Direct and indirect effects of Key2Teach on teachers' sense of self-efficacy and emotional exhaustion, a randomized controlled trial.

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HIGHLIGHTS

- Self-efficacy for instructional strategies increased as a result of Key2Teach.
- Emotional exhaustion decreased five months after finishing Key2Teach.
- Effect of Key2Teach on emotional exhaustion was not mediated through self-efficacy.
- Indirect effects were seen for two domains of self-efficacy through closeness.
- Effect of Key2Teach on emotional exhaustion was not mediated through closeness.

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ABSTRACT

The effects of Key2Teach on teachers' sense of self-efficacy and emotional exhaustion related to students with externalizing problem behaviour were investigated using an RCT-design. 103 teachers were randomly assigned to an intervention or control condition and followed during a school-year. Data were collected at three time-points. Self-efficacy for instructional strategies improved at post-test and emotional exhaustion decreased at follow-up as a result of Key2Teach. Self-efficacy did not mediate the effect on emotional exhaustion. The effect of Key2Teach on self-efficacy concerning student engagement and classroom management was mediated by an increase in closeness. Implications for research and practice are discussed.

1. Introduction

Experienced and effective teachers are important for optimal academic and social development of students. Promoting teachers' skills and competencies and retaining experienced teachers within the profession is therefore considered of importance in many western countries, to such an extent that the European Union has prioritized teacher training and teacher education in its educational policy (ET 2020; Council of the European Union, 2009). However, teaching can be challenging and many teachers experience overload in their daily work (Day & Hong, 2016; Evers, Tomic, & Brouwers, 2004). One of the main reasons for such overload and the related turnover in the educational profession, is that teachers find it difficult to interact with students with externalizing problem behaviours (Aloe, Shisler, Norris, Nickerson, & Rinker, 2014; Mashburn, Hamre, Downer, & Pianta, 2006; Spilt, Koomen, & Thijs, 2011; Tsouloupas, Carson, Matthews, Grawitch, & Barber, 2010; Yoon, 2002). The conflictual relationships that develop in

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interaction with students with externalizing problem behaviour may cause reduced feelings of competence and provoke emotional exhaustion in teachers (Evers, Brouwers, & Tomic, 2002; Spilt et al., 2011; Van Droogenbroeck, Spruyt, & Vanroelen, 2014). This study investigates to what extent the teacher-focused coaching intervention Key2Teach, which has previously been shown to improve teacher's relationship with students who show externalizing behaviours, positively impacts teachers' sense of self-efficacy and emotional exhaustion. This may highlight a possible avenue towards reducing the work-related stressors that teachers encounter on a daily basis.

1.1. Theoretical background: effects of externalizing problem behaviour

Research from the Health Behaviour and School Aged Children study in the Netherlands shows that nearly one in four of the Dutch primary school students exhibit externalizing problem behaviour, which include conduct problems, aggressive behaviour and hyperactivity problems (Goodman, 2001; Looze et al., 2014). Such behaviour can consist of distractibility, hyperactivity, disobedience and hostile aggression (Tsouloupas et al., 2010). Dealing with externalizing problem behaviour is difficult for teachers (Harrison, Vannest, Davis, & Reynolds, 2012; Kaakinen, 2017). Not only has such externalizing problem behaviour been related to academic underachievement and peer victimization (Lier et al., 2012), research also suggests that such problems pose a significant threat to teachers' occupational wellbeing.

A meta-analysis of Aloe et al. (2014) indicates a significant relationship between student externalizing problem behaviour and teachers' symptoms of burnout. Based on the Job Demand-Resources Model, symptoms of burnout can be the result of an imbalance between job demands and job resources (Hakanen, Bakker, & Schaufeli, 2006). The experience of having insufficient emotional resources in social interactions, which obstructs professionals to be fully present, is the main characteristic of burnout, a work-related phenomenon (Maslach & Jackson, 1981; Taris, Van Horn, & Schaufeli, 2004). Such emotional exhaustion is the driving force in predicting job dissatisfaction (Martin, Sass, & Schmitt, 2012). Research has shown that teachers are more prone to burnout compared to other professions (Hooftman et al., 2016). The externalizing problem behaviour of students can be considered a serious job demand when teachers do not experience enough support. Their daily interactions with students with externalizing problem behaviour put teachers at risk for developing such burnout problems (Aloe et al., 2014).

In addition, externalizing problem behaviour in students can challenge teacher's sense of self-efficacy (Doumen et al., 2008; Gastaldi, Pasta, Longobardi, Prino, & Quaglia, 2014; Spilt et al., 2011). Based on the social-cognitive theory, teachers' sense of self-efficacy is the perception of teachers of their own capacity to stimulate learning and engagement of students, even among difficult or unmotivated students (Bandura, 1997; Tschannen-Moran & Woolfolk Hoy, 2001). Teachers' perceptions of their own competency have long been considered an important cognitive resource for teachers to handle the challenges of daily interactions, and contribute to their performances as well as their well-being (Bandura, 1997). Feelings of self-efficacy help teachers to motivate students, to involve them in the classroom and to manage students' disruptive behaviour (Dunn & Rakes, 2011), thereby promoting students' academic development. These outcomes resonate well with the social-cognitive view that self-efficacy is a potent force in affecting the motivational, affective, cognitive and selective processes needed for desired goals to be realized (Bandura, 1997). In their research Tschannen-Moran and Woolfolk Hoy (2001) distinguish three relevant dimensions related to teachers' self-efficacy, namely instructional strategies, classroom management and student engagement. The dimension of instructional strategies captures teachers' capacity in using various instructional methods. The dimension of student engagement measures the extent to which teachers feel able to activate students' interest in their schoolwork. In addition to instructional strategies, the dimension of classroom management maps teachers' ability to organize students' time, behaviour, and attention. A study by Tsouloupas et al. (2010), examining the relation between self-efficacy and externalizing problem behaviour, has shown that teachers who experience a large amount of externalizing problem behaviour in their classroom feel less competent at handling difficult behaviours and stressful situations. This is a concerning finding, as the personal competence of teachers is acknowledged worldwide as one of the most important sources for adequate teacher functioning (Tschannen-Moran & Woolfolk Hoy, 2001).

It is important to note that self-efficacy may also play role in the prevention of emotional exhaustion. Research shows that teachers with a high sense of self-efficacy experience less emotional exhaustion than teachers with a low sense of self-efficacy (Betoret, 2006; Evers et al., 2002; Schwarzer & Hallum, 2008; Skaalvik & Skaalvik, 2010). This suggests that feelings of self-efficacy may modify the effects that externalizing problem behaviour has on feelings of emotional exhaustion in teachers (Dicke et al., 2014; Martin et al., 2012; Pas, Bradshaw, Hershfeldt, & Leaf, 2010; Tsouloupas et al., 2010). Tsouloupas et al. (2010) found that the relation between student misbehaviour and emotional exhaustion was mediated by self-efficacy in handling student misbehaviour. Also, in their study on the relation between self-efficacy in classroom management, emotional exhaustion, and classroom disturbance, Dicke et al. (2014) found that self-efficacy in classroom management predicted emotional exhaustion via classroom disturbances, only when self-efficacy was low. In addition, Martin et al. (2012) found that instructional management mediated the relation between teacher's feelings of self-efficacy and student misbehaviour, and that student misbehaviour affected the level of teacher's emotional exhaustion. Nevertheless, the risks that externalizing problem behaviour of students poses for important elements of teacher's occupational well-being and their turnover intentions (Tsouloupas et al., 2010), highlight the need of providing teachers with strategies to effectively handle such behaviour in their classrooms.

1.2. The role of the teacher-student relationship

An underlying factor that is likely to impact the influence of externalizing problem behaviour in students on teachers' sense of self efficacy, is the teacher student relationship. Due to students' externalizing problem behaviour, the teacher-student relationship deteriorates, which then may lead to a decrease in teachers' self-efficacy. The quality of the teacher-student relationship is often characterized by two aspects; closeness and conflict, and has been associated with teachers' sense of self-efficacy. Closeness refers to an affective, warm and open relationship between teacher and student, whereas conflict refers to a negative and conflictual relationship, including tension, anger and mistrust (Koomen, Verschueren, van Schooten, Jak, & Pianta, 2012). Research shows that experiencing many conflicts in the teacher-student relationship can cause decreased feelings of self-efficacy in teachers (Yeo, Ang, Chong, Huan, & Quek, 2008). Studies into the relationship between self-efficacy and teacher-student closeness (as opposed to conflict) show a less clear picture: this relationship is not proven convincingly and the direction of effects is less clear (Hamre, Pianta, Downer, & Mashburn, 2008; Mashburn et al., 2006; Yoon, 2002;

Zee, Jong, & Koomen, 2017).

In addition, poor quality of teacher-student relationships has also been associated with emotional exhaustion in teachers (Cano-García, Padilla-Muñoz, & Carrasco-Ortiz, 2005). Conflictual relationships, which tend to develop more often between teachers and students who exhibit externalizing problem behaviour, could lead to emotional exhaustion in the teacher (Spilt et al., 2011; Van Droogenbroeck et al., 2014). Studies also show that disciplinary problems with students increase the amount of emotional exhaustion that teachers experience (Skaalvik & Skaalvik, 2010). On the other hand, other research highlights closeness as a protective factor for the development of emotional exhaustion in teachers (Milatz, Lüftenegger, & Schober, 2015). Thus, the teacher-student relationship may play a role in the impact that externalizing problem behaviour has on self-efficacy and emotional exhaustion in teachers.

1.3. Improving teachers' competence and wellbeing, through the student-teacher relationship

Promoting a favourable teacher-student relationship between teachers and students with externalizing problem behaviour thus may contribute to reducing emotional exhaustion and improve self-efficacy (Spilt et al., 2011; Zee et al., 2017). This may subsequently prevent teacher turnover (Wang, Hall, & Rahimi, 2015). Various interventions have focused on improving the teacher-student relationship. One of such interventions is the relationship-focused reflection program (RFRP; Koomen & Spilt, 2013, pp. 1–43), which focuses on improving the mental representation that teachers have of their relationship with students. Research by Spilt, Koomen, Thijs, and Van der Leij (2012), showed as a result of this intervention that teachers with high self-efficacy beliefs were more likely to report reduced conflict in their relationship with students than low-efficacy teachers. Studies on the effects of two other interventions, MyTeachingPartner (MTP) and Banking Time (Driscoll & Pianta, 2010; Pianta, Mashburn, Downer, Hamre, & Justice, 2008), focusing on the improvement of teacher's functional interaction patterns, showed that the teacher-student relationship as well as students' achievement improved as a result of the intervention. A combination of adjusting the teacher's mental representation with the practice of effective interaction skills may have additional value when aiming to improve the teacher-student relationship (Sabol & Pianta, 2012, pp. 213–231). For that reason, the teacher-focused coaching intervention Key2Teach was developed. In previous research, Key2Teach was shown to have an impact on the teacher-student relationships, as closeness increases and conflict decreases in teacher-student dyads (Hoogendijk et al., 2018).

As most studies have focused on the effects of interventions on elements of the teacher-student-relationship, not much is known about whether such interventions can also impact on aspects of teacher-wellbeing, such as teachers' sense of self efficacy and emotional exhaustion. In this study, we therefore examine the effects of the intervention Key2Teach on self-efficacy and emotional exhaustion. This may provide us with more insight in the complex dynamic regarding the impact that externalizing problem behaviour has on the occupational well-being of teachers, as well as in ways to effectively impact this dynamic.

1.4. The Key2Teach intervention

Key2Teach is developed as an extension of existing interventions, designed to improve a conflictual relationship between a teacher and a student with externalizing problem behaviour (Van Veen et al., 2015). Key2Teach is a teacher-focused coaching intervention consisting of four building blocks and two phases (Table 1). Phase one consists of four sessions and is designed to provide the teacher with insight into his or her own representation of the teacher-student relationship and how this influences the actual interactions with the student. This phase incorporates two building blocks. The first building block provides the teacher with an understanding of his or her mental representation of the relationship with the student, using the Relationship-Focused Reflection Program (RFRP; Koomen & Spilt, 2013, pp. 1–43). By means of a semi-structured interview, the Teacher Relationship Interview (TRI; Pianta, 1999; Koomen & Lont, 2004), the teacher is asked to provide a narrative that includes classroom situations and emotions concerning a specific student. Outcome of this interview is a unique relationship profile based on the teacher's story including strengths and weaknesses regarding four pedagogical skills (sensitivity of discipline, providing a secure base, perspective taking and understanding of the child's needs and beliefs about efficacy) and three feelings (feelings of helplessness, negative affect, and positive affect) (see also Koomen & Lont, 2004). This profile serves as a starting point for more in-depth reflection. The second building block concerns functional behaviour analyses (Ellis, 1991), and is directed at providing the teacher with insight into the relation between his or her mental representation and his or her behaviour towards this student. During two sessions, the teacher and coach discuss behaviour, thoughts and feelings of the teacher and student based on a video clip of a classroom situation that is prepared by the coach. At the end of the first phase, the teacher and coach articulate a temporary working hypothesis that forms the starting-point for the coaching in phase 2.

Phase two (eight sessions) aims to improve dysfunctional interaction patterns between teacher and students with externalizing problem behaviour through focusing on the interaction skills of the teacher. The teacher is provided with direct opportunities to practice interaction skills. To achieve this goal, the coach makes use of video interaction guidance (VIG; Allen, 1967; Hayes, Richardson, Hindle, & Grayson, 2001) and synchronous coaching (Coninx, Kreijns, & Jochems, 2012; Rock et al., 2009). Using VIG (building block 3), the coach discusses interaction patterns of the teacher and the student in relation to the previously formulated working hypothesis. Subsequently, coach and teacher select appropriate keywords, which are short, specific and represent goal-oriented behaviour (Coninx et al., 2012). These keywords represent functional interaction skills and are based on domains emotional support, classroom organization and instructional support, as distinguished by Pianta and Hamre (2009). These keywords are used during the synchronous coaching (building block 4) sessions (Coninx et al., 2012; Rock et al., 2009). During these sessions, the coach is situated at the back of the classroom during a lesson. Using bug-in-ear technology, the coach immediately provides the teacher with a relevant keyword when there is an opportunity to practice the previously discussed interaction skills. These lessons are videotaped. Afterwards, teacher and coach discuss the lessons, using VIG (building block 3). By slowing down the images and analyse them image-by-image, the interaction patterns become visible and the coach and teacher discuss thoughts and feelings of the teacher during these interaction patterns (Jansen, Brons, & Faber, 2013).

In previous research Key2Teach was shown to have an effect on the teacher-student relationship, especially on teacher-student closeness (Hoogendijk et al., 2018). In the present study, we use data from the previous study to extend these findings, by examining the effects of Key2Teach on different aspects related to teacher's occupational well-being.

1.5. The present study

In the present study we examine the effects of Key2Teach on

Table 1
Sessions Key2Teach.

	Building block	*Instruments*	*duration (minutes)*	*Homework*	*Exposure n (N) teachers*
Phase 1	Insight				
Session 1	Introductions and Relationship-Focused Reflection Program	Teacher Relationship Interview (TRI; Pianta, 1999b; Koomen & Lont, 2004)	45–60		53 (53)
Session 2	Discussing profile and introduction of functional behavioural analysis	Relationship profile (Koomen & Lont, 2004)	45–60		53 (53)
Session 3	Functional behavioural analysis	G-diagrams (Ellis, 1991)	45–60	1. Making Four G-diagrams	52 (52)
Session 4	Functional behavioural analysis	G-diagrams (Ellis, 1991)	45–60	2. Reflection session	52 (52)
Phase 2	Skills				
Session 5	Determining working hypothesis	Micro-analysis (Allen, 1967; Hayes et al., 2001)	45–60	3. Making Four G-diagrams	49 (49)
Session 6	Selecting keywords based on working questions	Micro-analysis	45–60		49 (49)
Session 7	Synchronous coaching	Bug-in-ear technology (Coninx et al., 2012; Rock et al., 2009), keywords (Pianta & Hamre, 2009; Pianta, Hamre, & Mintz, 2012)	30–45	4. Reflection BIE session	49 (49)
Session 8	Video Interaction Guidance	Micro-analysis and GROW-model (Whitmore, 2009)	45–60		49 (49)
Session 9	Synchronous coaching	Bug-in-ear technology, keywords	30–45	5. Reflection BIE session	49 (49)
Session 10	Video Interaction Guidance	Micro-analysis and GROW-model	45–60		43 (49)
Session 11	Synchronous coaching	Bug-in-ear technology, keywords	30–45	6. Reflection BIE session	44 (49)
Session 12	Video Interaction Guidance and end	Micro-analysis and GROW-model	45–60		49 (49)

self-efficacy and emotional exhaustion of teachers in a Randomized Controlled Trial (RCT). We focus on teachers' relationship with students in regular primary education with high levels of externalizing behaviour problems. We extend the previous research results (Hoogendijk et al., 2018) by focusing on the mediating role of closeness in the teacher-student relationship.

We first expect that Key2Teach has a positive effect on teacher's sense of self-efficacy, because one of the sources of self-efficacy is successful experiences in daily work (Bandura, 1997). Because Key2Teach focuses on these successful experiences as the starting point for improvement, teachers' sense of self-efficacy will increase as a result of the intervention. We also expect a decrease in emotional exhaustion as a consequence of Key2Teach, mainly due to the Relationship-Focused Reflection Program and functional behavioural analysis. Other interventions that have been shown to decrease burnout also use elements of cognitive behavioural analysis that are aimed at improving situations that teachers find difficult, as is indicated in a review by Awa, Plaumann, and Walter (2010). Awa et al. (2010) concluded in their review that most of the intervention programs focusing on reducing burn out led to a reduction, most likely around 6 months. Iancu, Rusu, Măroiu, Păcurar, and Maricuţoiu (2017) therefore conducted a meta-analysis in which they analysed the effect of such intervention programs for different time periods between post-test measurement (directly after the intervention) and follow-up measurement: one month, between one and three months or more than three months. They found that interventions are more likely to decrease emotional exhaustion when the time-period between post- and follow-up measurement is longer.

Secondly, this study will examine to what extent a possible effect of Key2Teach on emotional exhaustion five months later is due to an improvement in self-efficacy directly after finishing the Key2Teach intervention. We expect that enhancing teachers' sense of self-efficacy by giving them practical skills in interacting with students with externalizing problem behaviour will have an effect on their subsequent levels of emotional exhaustion at follow-up.

Thirdly, this study will examine the role of teacher-student closeness in the effects of Key2Teach on self-efficacy and emotional exhaustion. As one of the aims of Key2Teach is to promote closeness between teachers and students, we examined the effect of Key2Teach on self-efficacy through closeness (Fig. 1, model 1). Moreover, as closeness can be considered a protective factor when it comes to emotional exhaustion, this study also examines whether a potential positive effect of Key2Teach on emotional exhaustion is mediated by an increase in closeness in the teacher-student relationship. This leads us to the following three research questions:

1) Does Key2Teach improve teachers' sense of self-efficacy and reduces emotional exhaustion in teachers? We hypothesize a positive effect of Key2Teach on both.
2) To what extent is the effect of Key2Teach on emotional exhaustion predicted by an increase in self-efficacy? In this model, we hypothesize a positive effect of Key2Teach on emotional exhaustion at follow-up through self-efficacy at post-test.
3) What role does teacher-student closeness play with regard to the effect of Key2Teach on self-efficacy and emotional exhaustion? Given the lack of knowledge in the research literature, we do not have a specific hypothesis with regard to this relation.

2. Method

2.1. Design

Effects of Key2Teach were examined in a Randomized Controlled Trial (RCT), using an intent-to-treat design, comparing teachers who received the Key2Teach intervention to teachers who received educational support as usual (Dutch Trial Register: NTR3811). Two cohorts of primary school teachers were included (school year 2013–2014 and school year 2014–2015). In the spring of 2013 and 2014, primary schools located within one hour of the main research location received a digital invitation to take part in the study. School principals or individual teachers could contact the researchers to receive more details regarding participation in the study. Schools were excluded from participation if other behavioural interventions were being implemented at that time. Teachers could only participate if they taught in grades 3 to 6 for at least 2,5 days per week, and at least two teachers had to participate in each school.

When teachers in a school were interested in the study, more information about the study was provided by the researchers in the form of a presentation. Teachers received an information leaflet and a permission form, which they had to return within two weeks.

Figure 1. Model 1 Alternative Mediation Model

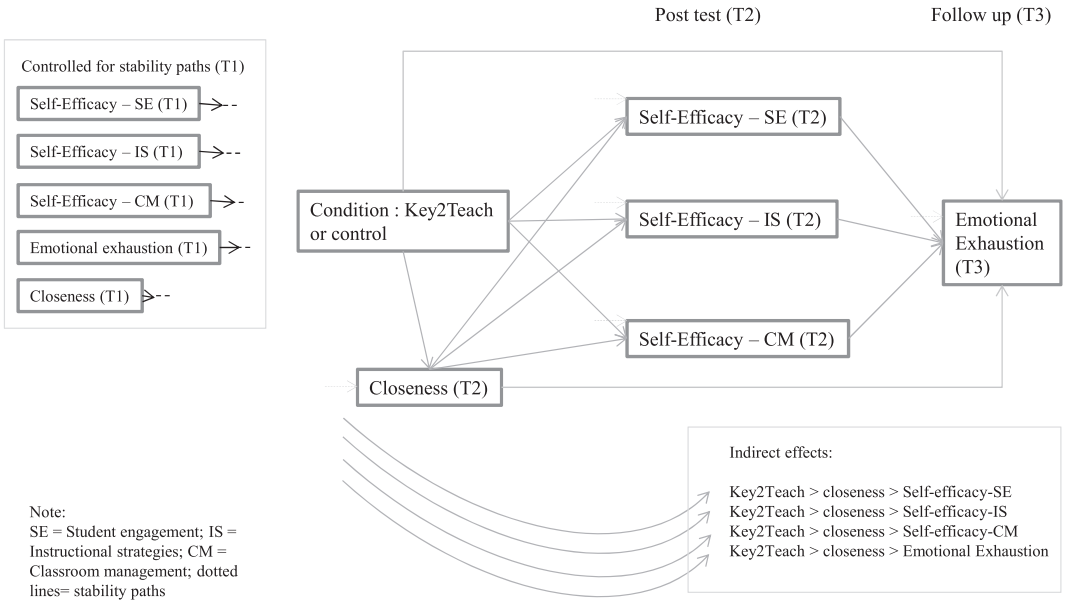

Fig. 1. Model 1 alternative mediation model.

Inclusion of teachers took place between June and September 2013 (first cohort) and March and July 2014 (second cohort) and due to reasons of feasibility, power and expected dropout inclusion ended when a number of 150 teachers was reached (Fig. 2). Twenty-three teachers withdrew before the start of the study, either because teachers considered the study too much of a time investment or were too busy with other tasks, such as their school switching locations or the implementation of new educational methods. At the start of the new school year, parents received an information leaflet and a permission form. If schools applied, a parent information meeting was organized in schools by the researchers. Only children for whom parental permission was obtained were involved in the study.

At the start of the study a screening took place in which the teacher filled out a questionnaire on every student in his classroom. Based on this screening, the teacher-student dyads were determined. Students were included in the teacher-student dyad if they had (sub)clinical levels of externalizing problem behaviour (at least above the 90th percentile on conduct and/or hyperactivity scales) and the highest conflictual relationship in the classroom (at least above the 50th percentile). A number of included students may thus also cope with such serious behaviour problems, that are eligible for a clinical diagnosis, as the presence of a clinical diagnosis was not an inclusion or exclusion criterion. The research protocol was approved by the Medical Ethics Committee Southwest Holland (METC-ZWH, 13-023).

Three measurements took place during the school year. Pre-intervention data were collected in the fall, at least six weeks after the start of the school year and before the intervention started. Screening-data and pre-intervention data were used as baseline data (T1). When Key2Teach was completed the post-intervention measurement (T2) took place in June, and the follow-up measurement (T3) took place five months after finishing Key2Teach. Teachers and students separately completed questionnaires in each of these measurements. The teacher had access to a website in which questions could be answered digitally.

2.2. Participants

The screening was completed by 127 teachers (Fig. 2). After screening 24 teachers dropped out for the following reasons: no dyad-student because of withdrawal of student permission (n = 11), not enough (<90th percentile) externalizing problem behaviour in students (n = 7) and/or no conflict levels higher than the 50th percentile (n = 6). Thus, our final sample consisted of 103 teachers: 46 teachers in the first cohort (2013–2014) and 57 in the second cohort (2014–2015). Randomized assignment to the intervention and the control group was performed for this sample of 103 teachers after the initial selection process.

Of our teachers (n = 103), 77 percent was female and teachers were on average 39.24 years old (ranging between 23.50 and 62.67 years). Teachers had an average of 12.62 years of working experience (ranging between 0 and 38 years). The 103 primary school students selected for the teacher-student dyad (77 percent boys) were aged 9.42 years on average.

After randomization of the 103 teacher-student dyads, the experimental group consisted of 53 dyads and the control group consisted of 50 dyads. The control group did not significantly differ from the experimental group at the start of the study with regard to teacher age (t (101) = 0.58, p = .56, d = 0.11), student age (t (101) = 1.08, p=.28, d = 0.21), teachers' years of working experience (t (101) = 0.10, p = .92, d = 0.02), teacher gender (χ^2 (1) = 2.16, p = .14, φ = −0.17) and student gender (χ^2 (1) = 1.05, p = .32, φ = 0.12). With regard to scores on the outcome variables at baseline, the control group had significantly higher levels of emotional exhaustion (t (100) = 2.67,p = .01, d = 0.53). Using a two-way ANOVA, we tested whether the initial levels of emotional exhaustion impacted the effect of Key2Teach on emotional exhaustion. The interaction effect between “initial levels of exhaustion” by “condition”, was not significant (F (10,38) = 8.81, p = .05, η^2 = 0.36), indicating no evidence for such a moderating effect. No other differences were found (Table 2).

Of the 103 teachers participating during the pre-intervention,

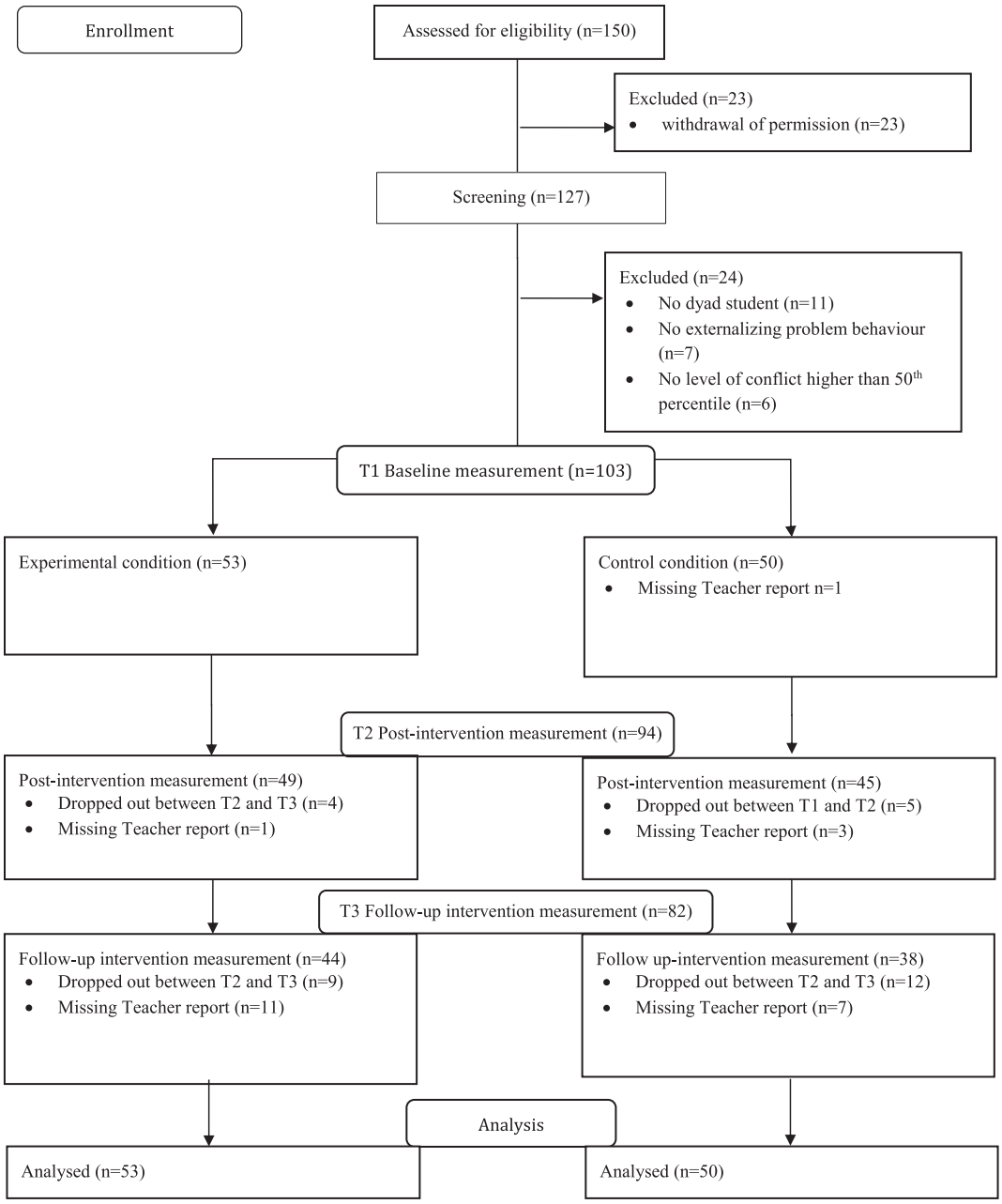

Fig. 2. Flowchart of Participating teachers and students.

twenty-one dropped out over the course of the study. Dropout was not significantly related to condition (χ^2 (1) = 0.41, $p = .52$, $\varphi = 0.09$), teachers' age ($t(101) = 0.14$, $p = .89$, $d = 0.03$) or teachers' gender (χ^2 (1) = 0.05, $p = .82$, $\varphi = -0.05$).

2.3. Practical implementation Key2Teach intervention

Key2Teach consists of twelve sessions. Table 1 includes information on the various sessions, session-duration, instruments and homework. Sessions are conducted using a specified protocol, which contains information about the theoretical background and instructions for every meeting for coach and teacher.

Information on the exposure of the teacher to the Key2Teach intervention is included in Table 1. Forty-three of all 53 teachers in the experimental condition attended all twelve sessions. Because they reported having a lack of time as a result of the approaching end of the school year, one teacher attended eleven sessions and five teachers attended ten sessions. Two teachers attended only two sessions, and two teachers attended four sessions, but these four teachers dropped out of the study after the first phase.

2.4. Key2Teach coaching training

Within this study fourteen coaches coached 53 teachers in the experimental condition during the school year of 2013–2014 (first cohort: $n = 24$) and 2014–2015 (second cohort: $n = 29$). The average number of teachers appointed to a coach was 3.17 (ranging between 1 and 10). All coaches were already certified School-Video Interaction Guidance (S-VIG) coaches before they were trained to use the Key2Teach intervention (LBBO, 2016). Coaches were trained

Table 2
Averages and standard deviations at T1, T2 and T3 and test of pre-intervention measurement differences (T1) between conditions on all outcome variables.

	Control						Experimental						Test of baseline differences			
	T1		*T2*		*T3*		*T1*		*T2*		*T3*					
	N	*M (SD)*	*N*	*M (SD)*	*N*	*M (SD)*	*N*	*M (SD)*	*N*	*M (SD)*	*N*	*M (SD)*	*t*	*df*	*p*	*d*
Emotional exhaustion	49	2.97 (.90)	42	2.83 (1.16)	35	3.06 (1.23)	53	2.53 (.75)	48	2.38 (.73)	42	2.37 (.70)	2.67	100	.01	.53
Self-efficacy student engagement	49	3.80 (.36)	42	3.92 (.43)	35	3.93 (.38)	53	3.78 (.39)	48	3.91 (.39)	42	3.89 (.39)	0.31	100	76	.06
Self-efficacy instructional strategies	49	4.12 (.38)	42	4.12 (.50)	35	4.16 (.40)	53	4.01 (.48)	48	4.24 (.39)	42	4.22 (.40)	1.257	100	.21	.25
Self-efficacy classroom management	49	3.93 (.48)	42	4.13 (.39)	35	4.12 (.46)	53	3.93 (.46)	48	4.10 (.39)	42	4.08 (.40)	0.10	100	.92	.02
Teacher-student closeness	47	38.98 (8.08)	40	39.93 (9.03)	–	–	52	40.29 (7.71)	48	45.40 (6.15)	–	–	-0.83	97	.41	.17

by the research team to use the Key2Teach method using a standardized protocol (Van Veen et al., 2015). For this training, coaches attended three four-hour training sessions and eight (first cohort) to four (second cohort) four-hour intervision meetings. Training was provided by members of the research team and key members/leading coaches who took part in developing the protocol of the intervention. The intervision meetings were led by these leading coaches.

2.5. Measures

2.5.1. Student externalizing problem behaviour

The teachers reported externalizing problem behaviour of the students on subscales Conduct ($\alpha = 0.65$) and/or Hyperactivity ($\alpha = 0.87$) of the Strengths and Difficulties Questionnaire (SDQ; Van Widenfelt, Goedhart, Treffers, & Goodman, 2003). Both subscales represent the amount of externalizing problem behaviour exhibited by the student (Goodman, 2001). Teachers rated items such as '*Often fights with other children or bullies them*' and '*Restless, overactive, cannot stay still for long*' on a three-point scale on which 0 = not true, 1 = sometimes true, and 2 = completely true. Internal consistency and correlations with other behavioural questionnaires (CBCL/YSR) have been evaluated as good in previous studies (Goodman, 2001; Van Widenfelt et al., 2003).

2.5.2. Teacher perception of the teacher-student relationship

Teacher rated their perception of closeness and conflict in the teacher-student relationship on the Closeness and Conflict subscales of the Dutch version of the Student-Teacher Relationship Scale (STRS; Koomen, Verschueren, & Pianta, 2007). The subscale Closeness ($\alpha = 0.90$-0.91) consists of 11 items (e.g. *'I share an affectionate, warm relationship with this child'*) assessing the amount of affection, warmth and open communication the teacher experiences related to specific child. The subscale Conflict ($\alpha = .90$) consists of 11 items (e.g. *'This child and I always seem to be struggling with each other'*) assessing the extent to which the teacher finds the relationship with a specific child to be negative and conflictual. Teachers rated items on a 5-point Likert-scale ranging from *definitely does not apply* to *definitely applies*. Construct validity and convergent validity of the Closeness and Conflict scale with child and peer reports of the same construct have been established (Koomen et al., 2007).

2.5.3. Teachers' sense of self-efficacy

Teachers' sense of self-efficacy was assessed by having teachers complete the short version of the Teachers' Sense of Efficacy Scale (TSES; Tschannen-Moran & Woolfolk Hoy, 2001), including the subscales: Student Engagement, Instructional Strategies and Classroom Management. Student Engagement measures the extent to which teachers feel able to activate students' interest in their schoolwork and consists of 4 items (for example '*how much can you do to motivate students who show low interest in school work?'*; $\alpha = 0.52$-0.65). Instructional Strategies assesses the extent to which teachers feels competent to give instruction in a way that adapted to the students' needs and consists of 4 items (for example '*to what extent can you provide an alternative explanation or example when students are confused*?'; '$\alpha = 0.69$-0.75). Classroom Management assesses the extent to which teachers feel able to organize students' time, behaviour, and attention and consists of 4 items (for example '*How much can you do to get children to follow classroom rules*'; $\alpha = 0.73$-0.77). Although the TSES is usually measured on a 9-point rating scale, teachers in the present study responded on a 5-point Likert scale, ranging from 1 (*nothing*) to 5 (*a great deal*). This deviated less from the other questionnaires that were used in the study, like the STRS and UBOS-L. A 5-point Likert scale is suggested to provide better quality of the data compared to 7 or 11 points scale (Revilla, Saris, & Krosnick, 2013). Positive correlations with other measurement instruments for self-efficacy in general, as well as specifically for teachers, provide evidence for the convergent validity of the TSES (Tschannen-Moran & Woolfolk Hoy, 2001).

2.5.4. Teachers' emotional exhaustion

Emotional exhaustion was assessed by having teachers complete the Emotional Exhaustion subscale of the Dutch version of the Maslach Burnout Inventory, the Utrechtse Burnout Schaal for teachers (UBOS-L; Schaufeli & Van Dierendonck, 2000). The Emotional Exhaustion subscale assesses to what extent teachers expire feelings of strain, particularly chronic fatigue resulting from overtaxing work (Hakanen et al., 2006) and consists of 9 items (for example *'I feel emotionally drained from my work'; $\alpha = 0.83$-0.89).* Items were rated on a 7-point Likert scale, ranging from 0 (*never*) to 6 (*every day*). Validity of the UBOS-L has been demonstrated by predicting drop-out and illness of teachers due to psychological work-related symptoms (Schaufeli & Van Dierendonck, 2000).

2.5.5. Demographic variables

Using supplemental questionnaires, several demographic variables on both students and teachers were collected. Information regarding age at baseline, gender and years of working experience was collected for teachers. Data on age and gender at the pre-intervention measurement were collected for students.

2.6. Data-analysis

To evaluate baseline differences in study condition and demographic variables, we first conducted *t*-test, using SPSS (version 24). The effects of Key2Teach were analysed using Structural Equation Modelling in Mplus 8 (Muthén & Muthén, 1998–2017). Parameter estimates were computed through maximum likelihood estimation with robust standard errors (MRL). An alpha of 5 percent was used for all tests of statistical significance. The strength of the pathways was indicated using standardized regression coefficients,

which represent change in standard deviation units. Effect sizes of standardized path coefficients with values less than 0.10 indicate small effects, values around 0.30 indicate medium effects, and values around 0.50 indicate large effects (Kline, 2016). Baseline data were included in the model to ensure that initial differences at pre-test did not influence our results (Cole & Maxwell, 2003). Outcomes were allowed to correlate. Mediation was tested trough model indirect commands in Mplus and using bias-corrected bootstrapped 90% confidence intervals (bootstrapped = 5000) as these provide the most accurate types I and II error rates (Preacher & Hayes, 2008). To test model fit, several absolute and relative fit indices were used. Absolute model fit was determined by the model χ^2. A non-significant χ^2 is an indication of good model fit. The comparative fit index (CFI) and the root mean square error of approximation (RMSEA) were also used. The CFI indicates misfit of a specific model, with >0.95 representing a close fit, and >90 representing an acceptable fit. The RMSEA gives an indication of the degree of misfit of the model, with values $\leq$ 0.05 reflecting a close fit, and $\leq$0.08 a satisfactory fit (Hu & Bentler, 1999).

Missing data were minimized by using electronic software for the questionnaires. The computer directly checked whether the teacher has filled in all questions. With regard to teachers' questionnaires (i.e. TSES, UBOS-L, and STRS), missing data ranged from to 4% on the post-test to 22% at follow up. At post-test no significant difference between the teachers and students who provided data and those who did not provide data were found regarding teacher age (t (92) = -0.26, p = .79), student age (t (92) = -0.41, p = .68), teachers' years of working experience (t (92) = -0.48, p = .63), teacher gender (χ^2 (1) = 2.16, p = .14) and student gender (χ^2 (1) = 0.38, p = .54). Also, at follow up, no significant differences were found between the teachers and students who provided data and those who did not provide data regarding teacher age (t (80) = -1.12, p = .27), student age (t (80) = 1.31, p = .19), teachers' years of working experience (t (8) = -0.89, p = .38), teacher gender (χ^2 (1) = 0.48, p = .49) and student gender (χ^2 (1) = 2.17, p = .14). The FIML approach uses all of the available information in the data to produce robust parameter estimates for the missing data (Asendorpf, Schoot, Denissen, & Hutteman, 2014; Muthén & Muthén, 1998–2017; Peeters, Zondervan-Zwijnenburg, Vink, & Schoot, 2015).

We analysed our theoretical models through path-analysis in Mplus. First, we tested a fully saturated model with all variables included in this study and all possible paths between the variables. Mplus showed an error message, likely due to including more parameters than the sample size. Because of this error message we are not able to reliably interpret this model (see supplementary materials on Open Science Framework for the output of this analysis). To obtain model parsimony, we conducted the following steps in building up our model to answer our research questions.

Second, to assess the effects of the intervention on outcome measure at the post-intervention measurement (T2) and the follow up measurement (T3) five months later, post-test scores and follow-up scores were regressed on their baseline-scores (T1), study condition and demographic covariates. Only the demographic covariates that differed significantly between the groups at baseline were selected for inclusion in the analyses of intervention impact. However, none of the covariates differed significantly.

Thirdly, to assess the indirect effects of the intervention on emotional exhaustion through self-efficacy, follow up scores of emotional exhaustion were regressed on post-test scores of self-efficacy. Indirect paths between the intervention condition, self-efficacy and emotional exhaustion were also added to the model.

Fourthly, the model based on Fig. 1 (model 1) was built using path modelling. During the process of analysis, we have also tested whether the increase in closeness was mediated by an increase in self-efficacy (model 1a). We have included these results in the supplementary materials on Open Science Framework. The indirect paths as described in the figure were added to the model. We decided to constrain the direct path between self-efficacy at post-test and emotional exhaustion at follow-up, because of the results of the analysis of research question 2. For model parsimony, only significant indirect effects were retained in the model.

Additional information about correlations, outlier analysis, ANOVA, results of the analyses regarding model 1a, fully saturated model and the output of all of the analyses are published on the Open Science Framework (link: osf.io/t4g6n).

3. Results

3.1. Research question 1: direct effects of Key2Teach

In Table 3 the direct effects of Key2Teach on self-efficacy and emotional exhaustion of teachers at the end of the school year (T2) and five months' follow-up (T3) are shown. Teacher-reported self-efficacy increased for instructional strategies, indicating a small to medium effect (β = 0.23, p = .01), but not for student engagement or classroom management in the experimental condition as opposed to the control condition. We did not find evidence for a decrease in emotional exhaustion in teachers in the experimental condition after the intervention was completed. However, at follow up, teachers in the experimental condition did report a small to medium decrease in emotional exhaustion, as opposed to the control condition (β = −0.19, p = .02), but no improvement in levels of self-efficacy was recorded at this time point.

3.2. Research question 2: indirect effects of Key2Teach on emotional exhaustion through self-efficacy

With regard to our second research question, the indirect effect of Key2Teach on emotional exhaustion through the three domains of self-efficacy was not significant. Consistent with the simple model, teachers in the experimental condition showed higher self-efficacy for instructional strategies (β = 0.23, p = .01) in opposed to the control condition. Besides, higher levels of self-efficacy were not associated with decreased amount of emotional exhaustion (β = −0.01, p = .94; β = −0.10, p = .35; β = −0.06, p = .60). The indirect effect of Key2Teach on emotional exhaustion through self-efficacy for student engagement (β = 0.00, p = .98, bias-corrected 90% CI = −0.02,.01). The effect of Key2Teach on emotional exhaustion through self-efficacy for instructional strategies was not significant (β = −0.02, p = .42, bias-corrected 90% CI = −0.08,.01) was also not significant, and neither was the indirect effect of Key2Teach on emotional exhaustion through the third domain of self-efficacy, classroom organization, (β = −0.00, p = .95, bias-corrected 90% CI = −0.03, 0.01) significant. The direct effect of Key2Teach on emotional exhaustion (β = −0.17, p = .06) disappeared, indicating that teachers' emotional exhaustion did not

Table 3
Intervention effects at post-test (T2) and follow up test (T3) (n = 103).

	Post-test (T2)			*Follow-up test (T3)*		
	B	*SE B*	*β*	*B*	*SE B*	*β*
Self-efficacy student engagement	.04	.08	.05	-.03	.08	-.04
Self-efficacy instructional strategies	.20*	.08	.23*	.10	.08	.13
Self-efficacy classroom management	.01	.07	.02	-.03	.08	-.04
Emotional Exhaustion	-.19	.17	-.10	-.38*	.18	-.19*

Univariate models are all saturated and thus have perfect model fit (*p < 0.0.05; **p < .001).

decrease at follow-up due to the intervention. Model fit indicate a close fit (model fit, χ^2 (12) = 15.88, p = .20; CFI = 0.98; AIC = 1079.63; BIC = 1190.29; RMSEA (90%) = 0.06 (0.00,.12)).

3.3. Research question 3: indirect effects of Key2Teach through teacher-student closeness

For our third research question the influence of teacher-student closeness on teacher self-efficacy and emotional exhaustion was examined. Model 1 showed a close model fit (χ^2 (25) = 31.25, p = .18; CFI = 0.97; TLI = 0.96 RMSEA (90%) = 0.05 (0.00 .10)), AIC = 2304.47; BIC = 2441.47). For model parsimony, only significant indirect effects were retained in the model. The two non-significant indirect effects (Key2Teach on self-efficacy for instructional strategies through closeness and Key2Teach on emotional exhaustion through closeness) were constrained to zero (Fig. 3, final model).

The final model showed that Key2Teach significantly improved the amount of self-efficacy for instructional strategies (β = 0.23, p = .01) as well as closeness in the teacher-student relationship (β = 0.30, p < .00) at the end of the school year in which the intervention took place. In turn, closeness predicted teachers' sense of self-efficacy for student engagement positively (β = 0.28, p < .00) at the end of the school year. This (positive) indirect small effect of Key2Teach was significant (β = 0.08, p = .01, bias-corrected 90% CI = 0.03, 0.17) indicating that increased teacher-student closeness as a result of Key2Teach was associated with an increase in self-efficacy for student engagement.

Secondly, teacher-student closeness also predicted teachers' sense of self-efficacy for classroom organization (β = 0.28, p < .00). This (positive) indirect small effect of Key2Teach was also significant (β = 0.08, p < .00, bias-corrected 90% CI = 0.03, 0.17), which means that increased teacher-student closeness as a result of Key2Teach was associated with an increase in feelings of self-efficacy in classroom management at the end of the school year.

As a result of Key2Teach, teachers reported a small to medium decrease in their feelings of emotional exhaustion five months after the intervention was completed (β = −0.19, p = .02).

4. Discussion

Handling students externalizing problem behaviour is a challenge for teachers. This may affect their wellbeing, competence and their relationship with this students (Aloe et al., 2014). Teacher coaching can support teachers in handling such behaviours, building a positive relationship, and thereby positively impacting aspects of their occupational wellbeing. In this study we examine the effects of the teacher-focused coaching intervention Key2Teach on teachers' sense of self-efficacy and emotional exhaustion using an RCT-design. This intervention consists of four building blocks: relationship-focused reflection, functional behavioural analysis, video interaction guidance and synchronous coaching, and is designed to improve the relationship between teachers and students with externalizing problem behaviour by providing them with insight into their mental representation of the teacher-student relationship (first phase) and to improve their interaction patterns with these students (second phase). By also focusing on indirect effects, this study tries to shed more light on the underlying mechanism that explains the effect of Key2Teach on emotional exhaustion, more specifically on the role of self-efficacy and teacher-student closeness. Our main findings are discussed below.

4.1. Effect of Key2Teach on emotional exhaustion and self-efficacy

First of all, Key2Teach seems to reduce emotional exhaustion, although in this study, this effect was only apparent five months after finishing the intervention, at the start of the new school year. This follows the Job Resources-Demands Model, which suggests that the balance between demanding aspects, such as externalizing problem behaviour of students, and resources, such as the competences acquired in a teacher training, influences the development of emotional exhaustion (Hakanen et al., 2006). The effect on emotional exhaustion is in line with a study by Bibou-Nakou, Stogiannidou, and Kiosseoglou (1999), who found that working on the perception of externalizing behavioural problems in class and on the preferred practices regarding such behaviours,

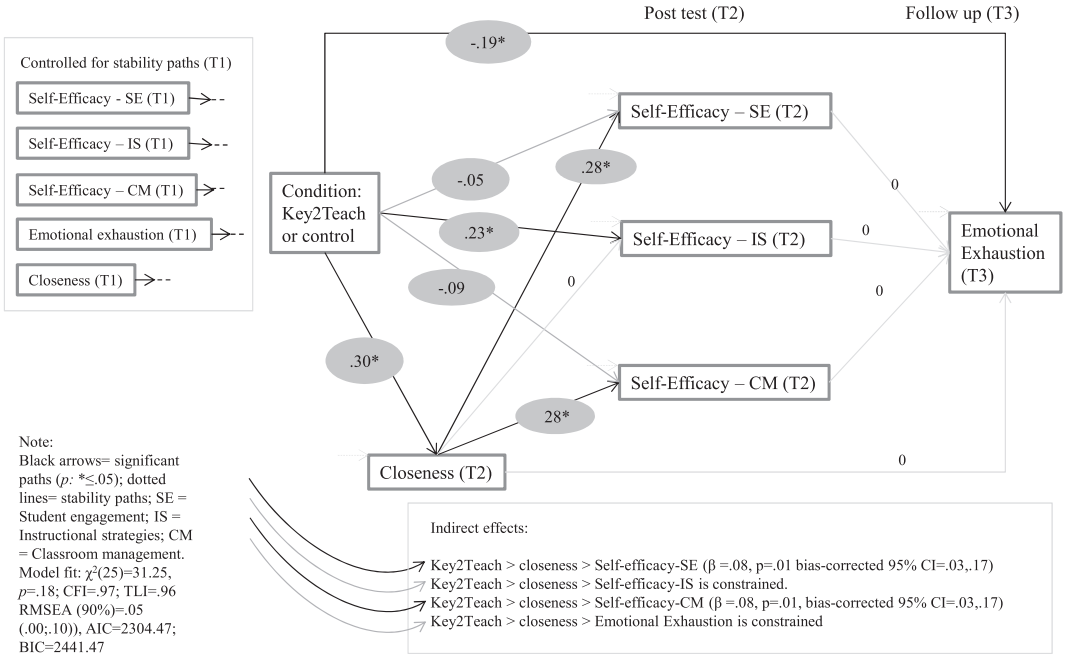

Fig. 3. Intervention effects and mediation (final model).

decreases the experienced emotional exhaustion of teachers. In addition, our finding is supported by the conclusion of a review by Awa et al. (2010), that interventions aimed at decreasing emotional exhaustion in teachers need to have a personal approach and a focus on showing teachers how to improve their classroom organization, which both are important elements of the Key2Teach intervention. Nevertheless, as such an effect is not yet apparent directly after the intervention was completed, it may take more time before teachers' occupational wellbeing may benefit from the coaching program (Iancu et al., 2017). This follow up effect also highlights the importance for conducting follow-up measurements when studying the effect of coaching on teachers.

In line with the social-cognitive theory, Key2Teach directly improves teachers' sense of self-efficacy for instructional strategies, as teachers learn how they can use their self-efficacy beliefs as a cognitive resource in instructional and emotional interactions with student. Also, as the Key2Teach intervention focuses on promoting supportive interactions, especially in phase two, this is in line with other research indicating an increase in self-efficacy as a consequence of positive interactions with the student in the classroom (Holzberger, Philipp, & Kunter, 2014). It is however important to note that that we did not find evidence for such an effect on self-efficacy five months after finishing the Key2Teach intervention, when the teacher is teaching a new group of students. The lack of a follow-up effect of Key2Teach on self-efficacy may be due to the fact that Key2Teach has been conducted within a specific classroom context, consisting of specific students, and focused on improving the relation between a specific student-teacher dyad. A new class with new students may have a different impact on teachers' self-efficacy levels, which may still need to be established within the new classroom. The effect of Key2Teach may not be transferred directly to the new classroom, but may only develop as a result of positive practices within a class.

Moreover, the increase in self-efficacy as a result of Key2Teach does not play a role in the effect of the intervention on emotional exhaustion. Results regarding the indirect effects show that the decrease in emotional exhaustion at follow-up is not mediated by an increase in teachers' sense of self-efficacy. This is not in line with earlier research that demonstrates strong links between self-efficacy and emotional exhaustion, suggesting that higher sense of competency reduces the risk for developing burnout symptoms (Dicke, Stebner, Linninger, Kunter, & Leutner, 2017; Holzberger et al., 2014; Hultell, Melin, & Gustavsson, 2013; Schwarzer & Hallum, 2008). The reason that we did not find such a mediating role for self-efficacy may be due to the fact that several teacher factors may have impacted this relation. Findings by Schwarzer and Hallum (2008) suggest that age and experience may play a role as their research results showed that for teachers under forty, self-efficacy impacted later emotional exhaustion, whereas such relationship was not apparent for older teachers. This highlight the importance to take teacher factors, such as age, gender, work experience and characteristics of the students into account when investigating the relation between self-efficacy and emotional exhaustion. However, in exploring person-based burnout development, Hultell et al. (2013) consistently found among different clusters of teachers that an increase in burnout was related to a decrease in feelings of self-efficacy. As Dicke et al. (2017) found that the impact of self-efficacy on emotional exhaustion was mediated by a decrease in classroom disturbance, it may be fruitful to also take classroom factors into account, especially in the context of interventions that focus on supporting teachers in handling externalizing behaviour problems of students in class.

It is also important to note that we found an impact of Key2Teach on the self-efficacy domain of instructional strategies only, which is again in line with the social-cognitive view that self-efficacy can differ from domain to domain (or from task to task). Key2Teach does not directly impact self-efficacy in the domains of student engagement and classroom organization. This is remarkable, as classroom management and motivation are often at stake when students exhibit high levels of externalizing problem behaviour. One would expect the Key2Teach intervention to have an effect on these areas, as the intervention specifically pays attention to handling such behaviours, thereby improving classroom management practices. A study on improving classroom management practices through the Good Behaviour Game by Breeman et al. (2016) found a significant improvement of supporting teachers in positively interacting with students' teachers' sense of self-efficacy of student engagement. However, Breeman et al. (2016) study was conducted in special education settings where the majority of students' cope with psychiatric disorders and high levels of problem behaviour, which limits the comparability to our findings.

4.2. The role of closeness

Although the direct effects of Key2Teach on self-efficacy are limited to the domain of instructional strategies, we found evidence that the increase that Key2Teach has on closeness, which was also described in an earlier study (Hoogendijk et al., 2018), results in an increase in other domains of self-efficacy in teachers. This finding resonates with the social-cognitive view that teachers' cognitions such as self-efficacy are influenced by environmental factors such as the teacher-student relationship. This finding is also supported by research by Mashburn et al. (2006), who show that teachers' ratings of positive relationships were associated with higher levels of self-efficacy. However, Yoon (2002) did not find evidence for such a relations. It is important to note that both studies are of cross-sectional nature, and were therefore not able to identify a longitudinal impact. Our longitudinal research adds to these findings and suggests that perceived closeness toward students' with externalizing behaviour problems is a precondition for teachers to feel competent in managing and organizing the classroom. It is important to note that in our study closeness and self-efficacy were measured at the same time-point, as a consequence of our design. To further substantiate the hypothesized causality, insight study including a large number of subsequent measurements may offer more insight into in the dynamics between closeness and self-efficacy over a school year.

Although earlier research also suggests that a close relationship with students can be a protective factor for the development of emotional exhaustion (Milatz et al., 2015), we found no evidence that close relationship that teachers have with a specific student with externalizing behaviour problems plays an important role in the development of emotional exhaustion. However, as there are only a few other studies that focused on the protective role of a positive teacher-student relationship in the development of emotional exhaustion, this reciprocal relation between this two constructs need to be examined in future research to obtain more insight into this relation both during the school year and in the long term.

4.3. Limitations

This study has some limitations that should be taken into account when interpreting the results. The first limitation concerns features of the sample. None of the teachers in our sample had such high levels of emotional exhaustion that there could be diagnosed with burnout. Improvements as a result of Key2Teach may thus be hard to detect. Future research including teachers with higher levels of emotional exhaustion may give more insight on the effects

of Key2Teach on emotional exhaustion and underlying dynamics. The levels of self-efficacy at baseline also seem mostly within the average range, which limits the possibility of detecting improvements. At least, as our sample size only allowed us to examine some aspects of the complex dynamic behind self-efficacy, closeness and emotional exhaustion, and the possible role of Key2Teach in this dynamic, further studies may include more teachers-student dyads to examine this dynamic.

A second limitation concerns the internal consistency of some of our measures. The low alpha of the subscale Student Engagement of the TSES indicates an insufficient reliability. This may indicate that using a 7-point Likert scale may have been more sufficient for this specific domain. The subscale Conduct of the SDQ also showed insufficient reliability, which hampers its usefulness to determine the presence of externalizing problem behaviour in children. However, as we have only used this subscale for screening purposes in combination with another subscale (hyperactivity) and another related selection criterion (the presence of conflict on the relation), the impact of this issue on our research sample may be limited.

Another limitation regards the fact that within this study we did not test for measurement invariance, due to insufficient sample size. Future studies, including larger samples, may focus on whether the assumption of measurement invariance with regards to the use of these questionnaires within this specific population is justified.

Another limitation concerns the focus of the intervention in relation to the outcome measures. In this study we looked at general effects on feelings of self-efficacy and emotional exhaustion. Maybe the use of a different instrument that more specifically targets the domain may promote a more reliable assessment of teacher's sense of competence within this domain. Nevertheless, future research may benefit from instruments focusing on self-efficacy in the specific domain of handling externalizing problem behaviour, such as the Self-efficacy scale for Classroom Management and Discipline (Emmer & Hickman, 1991). In addition, Key2Teach focuses on one student with externalizing problem behaviour, whereas the outcome regards general feelings of self-efficacy. Zee, Koomen, Jellesma, Geerlings and de Jong (2016) showed that feelings of self-efficacy can be student-specific. Teachers can experience different levels of self-efficacy for every student in class. In future research, a recommendation would be to use a student-specific version of the TSES, to assess the effects of the Key2Teach intervention on sense of competency towards a single student. On the other hand, teachers' general sense of self-efficacy has been related to student functioning and teacher dropout, thereby highlighting the importance of focusing on general self-efficacy as outcomes of teacher-focused interventions.

A final limitation is that the teachers, who were the focus of the intervention, have provided all outcome data. This may have led to a bias in the effects reported. In future research, it is therefore important to include information by other informants such as students or classroom observations. However, since self-efficacy and emotional exhaustion concern a teachers' personal experience it is vital to include their point of view.

4.4. Conclusion and practical implications

In conclusion, our study shows that Key2Teach not only improves teacher-student closeness, bur also has a positive impact on teachers' self-efficacy and emotional exhaustion. Key2Teach increases the teachers' sense of self-efficacy for instructional strategies and decrease feelings of emotional exhaustion. As emotional exhaustion in particular is one of the main reasons for teachers to quit their job, this finding can be considered of importance.

Our study also shows that self-efficacy does not play a role in the underlying dynamics regarding the effect of Key2Teach on emotional exhaustion. We did however find evidence for a mediating role of closeness. Closeness in the teacher-student relationship with students with externalizing problem behaviour improved by Key2Teach, which in turn improved teachers' sense of self-efficacy for engaging students and classroom organization.

This study thus also gives some insight in the longitudinal dynamic between self-efficacy, emotional exhaustion and the role of teacher-student closeness. A close relationship appears to play an important and protective role in the development of teachers' sense of self-efficacy. Now that more is known on the impact Key2Teach has on teachers.

These findings highlight Key2Teach as a potentially valuable intervention for teachers, whose stressful daily work increases their risk for developing burnout problems. This study shows the potential of implementing interventions like Key2Teach to support teachers in their daily practice, as well as their overall professional development. Elements of the intervention may also be used in teacher education, to better prepare student-teachers for their future professional challenges, especially at times when developing more inclusive learning environments becomes the norm. Still, future research needs to examine whether such improvements in teacher wellbeing actually contribute positively to the academic and behavioural development of students.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.tate.2018.07.014.

References

Allen, D. (1967). *Microteaching: A description*. Palo Alto: CA: Stanford Teacher Education Program.

Aloe, A. M., Shisler, S. M., Norris, B. D., Nickerson, A. B., & Rinker, T. W. (2014). A multivariate meta-analysis of student misbehavior and teacher burnout. *Educational Research Review, 12*, 30–44.

Asendorpf, J. B., Schoot, R. v., Denissen, J. J., & Hutteman, R. (2014). Reducing bias due to systematic attrition in longitudinal studies: The benefits of multiple imputation. *International Journal of Behavioral Development, 38*, 453–460.

Awa, W. L., Plaumann, M., & Walter, U. (2010). Burnout prevention: A review of intervention programs. *Patient Education and Counseling, 78*, 184–190.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: NY: W. H. Freeman.

Betoret, F. D. (2006). Stressors, self-efficacy, coping resources, and burnout among secondary school teachers in Spain. *Educational Psychology, 26*, 519–539.

Bibou-Nakou, I., Stogiannidou, A., & Kiosseoglou, G. (1999). The relation between teacher burnout and teachers' attributions and practices regarding school behaviour problems. *School Psychology International, 20*, 209–217.

Breeman, L., Van Lier, P. A., Wubbels, T., Verhulst, F. C., Van der Ende, J., Maras, A., … Tick, N. T. (2016). Effects of the Good Behavior Game on the behavioral, emotional and social problems of children with psychiatric disorders in special education settings. *Journal of Positive Behavior Interventions, 18*, 156–167.

Cano-García, F. J., Padilla-Muñoz, E. M., & Carrasco-Ortiz, M.Á. (2005). Personality and contextual variables in teacher burnout. *Personality and Individual Differences, 38*, 929–940.

Cole, D. A., & Maxwell, S. E. (2003). Testing mediational models with longitudinal data: Questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology, 112*, 558–577.

Coninx, N., Kreijns, K., & Jochems, W. (2012). The use of keywords for delivering immediate performance feedback on teacher competence development. *European Journal of Teacher Education, 35*, 1–19.

Council of the European Union. (2009). Council conclusions of 12 May 2009 on a strategic framework for European cooperation in education and training ('ET 2020'). *Official Journal of the European Union, 119*(2).

Day, C., & Hong, J. (2016). Influences on the capacities for emotional resilience of

teachers in schools serving disadvantaged urban communities: Challenges of living on the edge. *Teaching and Teacher Education, 59*, 115–125.
Dicke, T., Parker, P. D., Marsh, H. W., Kunter, M., Schmeck, A., & Leutner, D. (2014). Self-efficacy in classroom management, classroom disturbances, and emotional exhaustion: A moderated mediation analysis of teacher candidates. *Journal of Educational Psychology, 106*, 569–583.
Dicke, T., Stebner, F., Linninger, C., Kunter, M., & Leutner, D. (2017). A longitudinal study of teachers' occupational well-being: Applying the job demands-resources model. *Journal of Occupational Health Psychology, 23*, 1–16.
Doumen, S., Verschueren, K., Buyse, E., Germeijs, V., Luyckx, K., & Soenens, B. (2008). Reciprocal relations between teacher-child conflict and aggressive behavior in kindergarten: A three-wave longitudinal study. *Journal of Clinical Child and Adolescent Psychology, 37*, 588–599.
Driscoll, K. C., & Pianta, R. C. (2010). Banking Time in Head Start: Early efficacy of an intervention designed to promote supportive teacher-child relationships. *Early Education & Development, 21*, 38–64.
Dunn, K. E., & Rakes, G. C. (2011). Teaching teachers: An investigation of beliefs in teacher education students. *Learning Environments Research, 14*, 39–58.
Ellis, A. (1991). The revised ABC's of rational-emotive therapy (RET). *Journal of Rationale-emotive & Cognitive-behavior Therapy, 9*, 139–172.
Emmer, E., & Hickman, J. (1991). Teacher efficacy in classroom management and discipline. *Educational and Psychological Measurement, 51*, 1474–1491.
Evers, W. J., Brouwers, A., & Tomic, W. (2002). Burnout and self-efficacy: A study on teachers' beliefs when implementing an innovative educational system in The Netherlands. *British Journal of Educational Psychology, 72*, 227–243.
Evers, W. J., Tomic, W., & Brouwers, A. (2004). Burnout among teachers. Students' and teachers' perceptions compared. *School Psychology International, 25*, 131–148.
Gastaldi, F. G., Pasta, T., Longobardi, C., Prino, L., & Quaglia, R. (2014). Measuring the influence of stress and burnout in teacher-child relationship. *European Journal of Education and Psychology, 7*, 17–28.
Goodman, R. (2001). Psychometric properties of the strengths and difficulties questionnaire. *Journal of the American Academy of Child & Adolescent Psychiatry, 40*, 1337–1345.
Hakanen, J. J., Bakker, A. B., & Schaufeli, W. B. (2006). Burnout and work engagement among teachers. *Journal of School Psychology, 43*, 495–513.
Hamre, B. K., Pianta, R. C., Downer, J. T., & Mashburn, A. J. (2008). Teachers' perceptions of conflict with young students: Looking beyond problem behaviors. *Social Development, 17*, 115–136.
Harrison, J., Vannest, K., Davis, J., & Reynolds, C. (2012). Common problem behaviors of children and adolescents in general education classrooms in the United States. *Journal of Emotional and Behavioral Disorders, 55*, 55–64.
Hayes, B., Richardson, S., Hindle, S., & Grayson, K. (2001). Developing teaching assistants' skills in positive behaviour management: An application of Video Interaction Guidance in a secondary school. *Educational Psychology in Practice, 28*, 255–269.
Holzberger, D., Philipp, A., & Kunter, M. (2014). Predicting teachers' instructional behaviors: The interplay between self-efficacy and intrinsic needs. *Contemporary Educational Psychology, 39*, 100–111.
Hooftman, W. E., Mars, G. M., Janssen, B., Vroome, E. M., Janssen, B. J., Michiels, J. E., et al. (2016). *Nationale enquête arbeidsomstandigheden 2015*. Leiden, Heerlen: TNO and CBS.
Hoogendijk, C., Holland, J. G., Tick, N. T., Hofman, W. H., Severiens, S. E., Vuijk, P., … Van Veen, A. F. (2018). *Effect of Key2Teach on the teacher-student relationship with externalising problem behaviour: A randomised controlled trail*. Manuscript submitted for publication.
Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinairy Journal, 6*, 1–55.
Hultell, D., Melin, B., & Gustavsson, J. P. (2013). Getting personal with teacher burnout: A longitudinal study on the development of burnout using a person-based approuch. *Teaching and Teacher Education, 32*, 75–86.
Iancu, A. E., Rusu, A., Măroiu, C., Păcurar, R., & Maricuțoiu, L. P. (2017). The effectiveness of interventions aimed at reducing teacher burnout: A meta-analysis. *Educational Psychology Review, 30*, 1–24.
Jansen, H., Brons, C., & Faber, F. (2013). *Beeldcoaching zet in beweging*. Baarn: De Weijer Uitgeverij.
Kaakinen, M. (2017). The conceptualisation of pupils' problems by Finnish and Norwegian primary school teachers: Performance, welfare and behaviour. *Teachers and Teaching, 23*, 704–716.
Kline, R. B. (2016). *Principles and practice of structural equation modeling*. New York: The Guilford Press.
Koomen, H. M., & Lont, T. A. (2004). *Teacher relationship interview qualitative coding manual*. Ongepubliceerde Nederlandse vertaling: Universiteit van Amterdam.
Koomen, H. M., & Spilt, J. L. (2013). *Relatiegerichte reflectie in het basisonderwijs met behulp van het leerkracht relatie interviews: Trainingshandleiding* [*Relationship-focused reflection in primary education with the teacher relationship interview: Manual*]. Universiteit van Amsterdam & Vrije Universiteit Amsterdam.
Koomen, H., Verschueren, K., & Pianta, R. (2007). *LLRV leerling leerkracht relatie vragenlijst handleiding* [*Student teacher relationship scale: Manual*]. Houten: Bohn Staflue van Loghum.
Koomen, H., Verschueren, K., van Schooten, E., Jak, S., & Pianta, R. C. (2012). Validating the Student-Teacher Relationship Scale: Testing factor structure and measurement invariance across child gender and age in a Dutch sample. *Journal of School Psychology, 50*, 215–234.
LBBO. (2016, 04 12). SVIB- school video interactie begeleiding. Retrieved from: http://www.lbbb.eu/wat-is-lbbb/svib-school-video-interactiebegeleiding.
Lier, P. A., Vitaro, F., Barker, E. D., Brendgen, M., Tremblay, R. E., & Boivin, M. (2012). Peer victimization, poor academic achievement, and the link between childhood externalizing and internalizing problems. *Child Development, 83*, 1775–1788.
Looze, M. d., Dorsselaer, S. v., Roos, S. d., Verdurmen, J., Stevens, G., Gommans, R., … Vollebergh, W. (2014). *HBSC (Health Behaviour in School-aged Children) 2013 Gezondheid, welzijn en opvoeding van jongeren in Nederland* [*HBSC 2013: Health, well-being, and education of young people in The Netherlands*]. Utrecht: Universiteit Utrecht.
Martin, N. K., Sass, D. A., & Schmitt, T. A. (2012). Teacher efficacy in student engagement, instructional management, student stressors, and burnout: A theoretical model using in-class variables to predict teachers' intent-to-leave. *Teaching and Teacher Education, 28*, 546–559.
Mashburn, A. J., Hamre, B. K., Downer, J. T., & Pianta, R. C. (2006). Teacher and classroom charactersitics associated with teachers' ratings of pre-kindergartners' relationships and behaviors. *Journal of Psychoeducational Assessment, 24*, 367–380.
Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. *Journal of Occupational Behaviour, 2*, 99–113.
Milatz, A., Lüftenegger, M., & Schober, B. (2015). Teachers' relationship closeness with students as a reource for teacher wellbeing: A response surface analytical approach. *Frontiers in Psychology, 6*(1949), 1–16.
Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus user's guide* (7th ed.). Los Angeles, CA: Munthén & Muthén.
Pas, T. E., Bradshaw, C. P., Hershfeldt, P. A., & Leaf, P. J. (2010). A multivlevel exploration of the influence of teacher efficacy and burnout on response to student problem behavior and school-bassed service use. *School Pscyhology Quarterly, 25*, 13–27.
Peeters, M., Zondervan-Zwijnenburg, M., Vink, G., & Schoot, R. (2015). How to handle missing data: A comparison of defferent approaches. *European Journal of Developmental Psychology, 12*, 377–394.
Pianta, R. C. (1999b). Assessing relationships. In R. C. Pianta (Ed.), *Enhancing Relationships between children and teachers* (pp. 85–104). Washington DC: American Psychological Association.
Pianta, R. C., & Hamre, B. K. (2009). Conceptualization, measurement, and improvement of classroom processes: Standardized observation can levertge capacity. *Educational Reseracher, 38*(2), 109–119.
Pianta, R. C., Hamre, B. K., & Mintz, S. (2012). *Classroom assessment scoring system: Upper elementary manual*. Charlottesville: Teachstone.
Pianta, R. C., Mashburn, A. J., Downer, J. T., Hamre, B. K., & Justice, L. (2008). Effects of web-mediated professional development resources on teacher-child interactions in pre-kindergarten classrooms. *Early Childhood Research Quarterly, 23*, 431–451.
Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*, 879–891.
Revilla, M. A., Saris, W. E., & Krosnick, J. A. (2013). Choosing the number of categories in agree-disagree scales. *Sociological Methods & Research, 43*, 73–97.
Rock, M. L., Gregg, M., Thead, B. K., Acker, S. E., Gable, R. A., & Zigmond, N. P. (2009). Can you hear me now? Evaluation of an online wireless technology to provide real-time feedback to special education teachers-in-training. *Teacher Education and Special Education, 32*, 64–82.
Sabol, T. J., & Pianta, R. C. (2012). *Recent trends in research on teacher-child relationships*. Attachement & Human Development.
Schaufeli, W., & Van Dierendonck, D. (2000). *Handleiding van de Utrechtste Burnout schaal (UBOS)* [*Manual of the Dutch Burnout Scale (UBOS)*]. Lisse, the Netherlands: Swets & Zeitlinger.
Schwarzer, R., & Hallum, S. (2008). Perceived teacher self-efficacy as a predictor of job stress and burnout: Mediation analyses. *Applied Psychology, 57*, 152–171.
Skaalvik, E. M., & Skaalvik, S. (2010). Teacher self-efficacy and teacher burnout: A study of relations. *Teaching and Teacher Education, 26*, 1059–1069.
Spilt, J., Koomen, H. M., & Thijs, J. T. (2011). Teacher wellbeing: The importance of teacher-student relationships. *Educational Psychology Review, 23*, 457–477.
Spilt, J. L., Koomen, H. M., Thijs, J. T., & Van der Leij, A. (2012). Supporting teachers' relationships with disruptive children: The potential of relationship-focused reflection. *Attachment & Human Development, 14*, 305–318.
Taris, T. W., Van Horn, J. E., & Schaufeli, W. B. (2004). Inequity, burnout and psychological withdrawal among teachers: A dynamic exchange model. *Anxiety, Stress & Coping, 17*, 103–122.
Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teaching efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*, 783–805.
Tsouloupas, C. N., Carson, R. L., Matthews, R., Grawitch, M. J., & Barber, L. K. (2010). Exploring the association between teachers' perceived student misbehaviour and emotional exhaustion: The improtance of teacher efficacy beliefs and emotion regulation. *Educational Psychology: International Journal of Energy Economics and Policy, 30*, 173–189.
Van Droogenbroeck, F., Spruyt, B., & Vanroelen, C. (2014). Burnout among senior teachers: Investigating the role of workload and interpersonal relationships at work. *Teaching and Teacher Education, 43*, 99–109.
Van Veen, A. F., Holland, J. G., Hoogendijk, C., Clements, W., Reith, M., Scheltens, J., … Vuijk, P. (2015). *Key2Teach, Multi-Method Coaching: Trainingshandleiding*. Amsterdam, The Netherlands: Inholland University of Applied Sciences.

Van Widenfelt, B. M., Goedhart, A. W., Treffers, P. D., & Goodman, R. (2003). Dutch version of the strengths and difficulties questionnaire (SDQ). *European Child & Adolescent Psychiatry, 12*, 281–289.

Wang, H., Hall, N., & Rahimi, S. (2015). Self-efficacy and casual attributions in teachers: Effects of burnout, job satisfaction, illness and quitting intentions. *Teaching and Teacher Education, 47*, 120–130.

Whitmore, J. (2009). *Coaching for performance: GROWing human potential and purpose: The principles and practice of coaching and leadership. People skills for professionals* (4th ed.). Boston: Nicholas Brealey.

Yeo, L. S., Ang, R. P., Chong, W., Huan, V. S., & Quek, C. L. (2008). Teacher efficacy in the context of teaching low achieving students. *Current Psychology, 27*, 192–204.

Yoon, J. S. (2002). Teacher characteristics as predictors of teacher-student relationships: Stress, negative affect, and self-efficacy. *Social Behavior and Personality, 30*, 485–494.

Zee, M., Jong, P. F., & Koomen, H. M. (2017). From externalizing student behavior to student-specific teacher self-efficacy: The role of teacher-perceived conflict and closeness in the student-teacher relationship. *Contemporary Educational Psychology, 3*, 37–50.

Zee, M., Koomen, H. M., Jellesma, F., Geerlings, J., & de Jong, P. F. (2016). Inter- and intra-individual differences in teachers' self-efficacy: A multilevel factor exploration. *Journal of School psychology, 55*, 39–56.