behavior management	5.65	.57	5.91$_a$	.20	5.89$_a$	.29	5.29$_b$	.52	4.81$_b$	.81	19.40***
Productivity	5.63	.58	5.98$_a$	.28	5.68$_b$	.41	5.31$_b$	.78	5.26$_b$	.85	10.51*
Instructional learning formats	4.91	.65	5.66$_a$	.46	4.75$_b$	.53	4.57$_b$	.71	4.79$_b$	.40	17.02**
Instructional support											
Concept development	2.98	.89	4.29$_a$	.65	2.57$_b$	.53	2.65$_b$	.60	2.88$_b$	.72	24.01***
Quality of feedback	3.34	.79	4.02$_a$	.88	3.32$_b$	.61	2.67$_c$	.49	3.18$_{a,b,c}$	.84	13.57**
Language modeling	3.55	.78	4.28$_a$	.96	3.35$_b$	.64	3.23$_b$	.53	3.57$_{a,b}$	.59	8.42*
Teacher and classroom characteristics											
Group size	12.11	4.04	11.73	3.64	11.59	3.38	15.00	6.38	11.00	1.63	2.20/ns.
Work experience[1]	4.11	1.19	3.91	1.14	4.22	1.12	4.44	1.13	3.5	1.64	2.68/ns.
Support in learning[2]	20.48	12.75	20.42	14.07	22.87	12.36	11.81	7.21	24.42	15.74	5.28/ns.
Support in behavior[2]	17.23	14.71	18.08	13.43	17.69	12.65	7.33	8.25	24.72	22.73	4.45/ns.
Native language other than Finnish[2]	6.79	13.00	4.53	7.78	11.68	17.35	2.72	7.69	1.85	4.54	4.75/ns.
Occupational well-being											
Teaching-related stress	2.15	.63	1.94$_a$	.70	2.01$_a$	.53	2.52$_b$	.73	2.52$_b$	.47	8.78*
General stress	3.12	1.32	4.00$_a$	1.34	2.58$_b$	1.14	3.11$_a$	1.54	3.57$_a$	.79	9.33*
Emotional exhaustion	3.13	1.09	3.82$_a$	1.10	2.80$_b$	1.11	3.15$_{a,b}$	.93	3.29$_{a,b}$	.80	6.50†
Depressive symptoms	2.13	.73	2.55$_a$	.40	1.85$_b$	.60	2.22$_{a,b}$	1.11	2.29$_{a,b}$	.70	8.64*

Note: †$p < .10$, *$< .05$, **$< .01$, ***$< .001$. Means within a row with different subscripts are significantly different at the level of $p < .05$ based on Mann-Whitney U test. [1]*Work experience measured: 0 = none, 1 = less than a year, 2 = 1–5 years, 3 = 6–10 years, 4 = 11–15 years, 5 = more than 15 years.* [2]*Percentage of children who need support in the group.*

Appendix

Figure A1.

The Relationship Between Bioecological Model and TTI Framework. Based on Hamre et al. (2013).
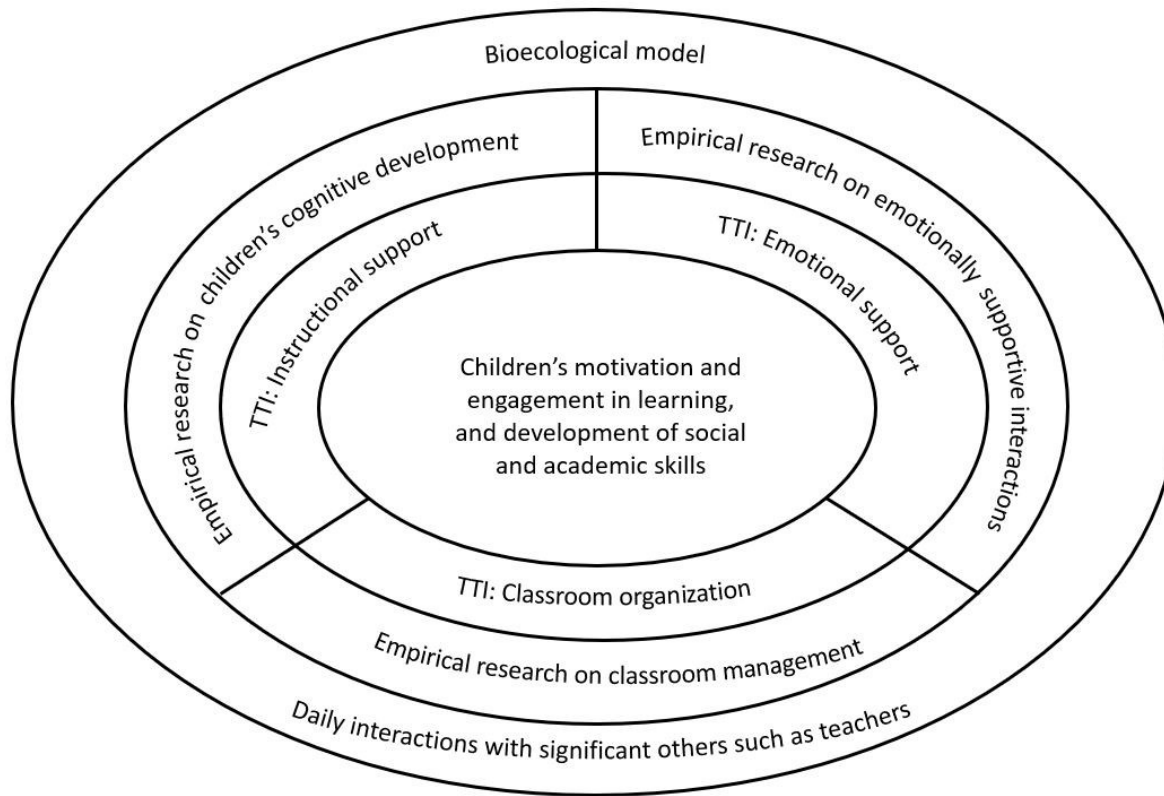
Figure A2.

Interaction Profiles Identified in Previous Profiling Studies Conducted in the ECE Settings.

	LoCasale-Crouch et al. (2007)	Salminen et al. (2012)	Hu et al. (2016)
Authors			
Context	U.S. prekindergarten classrooms (N = 676)	Finnish kindergarten classrooms (N = 49)	Chinese preschool classrooms (N = 180)
Analysis	Cluster analysis	Latent profile analysis	Latent profile analysis
Profile names and pre-valences	1. Highest quality (14.5%) 2. Positive emotional climate, high instructional quality (16.9%) 3. Positive emotional climate, mediocre instructional quality (31.4%) 4. Mediocre emotional climate, low instructional quality (18.5%) 5. Poorest quality (18.8%)	1. Highest quality (53%) 2. Medium quality (29%) 3. Medium quality with lower emotional support (12%) 4. Lowest quality (6%)	1. High quality (14.1%) 2. Medium quality with higher instructional support (14.4%) 3. Medium quality with lower instructional support (47.1%) 4. Low quality (24.4%)

III

RECIPROCAL ASSOCIATIONS AMONG TEACHER–CHILD INTERACTIONS, TEACHERS' WORK ENGAGEMENT, AND CHILDREN'S SOCIAL COMPETENCE

by

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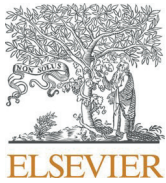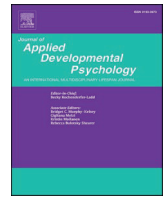
Reciprocal associations among teacher–child interactions, teachers' work engagement, and children's social competence

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ABSTRACT

This study aimed at examining reciprocal associations among teacher–child interactions, teachers' work engagement, and children's social competence across grade 1. The participants were 51 Finnish teachers and 815 children. The quality of teacher–child interactions (emotional support, classroom organization, and instructional support) was assessed with the Classroom Assessment Scoring System. In addition, teachers reported their work engagement and rated children's social competence (prosocial and antisocial behaviors). The results of the multilevel modeling indicated that high-quality instructional support was associated with more prosocial and less antisocial behavior. Prosocial behavior was associated with higher-quality instructional support. Work engagement was associated with less antisocial behavior, and prosocial behavior with higher work engagement. Finally, work engagement was associated with higher-quality teacher–child interactions. The results suggest that teachers can enhance children's social competence with high-quality instructional support. Moreover, children's prosocial behavior can be reflected in teacher–child interactions and in teachers' work engagement.

In their prosocial classroom model, Jennings and Greenberg (2009) proposed that teachers' social and emotional competence and well-being enables them to create healthy teacher–child relationships, conduct effective classroom management, and implement social-emotional learning in the classroom. This way, they noted, a teacher creates a positive classroom climate that enhances children's social, emotional, and academic outcomes. Thus, according to their prosocial classroom model, teachers' occupational well-being is reflected in their interactions with children, which again is reflected in children's outcomes, including their social competence. Based on this model, it is possible that teachers' work engagement as part of their occupational well-being is associated with the quality of teacher–child interactions and the average social competence of the children in the classroom. However, earlier research on the associations between teachers' work engagement and the quality of teacher–child interactions has been scarce and cross-sectional, and thus has not been able to examine directions of associations (e.g., Penttinen, Pakarinen, von Suchodoletz, & Lerkkanen, 2020). Directions of the associations between the quality of teacher–child interactions and children's social competence also remain somewhat unclear because most of the earlier studies have only examined if the quality of teacher-child interactions enhances children's social competence (e.g., Siekkinen et al., 2013). Recent research indicates

that the associations might be reciprocal – at least between emotional support and children's empathy (Pakarinen, Lerkkanen, & von Suchodoletz, 2020). Furthermore, although earlier research has shown that teachers' stress is associated with children's lower social competence (Herman, Hickmon-Rosa, & Reinke, 2018; Siekkinen et al., 2013), to date, it is not yet clear whether work engagement as a positive aspect of occupational well-being plays a role in children's social competence. Altogether, there is a limited amount of knowledge of the possible associations among the three domains of teacher–child interactions (emotional support, classroom organization, and instructional support), teachers' work engagement, and average social competence (prosocial and antisocial behavior) of children in the classrooms. To better understand how to support the development of children's social competence, this study aimed to explore reciprocal associations among the quality of teacher–child interactions, teachers' work engagement, and children's social competence over the course of first school year.

The quality of teacher–child interactions

In the present study, the quality of teacher–child interactions was conceptualized with the Teaching through Interactions (TTI) framework developed by Hamre et al. (2013). The focus of the TTI framework and,

hence, the present study, is at teacher-child interactions at the classroom-level, not at dyadic teacher-child relationships (i.e., relationships between teacher and individual children). The TTI framework is based on Bronfenbrenner & Morris's (2006) bioecological model, which suggests that regular interactions that children have, for example, with parents and teachers, are a central driver for their development (Hamre et al., 2013). Indeed, research has indicated that the quality of teacher-child interactions in the classroom is a critical indicator of the quality of education (Pianta, Downer, & Hamre, 2016, see also Burchinal, Vandergrift, Pianta, & Mashburn, 2010; Hu, Fan, Wu, LoCasale-Crouch, & Song, 2019). In TTI, interactions in the classroom are conceptualized under three domains: emotional support, classroom organization, and instructional support. The quality of these three domains can be assessed with an observational tool, the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2008).

The domain of *emotional support* has its roots in attachment theory (Ainsworth, Belehar, Waters, & Wall, 1978; Bowlby, 1969) and self-determination theory (Ryan & Deci, 2000; Skinner & Belmont, 1993), which underline the importance of sensitive and responsive interactions in supporting learning and motivation. According to the TTI framework, emotionally supportive teachers can create and maintain a positive climate in their classroom, they are sensitive to children's individual needs, and they consider children's perspectives. In these classrooms, children enjoy being with each other and with the teachers; they approach the teacher freely and express their ideas. The second domain, *classroom organization*, is grounded on earlier classroom management (see Emmer & Stough, 2001) and self-regulation skill research (e.g., Paris & Paris, 2001; Raver, 2004; Rimm-Kaufman et al., 2002). Teachers with high-quality classroom organization manage children's behavior and time efficiently and make the lessons interesting for the children. In well-organized classrooms, children behave well and are interested and involved in the activities and learning. The last domain, *instructional support*, is based on studies in cognitive and language development and in how adults can support this development with, for example, scaffolding (e.g., Catts, Fey, Zhang, & Tomblin, 1999; Skibbe, Behnke, & Justice, 2004). In instructionally supportive classrooms, teachers support children's learning in several ways: they give children specific feedback that is targeted on enhancing the learning, they use versatile language to support language development, and they ask open-ended questions such as "why" and "how" to encourage conversation and to support children's deeper understanding of concepts rather than memorizing facts. In these classrooms, children actively take part in conversations, and activities are related to their own experiences and lives.

Teachers' work engagement and the quality of teacher–child interactions

Teachers' occupational well-being has received growing interest in the field of educational research during the last decade (see Cumming, 2017). Research in occupational well-being has first focused on challenges in well-being such as stress and burnout whereas recent research has also noticed the positive aspects of well-being such as work engagement and job satisfaction (see e.g., Seppälä et al., 2009). However, the relation between teachers' occupational well-being and the quality of teacher–child interactions (e.g., Friedman-Krauss, Raver, Morris, & Jones, 2014; Hoglund, Klingle, & Hosan, 2015) and children's social competence (e.g., Herman et al., 2018; Siekkinen et al., 2013) has mainly been examined in terms of stress and burnout. Teachers' stress refers to negative emotions such as anxiety, frustration, and tension (Kyriacou, 2001) and its associations with the quality of teacher-child interactions (e.g., Jennings, 2015; Penttinen et al., 2020) and child outcomes (e.g., Siekkinen et al., 2013) have been negative. Since work engagement refers to positive emotions (see below), we expect that it has positive associations with the quality of teacher-child interactions and the average social competence of the children in the classroom.

Work engagement is characterized by three components: vigor, dedication, and absorption (Schaufeli, Salanova, González-romá, & Bakker, 2002). Teachers with a high level of vigor have a lot of energy and are ready to invest in their work. Highly dedicated teachers are proud of their work, consider it meaningful, and feel enthusiasm and inspiration while working. Finally, teachers with a high absorption are highly concentrated while working and might feel that "time flies" while working. Compared with those in other professions, teachers usually experience relatively high work engagement (Hakanen, Ropponen, Schaufeli, & De Witte, 2019). High work engagement can be considered favorable, as it is related to higher job satisfaction (Høigaard, Giske, & Sundsli, 2012; Klassen et al., 2012), lower levels of burnout (Høigaard et al., 2012), and lower intention to leave the profession (Høigaard et al., 2012; Skaalvik & Skaalvik, 2016).

Bakker and Demerouti (2008) introduced a model of work engagement, in which they proposed that people's performance at work is predicted by their work engagement, which is predicted by their resources. The first studies that examined the relation between work engagement and teaching performance reported teachers' work engagement as being positively associated with child-rated quality of instruction in secondary schools (Klusmann, Kunter, Trautwein, Lüdtke, & Baumert, 2008) and teachers' self-rated job performance among beginning teachers (Bakker & Bal, 2010). However, to date, there has been a limited amount of research conducted concerning the associations between teachers' work engagement and the observed quality of teacher–child interactions. In kindergarten classrooms, Penttinen et al. (2020) reported that teachers experiencing a high level of work engagement also provided high-quality instructional support. However, teachers' work engagement was not associated with the quality of emotional support or classroom organization. To the best of our knowledge, no research examining the relation between work engagement and the observed quality of teacher–child interactions in elementary school classrooms has been conducted. Moreover, the previous research conducted in kindergarten classrooms has been cross-sectional; thus, it is not clear if high-quality interactions with children enhance teachers' occupational well-being or vice versa. Therefore, in the present study, we examined also if the quality of teacher–child interactions is associated with teachers' level of work engagement.

Children's social competence and the quality of teacher–child interactions

Social competence can be defined as an ability to use a variety of skills in interactions with others to achieve meaningful goals in social groups (Waters & Sroufe, 1983). Sheridan and Walker (1999), and Merrell and Gimpel (1998) have suggested that these skills can be conceptualized under two separate aspects. The first aspect reflects the ability to learn context-appropriate social skills needed in social interaction whereas the second aspect reflects the ability to behave in a socially acceptable manner. When developing the Multisource Assessment of Social Competence Scale, Junttila, Voeten, Kaukiainen, and Vauras (2006) named the two aspects as prosocial behavior and antisocial behavior. The first aspect, prosocial behavior, refers to behaviors that people usually see as desirable and therefore encourage children to display (Junttila et al., 2006). These behaviors include cooperative behaviors (e.g., offering help, starting conversations, participating in group activities) and behaviors that show empathy (e.g., sensitive and accepting behaviors, showing, and communicating positive emotions). Thus, socially competent children have social skills that can be used to successfully interact with other people (Junttila et al., 2006; Merrell & Gimpel, 1998; Sheridan & Walker, 1999).

In contrast with prosocial behavior, antisocial behavior refers to behaviors that people usually see as undesirable (Junttila et al., 2006). These behaviors include impulsive behaviors (e.g., tantrums, getting easily irritated) and disruptive behaviors (e.g., teasing, quarreling, acting without thinking). Impulsive children have challenges in

restraining immediate responses, waiting, and planning (Baer & Nietzel, 1991) whereas disruptive children direct their disruptive behaviors at other people, often intentionally to annoy them (Kaplan, Gheen, & Midgley, 2002). Thus, socially competent children can inhibit impulsivity and disruptiveness (i.e., antisocial behavior) and behave in a way that is acceptable to other people (Junttila et al., 2006; Merrell & Gimpel, 1998; Sheridan & Walker, 1999).

When defining antisocial behavior, it is important to consider also externalizing behavior which shares some similarities with antisocial behavior. Externalizing behavior refers to variety of behaviors that are against social norms and/or are harmful to other people (Kauten & Barry, 2020). These behaviors include both hyperactive and aggressive behaviors (Hinshaw, 1987; Liu, 2004). Externalizing behavior is sometimes used as a synonym for antisocial behavior (Hinshaw, 1987; Liu, 2004) but as Liu (2004) states, there are distinctions between the two concepts. For example, externalizing behavior includes hyperactive behaviors but not all hyperactive children are antisocial (see Liu, 2004). Moreover, externalizing behavior can include behaviors such as substance use (Kauten & Barry, 2020) or delinquency (Liu, 2004) which are not part of antisocial behavior as defined above.

To conclude, children considered as highly socially competent display high levels of prosocial behavior in combination with low levels of antisocial behavior. A child with lower social competence can display either a mixture of prosocial and antisocial behaviors or a lack of prosocial behaviors and a presence of antisocial behaviors. Thus, it is also possible, that children display both high prosocial behavior and high antisocial behavior or low levels of both types of behavior (Junttila et al., 2006). Studies have highlighted the importance of children's social competence by showing its relationship with several positive outcomes. For example, in kindergarten, a link has been found between children's social competence and preliteracy skills (Pakarinen, Salminen, Lerkkanen, & von Suchodoletz, 2018), the number of friends, and the level of peer acceptance (Ladd, Birch, & Buhs, 1999). In elementary school, longitudinal studies have reported that children's social competence predicts their later academic skills (Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000; Legkauskas & Magelinskaitė-Legkauskienė, 2021), level of anxiety (Junttila, Vauras, Niemi, & Laakkonen, 2012; Legkauskas & Magelinskaitė-Legkauskienė, 2021), loneliness (Junttila et al., 2012), and peer preference (Caprara et al., 2000). Furthermore, children with high social competence in kindergarten are more likely to obtain a college degree and a full-time job in early adulthood and less likely to be engaged in criminal activity (Jones, Greenberg, & Crowley, 2015).

The role of teacher-child interactions in children's social competence has been examined rather notably in different educational settings. A meta-analysis by Perlman et al. (2016) showed that in preschool classrooms where the quality of instructional support was high, children's social competence was also high. However, the quality of emotional support or classroom organization was not related with children's social competence (Perlman et al., 2016). Similarly, in Finnish kindergarten classrooms where the quality of instructional support was high in fall, children displayed more empathy and less disruptiveness in spring (Siekkinen et al., 2013). In contrast, in a study by Broekhuizen et al. (2016), high-quality emotional support and classroom organization – but not instructional support – in prekindergarten and kindergarten classrooms predicted children's high social competence in first grade. Moreover, it has been shown in middle school data that high emotional support was associated with more prosocial behavior and high classroom organization with less aggression (Luckner & Pianta, 2011). However, there has been less research examining reciprocal associations or if children's social competence predicts the quality of teacher-child interactions. As an exception, one recent study reported a reciprocal link between kindergarteners' empathy and the quality of emotional support indicating that the quality of teacher-child interactions and children's social competence might be reciprocally associated. If there was high-quality emotional support in the classroom in fall, children

displayed more empathy in spring and vice versa: if children displayed more empathy in the classroom in fall, the quality of emotional support was higher in spring (Pakarinen et al., 2020). Furthermore, if there was more impulsivity in the classroom in fall, the quality of emotional support was lower in spring (Pakarinen et al., 2020).

To conclude, many studies have shown that high-quality emotional support (Broekhuizen et al., 2016; Pakarinen et al., 2020), classroom organization (Broekhuizen et al., 2016; Luckner & Pianta, 2011), and instructional support (Perlman et al., 2016; Siekkinen et al., 2013) are related with higher average social competence of the children in the classroom. However, only few studies have examined if children's social competence plays a role in teacher-child interactions and not all domains of teacher-child interactions have yet been examined reciprocally with social competence (see Pakarinen et al., 2020). For this reason, more research is needed to fully understand the dynamics between the quality of teacher-child interactions and average social competence of the children in the classroom.

Children's social competence and teachers' work engagement

Earlier research on the association between teachers' occupational well-being and children's social competence has focused on the role of teachers' stress in children's social competence. In Finnish kindergarten classrooms, children displayed more impulsivity and disruptiveness, less empathy, and lower cooperation skills if the teacher experienced higher stress (Siekkinen et al., 2013). Similarly, in US kindergarten to 4th grade classrooms, there was more disruptive behavior and less prosocial behavior in the classroom if the teacher experienced high levels of stress and burnout together with low levels of coping (Herman et al., 2018). In turn, research on the associations between teachers' work engagement and children's social competence remains limited. However, Jennings and Greenberg's (2009) prosocial classroom model suggests that teachers' social and emotional competence and well-being enhance their capability to provide high-quality interactions which support children's social, emotional, and academic skill development. At the same time, the model indicates that if teachers have challenges to their well-being, it may be difficult for them to respond to children's individual needs, be proactive, and manage child behavior, which is reflected in child outcomes such as child behavior in the classroom. Thus, based on this model, it is possible, that teachers' work engagement as one aspect of teachers' occupational well-being is associated with both the quality of teacher–child interactions and the average social competence of the children in the classroom.

Education system in Finland

The current study was conducted in Finland, where nine years of comprehensive school begin in the year when the child turns seven years old. Primary school is preceded by a one-year, free of charge, and mandatory kindergarten year, and followed by three years of secondary education in either upper secondary school or vocational school. Primary and secondary education in Finland is also free of charge. Elementary school teachers (grades 1–6) are required to have at least a master's degree in education, and an average class size in elementary school is 20 children (Organisation for Economic Co-operation and Development, 2018). Class sizes are not nationally regulated. In first grade, one school week consists of a minimum of 20 h of teaching. First grade teaching in Finland is focused on the development of children's academic, social, and motor skills (Finnish National Agency for Education, 2016). In terms of social competence, development of cooperating skills is important as children learn to work together in groups.

The aims of the present study

There has been a limited amount of research on the role of teachers' work engagement in the observed quality of teacher–child interactions

(with the exception of a cross-sectional study by Penttinen et al., 2020). Moreover, previous studies examining the associations between teacher–child interactions and children's social competence have mainly examined if the quality of teacher–child interactions enhance children's average social competence in the classrooms (e.g., Siekkinen et al., 2013) and less attention has been given to reciprocal associations (see Pakarinen et al., 2020). Finally, the associations between teachers' work engagement and children's social competence remain unstudied. Since little is known about the associations and direction of effect among the variables, this study examined reciprocal associations of the quality of teacher–child interactions, teachers' work engagement, and children's social competence between classrooms. More specifically, the following research question was investigated: *To what extent are the quality of teacher–child interactions (emotional support, classroom organization, and instructional support), teachers' level of work engagement, and average social competence (prosocial and antisocial behavior) of the children in the classrooms associated across grade 1?*

Moreover, the following hypotheses were set: First, based on the model of work engagement by Bakker and Demerouti (2008), we expected that teachers' level of work engagement is positively associated with subsequent quality of teacher-child interactions in the classrooms (Hypothesis 1). Second, because recent research has suggested that the quality of teacher-child interactions and children's social competence might be reciprocally associated (see Pakarinen et al., 2020), we assumed that the quality of teacher-child interactions is positively associated with subsequent social competence of the children in the classrooms (Hypothesis 2a) and that average social competence of the children in the classrooms is positively associated with subsequent quality of teacher-child interactions (Hypothesis 2b). Third, although earlier research has not examined the associations between teachers' work engagement and average social competence of the children in the classroom, based on the prosocial classroom model by Jennings and Greenberg (2009) and earlier research on the associations between teachers' stress and children's social competence (Siekkinen et al., 2013), we hypothesized that teachers' level of work engagement is positively associated with subsequent social competence of the children in the classrooms (Hypothesis 3).

Method

Participants and procedures

Participants of the present study were 51 first grade teachers and 815 children from their classrooms who were participating in a follow-up study (Lerkkanen & Pakarinen, 2016-2022) in the 2017–2018 school year. Participation in the study was voluntary, and teachers and children's guardians gave written consent for their or their child's participation. The ethical statement from the ethical committee of the university was received prior to commencing the study.

Before data collection, all 70 elementary schools in eight municipalities in Central Finland were contacted to ask permission from the principal to conduct the study in the school. All schools provided permission. Next, all 136 first grade teachers in the schools were contacted and invited to participate in the study. Finally, 54 teachers from 36 schools agreed to participate in the study. Number of participating classrooms per school varied between one and four and 88.5% of the children from the classrooms participated in the study based on guardians' consents. Participating schools were located in both rural and suburban areas. Because there was missing data from three of the participating 54 classrooms, only 51 classrooms were included in the analyses of the present study. The mean age of the participating teachers was 45 years ($SD = 8.85$, min. 27 years, max. 62 years), and their average work experience at schools was 16.54 years ($SD = 9.31$, min. 0.5 years, max. 39 years). All teachers were Finnish-speaking Caucasians and most of them (94.1%) were female.

In the participating classrooms, class sizes varied from seven to 25

($M = 19.25$, $SD = 4.40$). Children's (50.1% girls) mean age at the beginning of the school year was 7.19 years ($SD = 0.34$, min. 4.83 years, max. 9.28 years). The highest education of parents varied as follows: no vocational education (2.8%), vocational courses (min. 4 months; 1.2%), vocational school degree (33.1%), college-level training (7%), polytechnic degree (23.2%), university/college degree (22.8%), and licentiate or doctoral degree (4.3%). However, parental education information was available only for 67% of the participating children.

Data of the present study were collected twice during the first school year: in fall (2017; Time 1 [T1]) and spring (2018; Time 2 [T2]). Data consisted of video recordings from the classrooms, teacher questionnaires on their work engagement, and teacher ratings on children's social competence. Video recordings of the classes were collected to assess the quality of teacher–child interactions in the classroom. Video recordings were conducted during one regular school day, and three to four lessons were recorded in each classroom in fall (T1) and again in spring (T2). Similarly, the teacher questionnaires and their ratings on children's social competence were collected first in fall (T1) and again in spring (T2). Reliability information, that is, Cronbach's alphas for all measures, is presented in Table 2.

Measures

The quality of teacher–child interactions

The quality of teacher–child interactions was assessed with the Classroom Assessment Scoring System (CLASS K-3: Pianta et al., 2008). Validity of the CLASS in the Finnish data has been reported by Pakarinen et al. (2010). The measure has been widely used to measure the quality of teacher-child interactions in Finland (e.g., Pakarinen et al., 2020; Penttinen et al., 2020; Salminen, Pakarinen, Poikkeus, Laakso, & Lerkkanen, 2022; Siekkinen et al., 2013) and around the world (e.g., Canada: Hoglund et al., 2015; Chile: Leyva et al., 2015; China: Hu et al., 2019). CLASS conceptualizes teacher–child interactions under three domains: emotional support, classroom organization, and instructional support. Each of the domains consists of three to four dimensions, which again are measured with more specific behavior indicators. Indicators, dimensions, and domains are all described in the coding manual (Pianta et al., 2008), which guides the assessment of the quality of interactions. In the present study, approximately seven ($M = 6.82$, $SD = 1.18$, min. 5, max. 9) cycles per classroom in fall and approximately six ($M = 5.90$, $SD = 0.73$, min. 5, max. 8) cycles per classroom in spring were rated by six certified coders. The average length of one cycle was 18.5 min ($SD = 3.0$, min. 10.5., max. 26.5). The mean score of cycles for each domain at one time point was used in the analyses. To assess the inter-rater reliability of the CLASS ratings, 26% of the cycles were double coded, and the adjacent agreements and intraclass correlation coefficients (ICCs) for the ratings were calculated (see Table 1). Adjacent agreement refers to the percentage of ratings that are within one point of each other (Pianta et al., 2008). Developers of the CLASS measure (Pianta et al., 2008) use this measure to indicate sufficient inter-rater reliability of the ratings. In the present study, adjacent agreements varied from 77.2% to 100% (see Table 1). Thus, the level of adjacent agreement was acceptable for all ten dimensions at both timepoints (Pianta et al., 2008).

ICCs were calculated using two-way random effects model with absolute agreement (Landers, 2015). For most of the dimensions, ICCs indicated good (0.60–0.74) or excellent (0.75–1.00) reliability (Cicchetti & Sparrow, 1981; see Table 1). As exceptions, the level of agreement was fair for the ratings of Regard for student perspectives in the spring data and poor for spring ratings of Negative climate in the spring data. As ICC as a measure is subject to a variety of statistical assumptions (e.g., normality, stable variance), low ICC for negative climate might be caused by the nonnormality of the distribution and low variance in the ratings of this dimension. As shown in Table 1, adjacent agreement for the ratings of negative climate in spring was very and over 90% of the ratings were within one point of each other.

Table 1
Inter-rater reliabilities of the classroom assessment scoring system ratings.

	PC	NC	TS	RSP	BM	PR	ILF	CD	QF	LM
First grade fall										
Adjacent agreement	97.4%	100%	94.7%	93.4%	98.7%	97.4%	96.1%	96.1%	96.1%	97.4%
ICC	0.82	0.88	0.84	0.86	0.86	0.81	0.78	0.84	0.85	0.89
First grade spring						.				
Adjacent agreement	88.3%	93.2%	88.3%	77.7%	93.2%	94.2%	93.2%	87.4%	92.2%	91.3%
ICC	0.70	0.24	0.67	0.54	0.71	0.65	0.73	0.72	0.69	0.70

Note: PC = Positive climate; NC = Negative climate; TS = Teacher sensitivity; RSP = Regard for student perspectives; BM = Behavior management; PR = Productivity; ILF = Instructional learning formats; CD = Concept development; QF = Quality of feedback; LM = Language modeling; ICC = Intraclass correlation coefficient.

Teachers' work engagement

Teachers' work engagement was measured with the Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2002). Validity of the UWES measure in the Finnish data has been reported by Seppälä et al. (2009). The measure has been widely used in Finland (e.g., Hakanen, Bakker, & Schafeli, 2006; Penttinen et al., 2020; Vuorio, Suominen, Kautiainen, & Korhonen, 2019) and around the world (e.g., European countries: Hakanen et al., 2019; India: Kataria, Garg, & Rastogi, 2013; Serbia: Petrović, Vukelić, & Čizmić, 2017). UWES consists of nine items that the teachers answered on a scale from 1 (never) to 7 (daily). These items fall under three domains: vigor (e.g., "At my work, I feel bursting with energy"), dedication (e.g., "I am enthusiastic about my job"), and absorption (e.g., "I get carried away when I am working"). The mean score of the nine items was used in the analysis.

Children's social competence

Teachers rated children's social competence using the Multisource Assessment of Children's Social Competence Scale (MASCS; Junttila et al., 2006). Validity of the MASCS measure in the Finnish data has been reported by Junttila et al. (2006). The measure has been recently used to measure children's social competence for example in studies by Panula, Junttila, Aromaa, Rautava, and Räihä (2020), Pakarinen et al. (2020), and Salminen et al. (2022). MASCS consists of 15 items and four subscales: cooperating skills (5 items, e.g., "offers help to other children"), empathy (3 items, e.g., "is sensitive to the feelings of others"), impulsivity (3 items, e.g., "is easily irritated"), and disruptiveness (4 items, e. g., "bothers and annoys other children"). All 15 items were rated by teachers on a scale from 1 (never) to 4 (very frequently). Of the subscales, cooperating skills and empathy reflect prosocial behavior, whereas impulsivity and disruptiveness reflect antisocial behavior. Mean scores for prosocial behavior and antisocial behavior were used in the analysis.

Control variables

Teachers reported their work experience and class size on the questionnaire. Work experience and class size were controlled for in the analyses because earlier research has indicated that these teacher and classroom characteristics are related with the quality of teacher-child interactions (e.g., Friedman-Krauss et al., 2014; Slot, Lerkkanen, & Leseman, 2015). Children's gender was controlled for as previous studies have shown that girls' social competence is usually higher than boys' (e.g., Junttila et al., 2006; Pakarinen et al., 2018; Siekkinen et al., 2013).

Data analyses

First, as preliminary analysis, correlations among the variables were conducted with Mplus version 8 (Muthén & Muthén, 1998-2017) (see Table 2). Moreover, to investigate if there were differences among classrooms in children's social competence or gender, intraclass correlation coefficients (ICCs; see Table 2) were calculated. Third, to examine

to what extent are quality of teacher-child interactions, teachers' level of work engagement, and children's average social competence in classrooms associated across grade 1 fall (T1) and grade 1 spring (T2), multilevel models were conducted with Mplus. In the models, the social competence T1 scores were group-mean centered at the within-level. At the between-level, social competence at T1 was used as a classroom-mean averaged variable (cluster-mean). Multilevel modeling is an ideal analysis strategy for nested data because it enables the variance in the observed variables to be divided into the variation caused by the membership in a certain classroom (between-level variation) and variation due to individual children's differences, after taking into account classroom membership (within-level variation) (Hox, 2010).

At the between-level of the models (see schematic representation of the multilevel models, Fig. 1), stability and cross-lagged paths were estimated between the quality of teacher–child interactions, teacher's level of work engagement, and children's average social competence in the classroom at T1 and T2. All study variables were allowed to correlate with each other. Moreover, at the between-level of the models, teachers' work experience and class size were controlled for. However, these two between-level control variables were excluded from the final models due to model parsimony. Excluding the between-level control variables from the final models did not influence the results.

At the individual level of the models (within-level), group-mean centered social competence at T1 predicted social competence at T2. Social competence at T1 was predicted by gender. Multilevel-models were conducted separately for the three domains of teacher–child interactions (i.e., emotional support, classroom organization, and instructional support) and two domains of children's social competence (i.e., prosocial and antisocial behavior) because both the three CLASS domains and two MASCS domains were highly correlated. Consequently, six models were conducted (Figs. 2–7). Goodness-of-fit for the models was evaluated with a χ^2 test, comparative fit index (CFI), Tucker Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). Model fits for the investigated models are presented in Table 3.

Results

Descriptive results, correlations among the study variables, and intraclass correlation coefficients (ICCs) are shown in Table 2. ICCs were estimated using the classroom as a cluster variable. ICCs were statistically significant for both dimensions of children's social competence (i. e., prosocial, and antisocial behavior) at both time points (i.e., first grade fall and first grade spring), indicating that there was statistically significant variation in children's social competence among classrooms. ICC for children's gender was not statistically significant, indicating that there was no statistically significant variation in children's gender among the classrooms. Consequently, children's gender was treated as a within-level variable (variation only within classrooms) in further analysis, whereas children's social competence was treated as both a within- and between-level variable.

Table 2

Descriptive statistics and bivariate correlations between study variables (within-level correlations below the diagonal and between-level correlations above the diagonal).

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
First grade fall															
1. Emotional sup. T1	1	0.72***	0.54***	0.41***	0.51***	−0.08	0.70***	0.43**	0.43**	0.35**	0.46**	−0.17	–	0.08	−0.28*
2. Classroom org. T1	–	1	0.46***	0.43***	0.46***	0.06	0.56***	0.57***	0.40**	0.35**	0.49**	−0.02	–	0.03	−0.06
3. Instructional sup. T1	–	–	1	0.18	0.29†	−0.25†	0.26*	0.16	0.45***	0.10	0.40**	−0.41**	–	0.20	−0.21
4. Work engag. T1	–	–	–	1	0.40**	−0.22	0.46***	0.47***	0.34**	0.64***	0.29†	−0.30	–	0.19	−0.05
5. Prosocial beh. T1	–	–	–	–	1	−0.10	0.58***	0.48***	0.37**	0.51***	0.65***	−0.17	–	0.23	−0.23
6. Antisocial beh. T1	–	–	–	–	−0.32***	1	−0.13	−0.20	−0.23†	−0.19	0.03	0.82***	–	−0.35*	−0.06
First grade spring															
7. Emotional sup. T2	–	–	–	–	0.75***	−0.36***	1	0.73***	0.51***	0.45***	0.39**	−0.27†	–	0.08	−0.25*
8. Classroom org. T2	–	–	–	–	–	–	–	1	0.52***	0.42***	0.38**	−0.18	–	0.05	−0.08
9. Instructional sup. T2	–	–	–	–	–	–	–	–	1	0.23**	0.23†	−0.28*	–	0.10	0.14
10. Work engag. T2	–	–	–	–	–	–	–	–	–	1	0.11	−0.09	–	0.01	−0.24†
11. Prosocial beh. T2	–	–	–	–	0.75***	−0.36***	–	–	–	–	1	−0.11	–	0.08	−0.31†
12. Antisocial beh. T2	–	–	–	–	−0.26***	0.84***	–	–	–	–	−0.42***	1	–	−0.42*	0.03
Control variables															
13. Child gender[1]	–	–	–	–	−0.16**	0.29***	–	–	–	–	−0.19***	0.28***	1	–	–
14. Class size	–	–	–	–	–	–	–	–	–	–	–	–	–	1	−0.06
15. Work experience	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Descriptive statistics															
Mean	5.42	5.62	2.55	6.08	3.04	1.64	5.36	5.68	2.60	6.16	3.02	1.70	1.50	19.25	16.54
Std. deviation	0.46	0.45	0.44	0.75	0.30	0.33	0.40	0.43	0.46	0.83	0.26	0.34	0.50	4.39	9.31
Minimum	4.14	4.15	1.78	4.13	2.13	1.07	4.38	4.44	1.87	2.67	2.28	1.09	1	7	0.5
Maximum	6.40	6.47	3.53	7.00	3.65	2.58	6.20	6.50	3.73	7.00	3.53	2.83	2	25	39
α	0.79	0.74	0.82	0.87	0.89	0.92	0.74	0.75	0.79	0.93	0.88	0.92	–	–	–
ICC[2]	–	–	–	–	0.24***	0.18***	–	–	–	–	0.18***	0.13***	0.00	–	–

Note: T1 = first grade fall, T2 = first grade spring; N = 51; ***p < .001, **p < .01, *p < .05; †p < .10; [1]Child gender: 1 = female, 2 = male; [2]Intraclass correlation coefficients.

The quality of emotional support

The results first showed that at the between-level of the model 1, quality of emotional support, teachers' work engagement, and children's prosocial behavior were associated with their preceding values (Fig. 2: Model 1). Moreover, average prosocial behavior of the children in the classroom in fall was marginally significantly associated with the quality of emotional support, and statistically significantly associated with the level of teachers' work engagement in spring. Thus, if children displayed more prosocial behavior in the classroom at the beginning of grade 1, there was a higher quality of emotional support in the classroom at the end of grade 1, although the association was rather small. Furthermore, if there was more prosocial behavior in the classroom in fall, teachers reported higher levels of work engagement in spring. At the within-level of the model, children's prosocial behavior at the beginning of grade 1 was positively associated with their prosocial behavior at the end of grade 1, and girls displayed more prosocial behavior than boys.

Results further showed that at the between-level of model 2, average antisocial behavior of the children in the classroom was stable across grade 1 (Fig. 3: Model 2). Moreover, teachers' work engagement was associated with the subsequent quality of emotional support; if teachers reported higher work engagement in fall, the observed quality of emotional support in the classroom was higher in spring. At the within-level of the model, children's antisocial behavior in fall was associated with their antisocial behavior in spring. Moreover, boys displayed more antisocial behavior than girls.

The quality of classroom organization

Results showed that at the between-level of model 3, classroom organization was stable across grade 1 (Fig. 4: Model 3). Moreover, teachers' work engagement was positively associated with subsequent quality of classroom organization. Thus, if teachers reported higher work engagement in the fall, the quality of classroom organization in the classroom was higher in the spring. Furthermore, classroom organization was positively related to subsequent prosocial behavior of the children in the classroom, albeit marginally significantly. Thus, if the quality of classroom organization in the classroom was higher in fall, there was on average more prosocial behavior in the classroom in spring, although the association was rather small.

The results further showed that teachers' work engagement was negatively associated with subsequent antisocial behavior of the children in the classroom (Fig. 5: Model 4). Thus, if teachers reported higher work engagement in the fall, there was on average less antisocial behavior in the classroom in spring.

The quality of instructional support

Instructional support showed stability across the school year (Fig. 6: Model 5). Moreover, there was a reciprocal association between the quality of instructional support and children's prosocial behavior; First, instructional support was positively and statistically significantly associated with subsequent prosocial behavior of the children in the classroom. Thus, in classrooms where the quality of instructional support was higher in fall, children displayed on average more prosocial behavior in spring. Second, average prosocial behavior of the children in the classroom in fall was positively associated with subsequent quality of instructional support in spring. Thus, in classrooms where children displayed on average more prosocial behavior in the fall, the quality of instructional support was higher in spring.

Finally, the results showed that the quality of instructional support was negatively associated with subsequent antisocial behavior of the children in the classroom (Fig. 7: Model 6). Thus, if the quality of instructional support was higher in fall, there was on average less antisocial behavior in the classroom in spring. Moreover, teachers' work engagement was positively associated with subsequent instructional
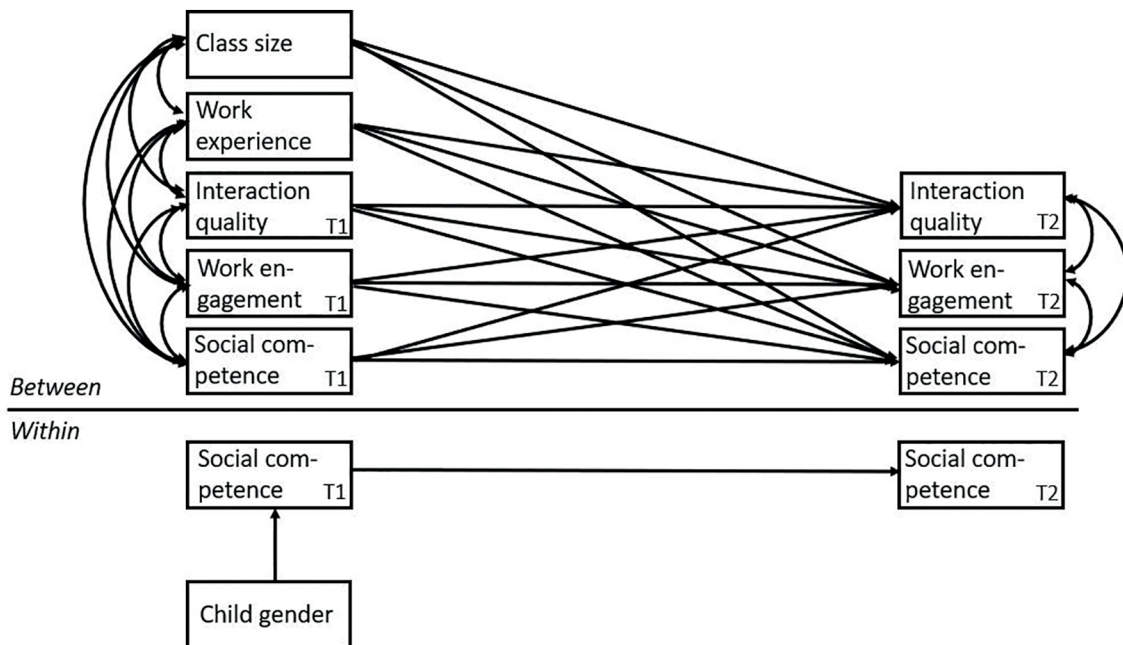
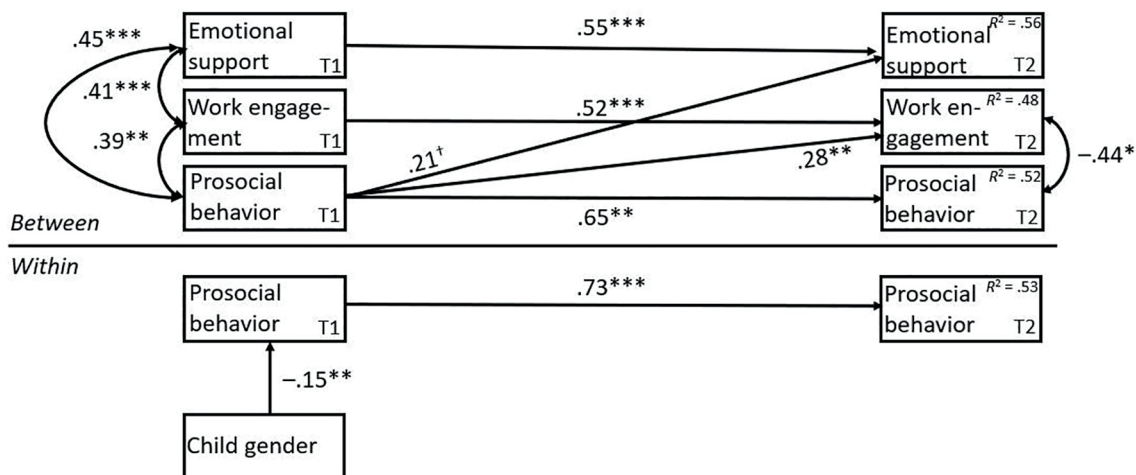**Fig. 1.** Schematic Representation of the Models. Note: T1 = first grade fall; T2 = first grade spring

Fig. 2. Model 1: Emotional Support, Work Engagement, and Prosocial Behavior. Note: T1 = first grade fall; T2 = first grade spring; $^{\dagger}p<.10$, $^*p<.05$, $^{**}p<.01$, $^{***}p<.001$. Non-significant associations were estimated but not displayed due to reasons of model clarity. T1 social competence at the within-level was group-mean centered, and at the between-level, the mean of children's social competence in the classroom was used (cluster-mean).

support; if the teacher reported higher work engagement in fall, the quality of instructional support in the classroom was higher in spring.

Discussion

The aim of this study was to examine reciprocal associations among the quality of teacher–child interactions, teachers' level of work engagement, and average social competence of the children in the classroom during first grade. The results showed reciprocal associations between the quality of instructional support and children's average prosocial behavior in the classrooms. Other associations were in one direction: Teachers' work engagement was positively associated with subsequent quality of teacher–child interactions (emotional support, classroom organization, and instructional support). Children's average prosocial behavior in the classroom was positively associated with subsequent quality of emotional support whereas the quality of

classroom organization was positively associated with subsequent prosocial behavior in the classroom. However, these two associations were rather small and therefore only marginally significant. Finally, teachers' high levels of work engagement in fall were associated with less antisocial behavior in the classrooms in spring whereas children's average prosocial behavior in the classroom in fall was associated with higher work engagement for teachers in spring. Together these results reveal new information on the diverse associations among teacher-child interactions, teachers' occupational well-being, and children's prosocial and antisocial behaviors in first grade classrooms.

The role of work engagement in the quality of teacher–child interactions

As hypothesized (Hypothesis 1) based on the model of work engagement (Bakker & Demerouti, 2008), teachers' work engagement was positively associated with subsequent quality of teacher–child

Fig. 3. Model 2: Emotional Support, Work Engagement and Antisocial Behavior. Note: T1 = first grade fall; T2 = first grade spring; †*p*<.10, **p*<.05, **p<.01, ***p<.001. Non-significant associations were estimated but not displayed due to reasons of model clarity. T1 social competence at the within-level was group-mean centered, and at the between-level, the mean of children's social competence in the classroom was used (cluster-mean).
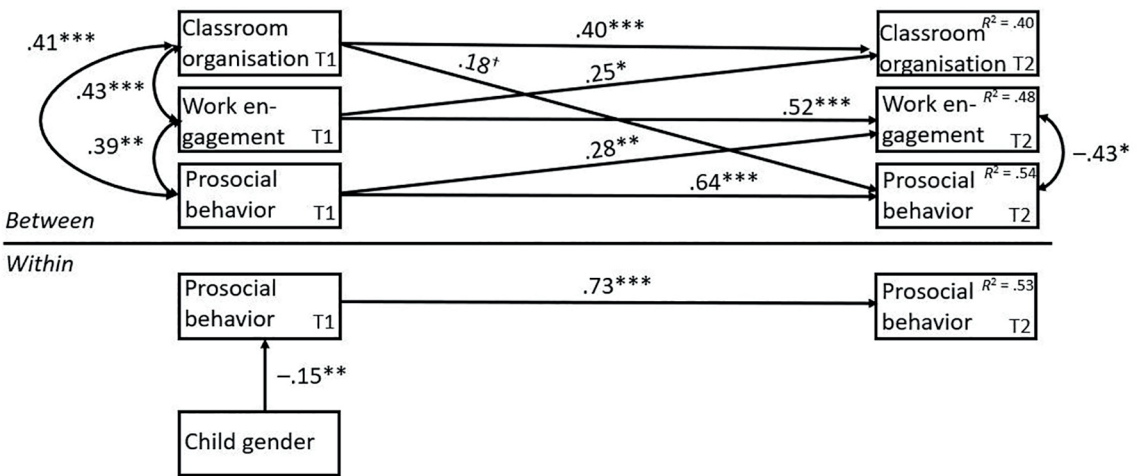
Fig. 4. Model 3: Classroom Organization, Work Engagement, and Prosocial Behavior. Note: T1 = first grade fall; T2 = first grade spring; †*p*<.10, **p*<.05, **p<.01, ***p<.001. Non-significant associations were estimated but not displayed due to reasons of model clarity. T1 social competence at the within-level was group-mean centered, and at the between-level, the mean of children's social competence in the classroom was used (cluster-mean).

interactions. Associations between observed quality of teacher–child interactions and teachers' work engagement have been studied earlier only cross-sectionally (see Penttinen et al., 2020). Thus, the results of the present study expand our understanding of the role of teachers' work engagement in the quality of teacher–child interactions by showing that teachers' work engagement at the beginning of grade 1 is related with the quality of emotional support, classroom organization, and instructional support at the end of grade 1.

When teachers experience high work engagement, they have energy to work, they find their job as being meaningful, and it is easy for them to concentrate on their work (Schaufeli et al., 2002). This enjoyment and dedication might be reflected in teachers' motivation to perform in their job as well as possible (see Bakker & Demerouti, 2008). The present study further suggests that the energy, dedication, and concentration that teachers feel when experiencing work engagement can be seen in all three domains of teacher-child interactions: in the warm and supportive interactions (emotional support), in proactive behavior management and efficient time management (classroom organization), and in high-quality instructions, conversations, and feedback (instructional support). Altogether, the results of this study, together with the earlier results (Penttinen et al., 2020) and theoretical models (Bakker &

Demerouti, 2008; Jennings & Greenberg, 2009), highlight the importance of teachers' occupational well-being in the quality of teacher–child interactions.

The interplay between social competence and the quality of teacher–child interactions

The results of the present study supported the Hypothesis 2a and 2b by showing that there were reciprocal associations between the quality of instructional support and average prosocial behavior of the children in the classroom. More precisely, the results indicated that in line with Hypothesis 2a, the quality of instructional support was associated with subsequent prosocial and antisocial behaviors in the classroom; if there was high-quality instructional support evident in the classroom in fall, children showed on average more prosocial behavior and less antisocial behavior in the classroom in spring. Moreover, in line with the Hypothesis 2b, in classrooms where children displayed more prosocial behavior in fall, the quality of instructional support was higher in spring. Associations between the remaining two domains of teacher-child interactions and children's social competence were not reciprocal but the direction of the association was different for emotional support and
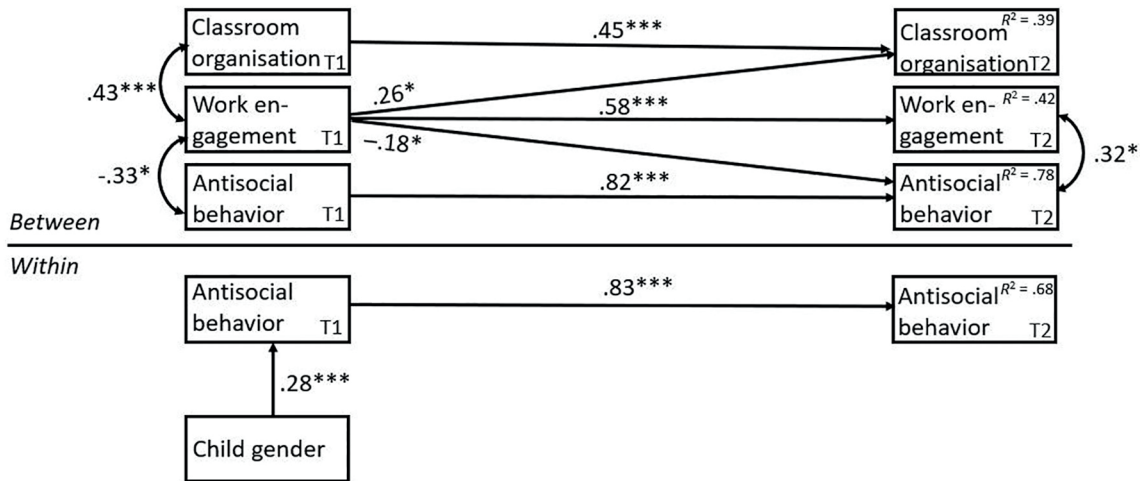
Fig. 5. Model 4: Classroom Organization, Work Engagement, and Antisocial Behavior. Note: T1 = first grade fall; T2 = first grade spring; †p<.10, *p<.05, **p<.01, ***p<.001. Non-significant associations were estimated but not displayed due to reasons of model clarity. T1 social competence at the within-level was group-mean centered, and at the between-level, the mean of children's social competence in the classroom was used (cluster-mean).

Fig. 6. Model 5: Instructional Support, Work Engagement, and Prosocial Behavior. Note: T1 = first grade fall; T2 = first grade spring; †p<.10, *p<.05, **p<.01, ***p<.001. Non-significant associations were estimated but not displayed due to reasons of model clarity. T1 social competence at the within-level was group-mean centered, and at the between-level, the mean of children's social competence in the classroom was used (cluster-mean).
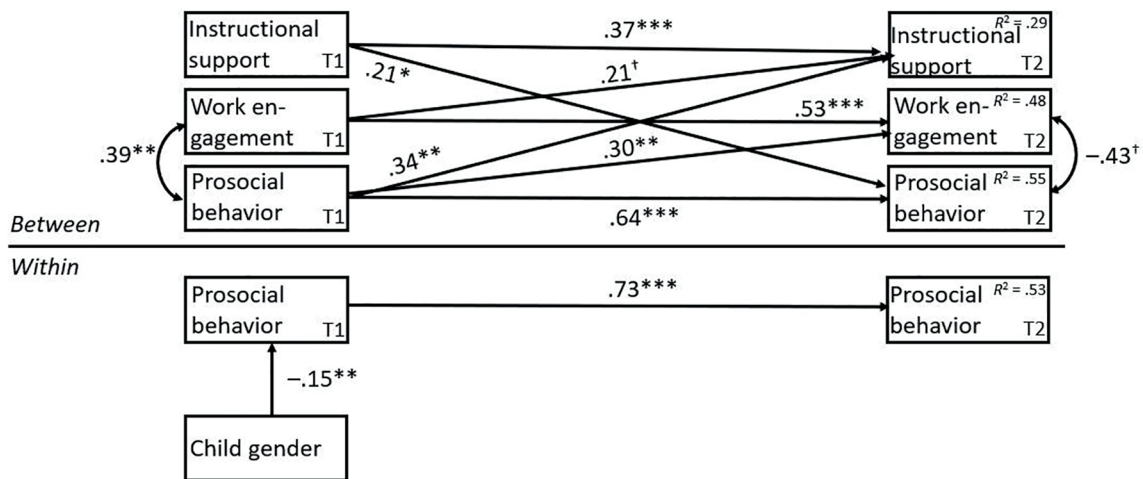
classroom organization; Children's average prosocial behavior in the classroom in the fall was associated with the quality of emotional support in the spring, whereas the quality of classroom organization in fall was associated with children's average prosocial behavior in the classroom in spring. These last two associations were only marginally significant, however, indicating that these results should be interpreted with caution.

Although previous studies indicated that emotional support (Broekhuizen et al., 2016; Luckner & Pianta, 2011; Pakarinen et al., 2020) and classroom organization (Broekhuizen et al., 2016; Luckner & Pianta, 2011) can support children's social competence, Siekkinen et al. (2013) also reported a positive association between high-quality instructional support and children's social competence in kindergarten. Thus, it seems that instructional support is not only important for the development of children's academic skills (e.g., see Burchinal et al., 2010; Cash, Ansari, Grimm, & Pianta, 2019; Mashburn et al., 2008) but might also contribute to children's social competence (see also Downer, Sabol, & Hamre, 2010; Salminen et al., 2022). When the quality of instructional support is high in first-grade classroom, teacher has versatile conversations with children, encourages them, gives feedback that supports

learning, and tasks that are tied into children's own experiences (Pianta e al., 2008). It might be that with this kind of support, teacher similarly promote the development of children's cooperation skills and empathy (i.e., prosocial behavior). It might also be that children display less impulsivity and disruptiveness (i.e., antisocial behavior) when they are engaged in interesting conversations and meaningful tasks.

The results of the present study further indicated that not only high-quality teacher–child interactions were associated with subsequent social competence of the children in the classroom but also the other way around. Similarly, children's empathy, one of the two subscales of prosocial behavior, was positively associated with subsequent quality of emotional support in a recent study from kindergarten classrooms (Pakarinen et al., 2020). Thus, it seems that children's prosocial behavior is not only associated with children's academic skill development (e.g., see Caprara et al., 2000) or lower risk for loneliness (Junttila et al., 2012), but it can also be reflected in the quality of emotional and instructional support in the classroom.

When children display prosocial behavior, they offer help, participate in group activities, start conversations with other children, are sensitive to others' feelings, and show acceptance of other children
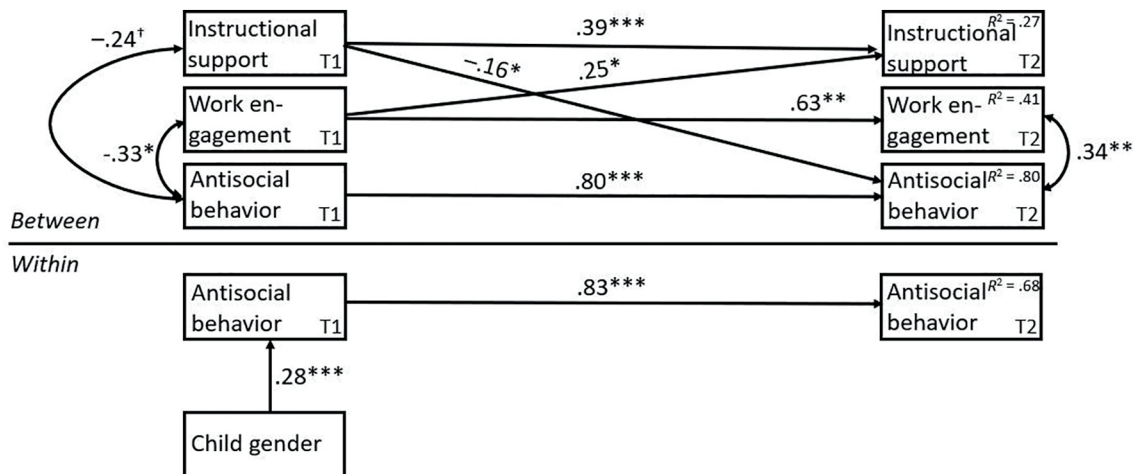
Fig. 7. Model 6: Instructional Support, Work Engagement, and Antisocial Behavior. Note: T1 = first grade fall; T2 = first grade spring; [†]$p<.10$, *$p<.05$, **$p<.01$, ***$p<.001$. Non-significant associations were estimated but not displayed due to reasons of model clarity. T1 social competence at the within-level was group-mean centered, and at the between-level, the mean of children's social competence in the classroom was used (cluster-mean).

Table 3
Model fit indices for the investigated models.

	$\chi2$	df	p-value	CFI	TLI	RMSEA	SRMR$_{between}$	SRMR$_{within}$
Model 1	5.13	1	0.024	0.993	0.874	0.071	0.006	0.026
Model 2	2.56	1	0.109	0.998	0.970	0.044	0.003	0.015
Model 3	5.18	1	0.023	0.993	0.866	0.072	0.006	0.027
Model 4	2.47	1	0.116	0.998	0.971	0.042	0.003	0.014
Model 5	4.99	1	0.025	0.993	0.874	0.070	0.006	0.026
Model 6	2.46	1	0.117	0.998	0.972	0.042	0.003	0.014

Note: CFI = Comparative fit index; TLI = Tucker Lewis index: RMSEA = Root mean square error of approximation; SRMR = Standardized root mean square residual.

(Junttila et al., 2006). It might be that this kind of behavior enhances the positive climate and sensitivity in the classroom (emotional support) and makes it easier to have frequent conversations and focus on promoting learning (instructional support). Overall, it might be easier for the teacher to work and interact in classrooms where children display prosocial behavior. Earlier research has supported this assumption by showing that child behavior plays a role in teacher–child relationships (for a review, see Nurmi, 2012). However, it should be noted that so far, it has not been common to examine reciprocal connections between the quality of teacher–child interactions and children's social competence, and most earlier studies have only examined how teacher–child interactions are reflected in social competence (see Broekhuizen et al., 2016; Luckner & Pianta, 2011; Siekkinen et al., 2013). The results of the present study contributed to the literature by showing that not only is the quality of teacher–child interactions associated with children's subsequent social competence in the classroom but also vice versa.

Associations between teachers' work engagement and children's social competence

To the best of our knowledge, this study is among the first attempts to examine the associations between teachers' work engagement and children's social competence, and thus, it provides new information on the interplay between teachers' occupational well-being and average social competence of the children in the classrooms. In line with Hypothesis 3, the results first showed that teachers' work engagement was positively associated with children's subsequent social competence; In classrooms where teachers reported high work engagement in fall, there was on average less antisocial behavior in the spring. Thus, if the teacher is enthusiastic and dedicated, children in the classroom have, for example, fewer tantrums, are not easily irritated, do not argue with other children, or tease or annoy their peers. This result supplements

earlier research which has shown associations between teachers' low occupational well-being (i.e., stress) and children's antisocial (Siekkinen et al., 2013) and disruptive behavior (Herman et al., 2018). Together, these results suggest that teachers' occupational well-being might contribute to the average social competence of the children in the classroom. For this reason, it is important to support teachers' occupational well-being and work engagement at school.

In contrast with the Hypothesis 3, children's social competence was also associated with teachers' subsequent work engagement. The results showed that in classrooms where there was more prosocial behavior in fall, teachers reported higher work engagement in spring. Thus, it appears that children's behavior in the classroom is also important for teachers' work engagement. It might be that when children display socially desirable behaviors such as helping others and showing empathy, working with children is more enjoyable for the teacher, and thus, they report higher work engagement. This result further confirms that children's prosocial behavior is not only beneficial for themselves (e.g., see Caprara et al., 2000; Jones et al., 2015; Junttila et al., 2012), but also for the teacher enjoyment and engagement in work. For this reason, it is important to support the development of children's social competence throughout their school years.

Practical implications

The results of the present study indicate that it is important to support teachers' work engagement, as it seems to be reflected in the quality of teacher–child interactions in first grade classrooms. In their study, Bakker, Hakanen, Demerouti, and Xanthopoulou (2007) showed that supervisor support, innovativeness, appreciation for one's work, and a positive organizational climate are important job resources that can help teachers to cope with child misbehavior and thus maintain high work engagement. Moreover, results of the current study highlight the

importance of supporting children's social competence as the average prosocial behavior of the children in the classroom seems to be reflected in the quality of instructional support, and in teachers' level of work engagement. Results further suggest that children's social competence can be supported with high-quality instructional support. Thus, it could be useful to provide teachers with opportunities to learn more about how to provide high-quality instructional support in their classrooms. One possibility for this are video-based professional development programs that have been shown to increase teacher–child interaction quality (e.g., Pianta, Mashburn, Downer, Hamre, & Justice, 2008).

Limitations and future directions

This study has some limitations that need to be acknowledged when interpreting the results. First, the sample size of the study at the classroom level was rather small, and there were only two time points in the study. Small sample size might lead to inaccurate and unstable estimation of the parameters and sometimes inflated values for goodness-of-fit indices (e.g., Muthén & Muthén, 2002). Moreover, although we had a cross-lagged design, more than two time points are needed to make causal inferences. In the future, the study design should be replicated with a larger sample size and more time points across several school years. Second, inter-rater reliability in terms of ICC was rather low for the negative climate dimension of teacher-child interactions at time-point 2. Since ICC is subject to a variety of statistical assumptions such as normality and stable variance, low ICC might be due to the non-normality and low variance in negative climate ratings. According to the adjacent agreement (i.e., agreement within one point), raters agreed highly on their negative climate scores. Third, work engagement was the only assessed indicator of teachers' occupational well-being. In future studies, using several indicators, including positive and negative aspects of occupational well-being, would provide a wider perspective on teachers' occupational well-being and its associations with teacher–child interactions and children's social competence. Fourth, although the MASCS measure (Junttila et al., 2006) has been developed to be used by teachers, parents, peers, and children themselves, children's social competence was only rated by teachers. For this reason, we recommend that in the future, researchers collect assessments from multiple sources to produce a more nuanced and comprehensive picture of children's social competence. Fifth, there was missing information concerning parents' education, which makes it difficult to draw any conclusions in terms of children's socioeconomic background. Finally, in the data analyses, only associations between classrooms were examined whereas differences between individuals in terms of associations remained unexamined, except for the stability of children's social competence during the school year and the association between children's social competence and gender which were examined also at the individual level. In the future, more research about the interindividual differences is needed to gain deeper understanding of the factors that are associated with children's social competence.

Conclusion

This study revealed new results on the interplay of teacher–child interactions, teachers' work engagement, and children's social competence in first grade classrooms. It expands earlier literature by showing that not only is the quality of instructional support positively associated with subsequent social competence of the children in the classroom, but the average prosocial behavior in the classroom is also associated with the subsequent quality of instructional support. Moreover, the study is among the first openings on the associations between teachers' work engagement and children's social competence. The results showed that the average prosocial behavior in the classroom is positively associated with teachers' subsequent work engagement. Furthermore, children display on average less antisocial behavior in classrooms where teacher experienced higher work engagement. Finally, the study expanded

earlier cross-sectional research by showing that teachers' level of work engagement is positively associated with the subsequent quality of all three domains of teacher–child interactions. These results highlight the importance of teachers' occupational well-being and high-quality teacher–child interactions for children's social competence as well as the role of children's social competence in teachers' work engagement and the quality of teacher–child interactions.

CRediT authorship contribution statement

Viola Soininen: Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing. **Eija Pakarinen:** Conceptualization, Methodology, Writing – review & editing. **Marja-Kristiina Lerkkanen:** Conceptualization, Methodology, Writing – review & editing.

Declaration of Competing Interest

None.

Data availability

The data that has been used is confidential.

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