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Author(s): Penttinen, Viola; Pakarinen, Eija; Suchodoletz, Antje von; Lerkkanen, Marja-Kristiina

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**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, Klinge, & 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, & Sundslid, 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 (Lerikkanen & 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: $\chi^2 = ns$ ($p > .05$), 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 Høglund 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 (L'hopital, 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.
<i>Kindergarten fall</i>											
1. Emotional support T1											
2. Classroom organization T1	.65***										
3. Instructional support T1	.56***	.64***									
4. Teaching-related stress T1	-.30*	-.23	-.14								
<i>Kindergarten spring</i>											
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			
<i>Control variables</i>											
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	
<hr/>											
<i>Descriptive statistics</i>											
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. ^aWork 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	<i>df</i>	<i>p</i> -value	CFI	RMSEA	SRMR	Comparison	Δ S-B	χ^2	Δ <i>df</i>	<i>p</i> -value	Δ CFI
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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