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Crossover of burnout in the classroom – Is teacher exhaustion transmitted to students?

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ABSTRACT

It has been proposed that well-being or lack of it can spread within tightly knit communities, including classrooms. Yet, to our knowledge, no studies have explored the crossover of burnout between the teachers and the students. In this study, we explored the relationship between teacher exhaustion and students' study burnout symptoms. We hypothesized that teacher exhaustion is likely to be transmitted to students in classroom interaction both directly and via students' perceptions of reduced social support from the teacher. A total of 1550 Finnish fifth-grade students from 104 classes and their teachers ($N = 104$) participated in the study. Multilevel structural modeling was applied to explore whether teacher exhaustion can cross over within classroom settings, i.e., whether it is related to their students' study burnout levels and students' perceptions of decreased social support. The findings indicated that teacher exhaustion contributed to higher levels of cynicism among the students. Interestingly, the teacher exhaustion was not related to the teacher support reported by their students. The perceived teacher support buffered the students' study burnout at both individual and classroom levels. The findings imply that teachers' well-being and the perceived social support from teachers play important roles in student well-being.

Introduction

School provides a central learning environment for both teachers and students (Aloe et al., 2014; Eccles & Roeser, 2011; Pyhältö et al., 2011, 2015; Twum-Antwi et al., 2020). At its best, classroom interactions can inspire both teachers and students: Positive teacher–student relationships have been found to be associated with elevated levels of study engagement and reduced risk of students experiencing burnout symptoms (Lindfors et al., 2018; Pietarinen et al., 2014; Zimmer-Gembeck et al., 2006). Such relationships have also been found to be related to experiences of empowerment, enjoyment, and engagement among teachers (Soini et al., 2010; Taxer et al., 2019). In turn, problems within teacher–student relationships have been shown to be associated with increased risk of teacher burnout (Corbin et al., 2019; Hastings & Bham, 2003; Spilt et al., 2011) and school failure, behavioral problems, and study burnout among students (e.g., Brendgen et al., 2007; Hamre & Pianta, 2005; Milkie & Warner, 2011). For example, it was recently shown that negatively loaded perceptions of teacher–student interaction were associated with increased cynicism among students (Anttila et al., 2018).

Moreover, there is tentative evidence that burnout may spread within teaching communities (Bakker & Schaufeli, 2000; Meredith et al., 2020), as well as within students' close relationships with their friends (Kiuru et al., 2008), suggesting that burnout is an inter-individual phenomenon. This implies that burnout can cross over not only from one teacher to another, but also from a teacher to their students via classroom interaction. However, most of the previous studies exploring the effect of teacher burnout to their students have focused on students' performance and motivation instead of their well-being (see meta-analysis by Madigan & Kim, 2021). Thus, to our knowledge, there have been no previous studies on the crossover of burnout between teachers and their students. We have taken up the challenge by exploring both individual and class-level variations in students' study burnout symptoms and perceived teacher support for studying. We analyzed whether teacher exhaustion is related to the students' perceptions of teacher support, and the study burnout levels within their classes.

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Teacher and student burnout

It has been suggested that a considerable number of teachers and students suffer from burnout resulting from chronic work/study stress (meta-analysis by García-Carmona et al., 2019; Parker & Salmela-Aro, 2011; Salmela-Aro et al., 2018; see also seminal work on burnout by Freudenberger, 1974). Up to 12% of Finnish teachers have experienced high levels of work stress, which is more than workers in any other profession (Finnish Institute of Occupational Health, 2013; Länsikallio et al., 2018) implying that a significant number of Finnish teachers are at risk of burnout. A recent report on Finnish students showed that up to 16% of 8th and 9th grade students experience study burnout symptoms, and that girls have a higher risk of developing study burnout than boys (Finnish institute for health and welfare, 2019). Variations between individuals, including teachers (Pyhältö et al., 2021; see also Klusmann et al., 2008a) and students (see Salmela-Aro & Read, 2017) in their risk of developing burnout has been detected.

Burnout has three distinct symptoms: exhaustion, cynicism, and inadequacy in work/study (Hakanen et al., 2006; Maslach & Jackson, 1981; Maslach et al., 2001; Pietarinen et al., 2013; Salmela-Aro, Kiuru, et al., 2009). Exhaustion refers to chronic fatigue and lack of emotional energy in work/study (Maslach & Jackson, 1981; Maslach et al., 2001; Salmela-Aro, Kiuru, et al., 2009). It has been suggested that exhaustion is the core of burnout, as it reflects the general stress which is a distinctive element in burnout (Klusmann et al., 2008b; Maslach et al., 2001). Cynicism involves negative, detached attitudes toward work/study, colleagues, and peers (Hakanen et al., 2006; Maslach & Leiter, 2016; Virtanen et al., 2018), while inadequacy is the self-evaluation component of burnout, referring to feelings of incompetence and inefficacy in work/study (Maslach & Leiter, 2008; Pietarinen et al., 2013; Tuominen-Soini & Salmela-Aro, 2014). It has been shown that teachers are typically cynical about the professional community and experience professional inadequacy in teacher–student interaction (Pietarinen et al., 2013; Pyhältö et al., 2011). The exhaustion experienced by the teachers is less context specific, as it typically results from work overload. Exhaustion is often a predecessor of cynicism (e.g., Dorman, 2003). So, exhaustion can be used as general indicator of a teacher's overall strain in their work. Students, in turn, suffer from exhaustion, cynicism and inadequacy primarily regarding their study (Salmela-Aro et al., 2008).

Teacher burnout and student burnout are related to several individual and inter-individual problems. Burnout is associated with depression and poor quality sleep, among both teachers and students (Bianchi et al., 2015; Lehto et al., 2019; Saleh & Shapiro, 2008; Salmela-Aro, Savolainen, et al., 2009; Salmela-Aro & Upadyaya, 2014; Shin et al., 2013). Among teachers, emotional exhaustion is also related to an intention to leave the profession (e.g., Leung & Lee, 2006), diminished self-efficacy (e.g., Brouwers & Tomic, 2000), and job satisfaction (e.g., Richards et al., 2019). It has been suggested that teacher exhaustion has an impact on student learning, as it is associated with reduced quality of instruction (e.g., Arens & Morin, 2016). Study burnout among students is negatively related to investment in studying, perceived school value, and academic achievement (Tuominen-Soini & Salmela-Aro, 2014). Students' experiences of cynicism are especially harmful because they have been shown to explain dropping out from school (Bask & Salmela-Aro, 2013). Burnout risk has also been shown to vary across teaching communities (Pietarinen et al., in press), classes (Lindfors et al., 2018), and student peer groups (Kiuru et al., 2008), implying that burnout may spread at school and in classrooms.

Crossover of burnout at school

Crossover refers to an inter-individual process in which strain experienced by one person affects the level of strain in another person (Westman & Etzion, 1995). Earlier research on the crossover of burnout has focused on crossover between spouses and within work teams or dyads outside the school context (e.g., Bakker et al., 2001; Westman & Etzion, 1995; Westman & Vinokur, 1998). It has been shown that the crossover of burnout is most likely to occur in environments characterized by frequent and friendly interaction (Bakker & Schaufeli, 2000; Hakanen et al., 2014). Due to the socially embedded nature of teaching, it is not surprising that burnout has been shown to cross over from one teacher to another (Bakker & Schaufeli, 2000; Meredith et al., 2020). A link between teacher burnout and student stress regulation has been identified (Oberle & Schonert-Reichl, 2016), which implies that burnout can cross over in classroom settings as well. Due to the power imbalance between the teachers and the students, it can be presumed that strain is more likely to be transmitted from teachers to students than vice versa (see Hakanen et al., 2014). Accordingly, it can be assumed that teacher exhaustion can cross over directly and/or indirectly to students.

Direct burnout crossover from a teacher to students results from either unconscious or cognitive processing (Bakker, Schaufeli, et al., 2007; Bakker, Westman, et al., 2007; Hatfield et al., 1994; Westman & Vinokur, 1998). The former typically takes place through emotional contagion in which students automatically mimic the facial

expressions and behaviors of the teacher and hence converge emotionally (Han et al., 2012; Hatfield et al., 1994). Emotions – and hence burnout – can also be transmitted via empathic reaction induced by cognitive processing (Bakker & Schaufeli, 2000; Bakker, Schaufeli, et al., 2007). This occurs when students try to imagine how they would feel in the position of their teacher and consequently catch their teachers' emotions themselves (Bakker et al., 2001; Jeon et al., 2014). In particular, emotional exhaustion may cross over from teachers to their students through emotional contagion due to the affective component of the exhaustion. Frenzel et al. (2009, 2018) showed that students' perceptions of their teachers' emotional states affected their own emotions. In addition, research findings indicate that teacher exhaustion is negatively related to student engagement, motivation, and school satisfaction (see Pakarinen et al., 2010; Ramberg et al., 2020; Wong et al., 2017). To summarize, due to direct crossover, teacher exhaustion is likely be associated with their students' increased study burnout levels.

Indirect crossover refers to a situation in which teacher burnout impairs their functioning with students, resulting in negative impact on students' well-being. Teacher exhaustion has shown to be negatively related to their students' academic performance (Herman et al., 2018; Klusmann et al., 2016). This suggests that the strain experienced by teachers has a negative impact on the quality of instruction. For example, exhausted teachers are less likely to provide social support for their students including being less encouraging, and giving less constructive feedback and guidance to students (Arens & Morin, 2016; Maslach & Leiter, 1999; Ramberg et al., 2020; Shen et al., 2015, see also seminal work on social support by Cobb, 1976). This can further compromise not only student learning outcomes but also increase their risk of developing burnout. In turn, there is evidence that social support from teachers protects students from study burnout (Gungor, 2019; meta-analysis by Kim et al., 2018; Niemiec & Ryan, 2009; Reddy et al., 2003; Salmela-Aro et al., 2008). Taken together, teacher exhaustion can impair their ability to provide social support for their students, which further contributes to students' experience of study burnout.

Although earlier studies have identified the crossover of burnout between spouses and in different workplace settings, including schools (e.g., Bakker & Schaufeli, 2000; Westman & Etzion, 1995), the crossover of burnout between teachers and their students has not been investigated. Thus, it is not clear whether burnout can cross over from teachers to their students. In this study, we assume that teacher exhaustion can cross over to their students and be manifested as increased levels of study burnout. In addition, we assume that teacher exhaustion is related to students' perceptions of decreased teacher support, which is further reflected in increased study burnout levels.

Aim of the study

The aim of the study was to explore the crossover of burnout in classrooms between the teachers and the students. More specifically, two routes of crossover were explored: 1) whether teacher exhaustion is directly related to students' experiences of study burnout symptoms, and 2) whether teacher exhaustion is related to students' perceptions of diminished social support from teacher, and if such perceptions of support are further related to students' experiences of study burnout. As there were no prior evidence showing the most likely routes of burnout crossover in classroom interaction, we assumed that teacher exhaustion can cross over to the students directly or indirectly, or both. The following hypotheses were tested (see Figure 1):

H1: Teacher exhaustion (TEXH) is related to higher levels of student exhaustion (EXH), cynicism (CYN), and inadequacy (INAD) in the classrooms (between level).

H2: Teacher exhaustion (TEXH) is negatively related to student perceptions of social support from their teacher (TSS) (between level) (see Arens & Morin, 2016; Maslach & Leiter, 1999; Shen et al., 2015).

H3: Perceived social support from teachers (TSS) is related to lower levels of student exhaustion (EXH), cynicism (CYN), and inadequacy (INAD) both at individual level (within level) and the classroom level (between level) (Gungor, 2019; meta-analysis by Kim et al., 2018).

Materials and methods

Research context

Finnish children typically start their school career with pre-primary education at the age of six. At the age of seven they start their nine years of comprehensive schooling, consisting of primary and lower secondary schools. Grades 1–6 (primary school) are typically taught by a class teacher, and grades 7–9 (lower secondary school) by a specialized subject teacher. All the comprehensive schools follow the national core curriculum and are publicly funded, including students being provided with textbooks and school lunches. The accountability structures are flexible, and they
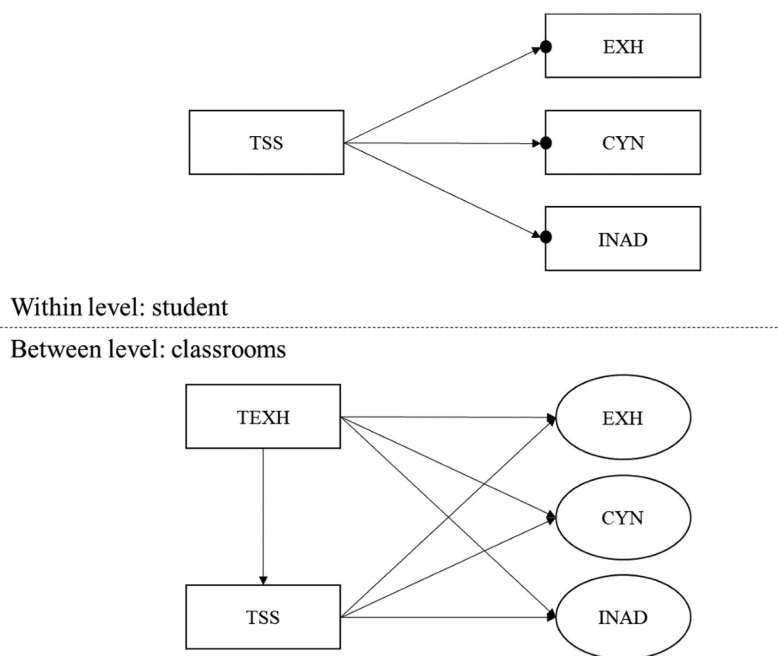
Figure 1. Hypothetical model of teacher exhaustion, social support from the teacher, and students' study burnout.

emphasize trust in teachers and schools (Aho et al., 2006). Thus, schools have the freedom to decide on the educational emphasis, teaching methods, and learning materials.

All comprehensive school teachers must have a master's degree in either educational science or another domain complemented with compulsory minor studies in education. Typically, class teachers hold a master's degree in educational science, whereas subject teachers have a master's degree in a specific subject, such as mathematics. Class teachers typically have their own classes or groups of students to whom they teach most of the subjects for multiple years. Thus, class teachers have significant impact in the social context that is provided to the students at primary school.

Sampling strategy and the participants

The data for this study were collected as a part of a larger national research project (2013–2019). In the research project, cluster sampling was applied in selecting the case schools. First, we selected six school districts that represented both rural and urban areas and were situated all over the country. Second, based on the national SES indicator data, we formed an SES index, which allowed us to select schools with both low and high socio-economic status (see Pietarinen et al., in press). The schools in the sample represented Finnish comprehensive schools well, as they were situated all over the country and varied in size, location (rural/urban), and

school SES (low/high). We created a two-level research design, meaning that we collected data from both teachers and their students.

Two separate data sets, student data and teacher data, were collected during the fall semester of 2018 by a member of the research group. Student data were collected in the classrooms during a lesson and teacher data were collected from comprehensive school teachers at teacher meetings. A member of the research group informed the teachers and students about the study and provided instructions on how to fill in the surveys, and finally collected the completed surveys. Teachers and students were given the opportunity to opt out of the study. Those teachers who were absent at the time of data collection were left with a blank survey form and return envelope. Written parental consent was required to allow students to participate, and participation was voluntary for both teachers and students. Research permission was also obtained from districts and municipalities. The data set collected for the research project at that time comprised 2067 fifth-grade students from 141 classrooms. Teacher data consisted of 1500 comprehensive school teachers. The total response rates were 73.6% (students) and 77.3% (teachers).

To allow the effect of teacher exhaustion on students to be investigated, we combined the data sets and selected only those students whose teachers had provided their names, and thus, could be connected to certain classes, and responded to the items measuring their exhaustion levels. This resulted in the student

sample consisting of 1550 fifth-grade students from 104 classrooms (49.3% ($n = 764$) female, 49.7% ($n = 770$) male, and one percent did not state their gender). The mean number of participating students per class was 15 (Min/Max = 1/29, SD = 5.6). The teacher sample comprised 104 teachers (63.5% ($n = 66$) female, 35.6% ($n = 37$) male, and one percent did not state their gender), who were class teachers in the participating classes. Male teachers were slightly overrepresented in the sample compared to the population of Finnish class teachers (Finnish National Agency for Education, 2017).

Measures

We used two scales to measure students' a) Study Burnout (7 items) and b) Social Support from the Teacher (11 items) and one scale measuring Teacher Exhaustion (3 items).

The Study Burnout scale consisted of three factors: exhaustion (3 items), cynicism (2 items), and inadequacy (2 items) (adapted from Salmela-Aro, Kiuru, et al., 2009) (See Appendix A). Social Support from Teachers (Rautanen et al., 2020) consisted of 11 items (Appendix A) measuring the extent to which a student reported that their teachers treat them with encouragement and respect. In addition, it measured the extent to which the students perceived receiving feedback from their teachers.

The Teacher Exhaustion scale was a part of the socio-contextual teacher burnout scale developed by Pietarinen et al. (2013). It included three items measuring teachers' overall work stress and exhaustion, and was based on the MBI inventory (Maslach & Jackson, 1981) and single item stress (Elo et al., 2003).

All items were rated on a seven-point Likert-scale ranging from 1 (completely disagree) to 7 (completely agree) except for the stress item included in the teacher exhaustion scale. The stress item was rated on a ten-point scale. The Cronbach alpha coefficients ranged from .69 to .95 (see Table 1), and all of them can be considered to be sufficient (Nunnally & Bernstein, 1994).

Statistical analysis

First, we explored if the fifth-grade students ($N = 1550$) and their teachers ($N = 104$) selected for the present study (i.e. the fifth-grade students in the classes taught by a teacher who had a) provided their name to allow us to connect their responses to their students' responses and b) responded to the items measuring their exhaustion). represented all the fifth-graders ($N = 2067$) and all the comprehensive school teachers ($N = 1500$) in the data set in terms of the study variables. According to

Table 1. Descriptive statistics of the scales and correlations on within-level (student) and between-level (classes).

Scale	N*	1.	2.	3.	4.	5.
1. Exhaustion	1510		.512	.682	−.338	[a]
2. Cynicism	1509	.564		.537	−.475	[a]
3. Inadequacy	1506	.823	.679		−.369	[a]
4. Social support	1508	−.834	−.688	−.987		[a]
5. Exhaustion (teacher)	104	.065[b]	.363	.077[b]	−.078[b]	
No of items		3	2	2	11	3
Min-Max		1/7	1/7	1/7	1/7	1/7.67
M		2.97	2.43	2.94	5.33	4.11
SD		1.50	1.62	1.56	1.29	1.77
Cronbach's Alpha α		.72	.79	.69	.95	.81
ICC		.046	.045	.029	.131	[a]
Design Effect		1.62	1.61	1.39	2.77	[a]

Correlations at the within individual level (individual students) are shown above the diagonal ($N = 1507$ due to missing data). Correlations at the between-level (classes) are shown below the diagonal ($N = 104$).
*Varying numbers due to missing data.
[a]Not applicable.
[b]Non-significant value at the $p < .05$ level.

the independent sample t-tests, the students included in the analyses did not differ statistically significantly from the whole student data set in terms of exhaustion (t (3521) = .330, $p = .74$), cynicism (t(3518) = .11, $p = .92$), inadequacy (t(3502) = .09, $p = .93$) or perceptions of social support from the teacher (t(3515) = .57, $p = .57$). The teachers included in the analyses also did not differ statistically significantly from all the teachers who participated in the study in terms of exhaustion levels (t(1602) = .70 $p = .48$).

Second, missing data analysis was conducted by using Little's MCAR test (Little, 1988) for student data. The proportion of missing values was small: the univariate percentage ranged from 2.6 to 2.8. According to Little's MCAR test, the data missing was completely at random (χ^2(15) = 16.20, $p = .37$). Therefore, we used the full-information maximum likelihood procedure in further analysis. Descriptive statistics and missing values were analyzed using IBM SPSS Statistics software (version 25).

Third, due to the two-level research design and the nested structure of the data, the intra-class correlations (ICC) and design effects (Deff) (see Snijders & Bosker, 1999, pp. 16–26) for the students' study burnout symptoms and perceived social support from the teacher were examined. The classes were used as a clustering variable. The ICCs were explored to find out if the students within the classes are more similar to one another than students randomly picked from the sample (Lai & Kwok, 2015). In other words, the ICCs and Deffs, i.e. the approximation of the effect of clustered design by weighting the ICCs with the average cluster size (see Snijders & Bosker, 1999, p. 23), were explored to find out whether there were differences between the classes in students' experiences of study burnout and social

support from the teacher (Heck & Thomas, 2000). The ICCs ranged from .029 (for inadequacy) to .131 (for perceived social support from the teacher) (see Table 1), indicating statistically significant class-level differences. The class-level differences were highest in perceived social support from the teacher. The design effects ranged from 1.39 to 2.77, respectively. As it has been suggested that ICCs above .05 and Deffs over 2 (Thomas & Heck, 2001; see Lai & Kwok, 2015, for a lower threshold of Deff = 1.1) indicate the need for multilevel analysis of the data, we applied two-level structural equation modeling for further analysis.

Our structural equation model consists of two levels: a within-class level (students within classes) and a between-classes level to account for the nested structure of the data. SEM (Structural equation modeling) was undertaken using the Mplus program (version 8.3, Muthén & Muthén, 1998–2012). The robust maximum likelihood (MLR) estimator was used due to the slightly non-normally distributed data. First, we tested the hypothesized model (Figure 1). The within-level predictor, social support from the teacher (TSS), was grand mean centered. Second, the model was modified to achieve a better fit with the data: statistically insignificant paths were removed from the model and statistically insignificant correlations between residual variances were fixed to zero. Several model fit indices were used to evaluate the model fit: the Chi-squared test of model fit, the Root Mean Squared Error of Approximation (RMSEA), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Standardized Root Mean Squared Residual (SRMR). In evaluating the model fit, the following cutoff criteria were applied: a non-significant chi-squared test value, CFI and TLI both above .95, RMSEA below .05 and SRMR below .06 would indicate a good model fit (Hu & Bentler, 1999).

Results

The results showed that fifth-grade students (N = 1550) experienced relatively low levels of all study burnout symptoms, including exhaustion, cynicism and inadequacy (see Table 1). They experienced slightly higher levels of exhaustion (mean = 2.97) and inadequacy (mean = 2.94) compared to cynicism (mean = 2.43). Moreover, most of the students reported receiving enough social support from their teachers (mean = 5.33). That is, the students mostly felt that their teachers treated them with respect and encouraged them. Students also reported receiving constructive feedback from their teachers. In turn, teachers reported moderate levels of exhaustion (mean = 4.11).

Students' study burnout symptoms and perceived social support from the teacher were statically significantly related to each other in the expected directions at the individual and classroom level. However, at the classroom level, teacher exhaustion was statistically significantly associated only with student cynicism, and not to social support or student experiences of exhaustion or inadequacy.

The intra-class correlations and design effects (N = 104; $ICC^{(min-max)}$ = .029–.131; $Deff^{(min-max)}$ = 1.39–2.77) showed that there was variation in student experiences of study burnout and social support from the teacher (see Table 1). However, most of the variation in study burnout experienced by the students was at the individual level. The largest variation between the classes was in the perceived social support from the teacher. This indicates that classes differed primarily in terms of students' perceptions of the extent to which their teacher treated them with respect, encouraged them and provided them with feedback.

The two-level path model to teacher exhaustion, students' perceptions of social support from the teacher, and study burnout

The two-level path model (see Figure 1) was tested to analyze the interrelations between perceived social support from the teacher, and students' study burnout symptoms at individual and classroom levels, as well as the associations between teacher exhaustion, students' burnout, and students' perceptions of social support from the teacher at the classroom level. The statistically insignificant paths were removed from the model and statistically insignificant correlations among residual variances were fixed to zero. The results showed that the model (see Figure 2) fitted the clustered data well: χ^2 (5) = 3.495, p = .624, CFI = 1.00, TLI = 1.00, RMSEA = .00, $SRMR_w$ = .002, $SRMR_B$ = .050.

The results showed that teacher exhaustion was related to students' experiences of cynicism (β_B = .31) at the classroom level (H1). In turn, teacher exhaustion was not statistically significantly associated with other study burnout symptoms, including inadequacy and exhaustion experienced by the students. Overall, the exhaustion experienced by a teacher seemed to explain the class-level variation in students' cynicism, i.e. the negative, detached attitudes toward schoolwork.

Moreover, the results showed that teacher exhaustion was not related to students' perceptions of social support from the teacher (H2). In other words, teachers' work stress levels and feelings of being exhausted did not have an impact on students' perceptions of their teachers' intentional teaching practices in terms of encouraging their students and providing them with constructive feedback.
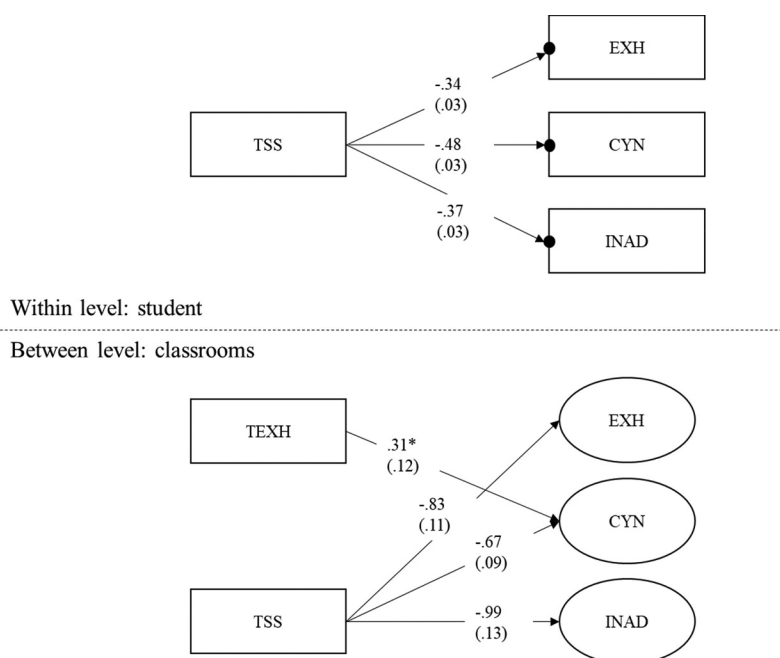
Figure 2. The two-level path model of teacher exhaustion, social support from the teacher, and students' study burnout.

The results also showed that the extent to which a student perceived receiving social support from their teachers was related to lower levels of study burnout symptoms (see Figure 2) (H3). In other words, students' perceptions of social support from the teacher, i.e. if the students perceived that their teacher treated them with respect, encouraged them and provided constructive feedback, seemed to be a significant buffer against study burnout symptoms. This effect was visible both at individual and classroom levels. At the individual level, the perceptions of social support were most strongly related to cynicism ($\beta_W = -.48$) compared to other study burnout symptoms.

Discussion

Our study contributes to the gap in the literature on crossover of burnout in school. Further, to our knowledge, it is the first study exploring this between teachers and students. Accordingly, our results contribute to the field of knowledge on educational psychology, particularly on teacher and student well-being at school.

The results showed that the Finnish students generally reported low levels of study burnout and high levels of teacher support. A reason for these findings might be that promoting the students' well-being is a central aim of the Finnish basic education (Finnish National Agency for Education, 2014). The basic education in Finland is not achievement-oriented, and there are no standardized tests in comprehensive school. The students have relatively short school days (OECD, 2019) and the

amount of homework is reasonable. In addition, Finnish children do not start their school career until the age of seven, meaning that they are quite well prepared for school. The Finnish system is also proactive in terms of potential support needs: students' support needs are monitored annually to be able to respond to them as soon as possible. A wide range of support is available, such as special and intensified support for learning. Teachers are also highly educated, and they put a lot of effort in promoting students' sense of belonging to their class and school community. However, the findings in our study showed that there is variation between classes in students' experiences of study burnout and teacher support.

The results imply that teacher exhaustion plays a role in students' experiences of study burnout. At the classroom level, teacher exhaustion was related to student study burnout. The result suggests that teacher strain in the classroom can cross over to their students (see also Oberle & Schonert-Reichl, 2016). Our results further showed that teacher exhaustion was associated with higher levels of student cynicism, whereas the relationship between teacher exhaustion and students' experiences of inadequacy or exhaustion could not be detected. Thus, Hypothesis 1 gained partial support. Our finding implies that students taught by an exhausted teacher are more at risk of losing interest in schoolwork and perceiving it as being meaningless. These novel results suggest that crossover of certain study burnout symptoms is based on teacher–student interaction: teacher exhaustion is transmitted to students and is manifested

as students' experiences of cynicism about studying. Earlier studies have shown that cynicism and exhaustion are the most likely burnout symptoms that spread among teachers (Bakker & Schaufeli, 2000; Meredith et al., 2020). Thus, burnout, especially exhaustion and cynicism, seems to cross over in schools not only among teachers but also between teachers and students. Due to the strong emotional component of exhaustion, it seems likely that the route of such crossover is direct, i.e., teacher exhaustion is transmitted through intensive and long-term interaction between the teacher and the students. More specifically, teacher exhaustion may change the interaction to be more negative, which may lead to decreased student motivation and engagement (see Pakarinen et al., 2010; Wong et al., 2017), and further to experiences of cynicism (see Anttila et al., 2018). However, the studies examining the underlying mechanisms of direct crossover (i.e., unconscious emotional contagion and/or cognitive processing) in the classroom are needed.

The results also showed that students' perceptions of social support from the teacher were related to lower levels of their study burnout levels, as was expected based on earlier findings (Gungor, 2019; Kim et al., 2018). Thus, perceived support from the teacher seemed to protect students from study burnout. This means that for an individual student, the experience that their teacher treats the students with respect and encourages them provides a strong buffer against all study burnout symptoms, i.e., exhaustion, cynicism, and inadequacy. This further highlights the benefits of positive interrelations between teachers and students (e.g., Hamre & Pianta, 2005; Lindfors et al., 2018; Pietarinen et al., 2014; Zimmer-Gembeck et al., 2006). However, classes seemed to differ from each other in terms of perceived social support from the teacher. This implies that there are likely to be variations in the teacher support that is available between the classes. This indicates that students within some classes are likely to receive less support from their teacher than their peers in other classes, and thus might be more prone to study burnout experiences.

Interestingly, teacher exhaustion was not related to students' perceptions of social support from the teacher. Hence, the findings did not support Hypothesis 2, and the indirect route of crossover of burnout in classrooms could not be detected. Contrary to some earlier studies (Arens & Morin, 2016; Shen et al., 2015), our finding implies that teachers' overall exhaustion does not affect their teaching practices in terms of providing social support for their students. One explanation of the findings is

that since teachers were typically suffering only moderate levels of exhaustion, they were able to display effective self-regulation behaviors (Pietarinen et al., 2013, see also Klusmann et al., 2008b) to avoid damaging the social support provided to their students. As teachers have been shown to experience cynical attitudes to their colleagues and not their students (Pyhältö et al., 2011), it is possible that teachers express and channel their feelings of being exhausted in contexts other than teacher–student interaction. However, it cannot be ruled out that if teacher exhaustion is extensive and prolonged, it may have an impact on students' academic performance and well-being due to impaired teaching practices other than social support (see Seiz et al., 2015).

Methodological reflections

The two-level research design, including data from students and their teachers, and the relatively large sample size allowed the investigation of the relationship between teacher exhaustion, and students' study burnout and perceptions of teacher support. Several fit indices showed that the model fitted the data. Thus, the results of the study provide evidence of the burnout crossover in classroom interaction. However, some methodological limitations need to be considered.

When interpreting the SEM results, the fact that the students in this study generally reported low levels of study burnout and high levels of teacher support needs to be considered. For example, it may be that the results are not generalizable to students with very high levels of study burnout. In addition, the scales have not yet been validated in other school systems or other age groups in exploring class-level variance. Also, as the data were cross-sectional, causal conclusions cannot be drawn. Longitudinal multilevel studies are therefore needed to investigate the development of the class-level differences and factors contributing to these trajectories.

At the classroom level, the variation in study burnout, especially inadequacy experienced by the students, was small (ICC = .029; Deff = 1.39) and the regression coefficient between teacher support and student inadequacy was high (β_B = .99). This means that class-level variation in student inadequacy was almost perfectly explained by variations in students' perceptions of teacher support and there was no variance left to be explained by teacher exhaustion. Therefore, when drawing conclusion on the potential effect of teacher exhaustion on student inadequacy at the classroom level, we need to consider that the small class-level variation might have affected the results.

Conclusions

The results imply that crossover of burnout takes place in classroom settings. This means that teachers and students' burnout symptoms are intertwined due to ongoing classroom interaction. The results also showed that teacher exhaustion was not related to students' perceptions of teacher support. Therefore, it seems that the route of the burnout crossover in teacher–student interaction is more likely to be direct than indirect (Bakker, Schaufeli, et al., 2007; Bakker, Westman, et al., 2007; Hatfield et al., 1994).

Practical implications

The results have practical implications for teacher education and school development, both in Finland and in general, and provide directions for future research. The results showed that there was a considerable variation between classes in perceived social support from the teachers, which may indicate that teachers differed from each other in terms of their skills or opportunities to support their students. Accordingly, students in certain classes might be at a higher risk of developing study burnout symptoms due to inadequate encouragement, respect, and feedback from the teacher. Although the levels of study burnout and perceptions of teacher support are likely to be context-specific, the strong social support from teacher has been shown to be a significant buffer of study burnout in a variety of socio-cultural contexts (e.g., meta-analysis by Kim et al., 2018). From this perspective, educating teachers to employ better social support practices seems to be a good investment in preventing study burnout among students (e.g., Gungor, 2019; meta-analysis by Kim et al., 2018; Niemiec & Ryan, 2009; Reddy et al., 2003; Salmela-Aro et al., 2008), and enhancing equality between the students in terms of access to teacher support resources. This also involves shaping teachers' working conditions in a way that allows them to support their students better (Luthar et al., 2020). Improved competences and opportunities to support students could also help teachers to overcome the challenges they face with students which can further reduce the risk of teacher burnout and career turnover (see Dicke et al., 2014; Luthar et al., 2020; Spilt et al., 2011).

The results also showed that teacher exhaustion was related to students' experiences of cynicism, which has been shown to be extremely harmful for student learning (Bask & Salmela-Aro, 2013). Therefore, teachers' occupational well-being is crucial from the viewpoint of student learning and well-being (see also meta-analysis by Madigan & Kim, 2021), and thus, it needs to be supported. In teacher education, it is important to equip teachers with the skills to buffer their overall work stress and burnout (see also Braun et al., 2020; Twum-Antwi et al., 2020). According to earlier studies on teacher burnout, proactive self-regulation and co-regulation strategies seem to provide such benefits (e.g., Pyhältö et al., 2021). In addition, teacher well-being and factors affecting to it should be considered within school development.

Research on burnout crossover in schools and classrooms is still in its infancy, so several directions for future research can be suggested. First, it is important to examine the mechanisms of burnout crossover in teacher-student interaction by considering the potential effects of classroom climate, the role of coping and self-regulation, and teachers' instructional practices other than social support. Cross-country studies are needed to find out the extent to which the findings can be generalized internationally. Second, longitudinal studies focusing on the crossover of burnout are of importance. Exploring the trajectories of teachers and students' burnout within classes and schools could provide useful information on the stability of the crossover effect. Although it has been suggested that burnout is more likely to flow from those higher in the hierarchy to those lower in the hierarchy (Hakanen et al., 2014), it is still possible that the crossover of burnout is reciprocal in classroom settings (see Frenzel et al., 2018: Maslach & Leiter, 1999; Spilt et al., 2011). That is, teacher and student well-being are both affected by ongoing social interaction in the classroom, and thus teacher well-being has an impact on students' well-being and behavior, which further affects teachers' well-being and functioning in the classroom. Therefore, longitudinal studies should be conducted to explore the potentially reciprocal nature of burnout crossover. Finally, as previous studies have indicated that positive emotions can also be contagious in classroom settings (Frenzel et al., 2009, 2018), future studies should aim to find out whether other positive attributes of well-being and learning, such as school engagement, can also cross over in classrooms.

Disclosure statement

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Data availability statement

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Appendix A. The scales and items for study burnout, social support from the teachers, and teacher exhaustion

Scale		Item
Study burnout	EXH01	I feel drowned by my school work.
	EXH02	I often sleep poorly due to issues with my school work.
	EXH03	I spend a lot of time worrying about my studies outside of school time.
	CYN01	I feel like my studies are no longer important.
	CYN02	Going to school feels like a waste of time to me.
	INAD01	I feel inadequate in relation to my studies.
	INAD02	I often feel that I am failing in my studies.
Social support from teachers	TSS01	My teachers give me encouragement and support.
	TSS02	Problems are addressed in a constructive manner at my school.
	TSS03	I am treated with respect.
	TSS04	I often receive constructive feedback from teachers.
	TSS05	I am treated equally.
	TSS06	I can openly discuss problems related to my studies with teachers.
	TSS07	I feel that my teachers appreciate the work I have done for my studies.
	TSS08	The teachers are interested in my opinions.
	TSS09	I feel that my teachers care about me.
	TSS10	I often receive encouraging feedback from my teachers.
	TSS11	The teachers listen to the students at my school.
Teacher exhaustion	TEXH01	I feel burnt out.
	TEXH02	With this work pace I don't think I'll make it to the retiring age.
	TEXH03*	Stress means a situation in which a person feels tense, restless, nervous or anxious or is unable to sleep at night because his/her mind is troubled all the time. Do you feel this kind of work-related stress?

* Work stress (TEXH03) was measured on a ten-point scale (1 = not at all – 10 = very much), while other variables were measured using seven-point Likert-scales (1 = totally disagree – 7 = totally agree).