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Teachers' perspective on their school environment and job satisfaction in Nordic and other European countries

Wilfried Admiraal

Centre for the Study of Professions, Oslo Metropolitan University, Oslo, Norway

ABSTRACT

Of the teachers who leave the profession, about half of them are dissatisfied with the school they work at. Teachers' school environment can have both supportive and adverse effects on their satisfaction with school and teaching in general. Yet this relationship might be different for the Nordic countries than for other European countries as the Nordic countries might share a similar education culture stressing social justice, equality and inclusiveness. Analyses of the TALIS 2018 teacher data of 24 European countries including Denmark, Finland, Norway, and Sweden showed that schools with a participative, collaborative, and safe school climate were positively related to teachers' school satisfaction. In contrast, schools with many teachers with feelings of distress were negatively related to teacher satisfaction. These relationships were similar for the Nordic countries and other European countries, which might call an alleged Nordic model of education into question.

1. Introduction

Across Europe teacher shortages occur in secondary education, affecting the quality of students' learning environment with class cancellations, combined classes, and overloaded teachers (EC/EACEA/Eurydice, 2021). Many teachers leave the teaching profession and of the teachers who leave the profession, about half of them are dissatisfied with the school they work at (Federičová, 2021). Teachers' school environment can have a crucial impact on their job satisfaction and the school's ability to retain teachers.

The Nordic countries might give a different picture than other European countries because of the alleged Nordic model. The Nordic model refers to the similarities and shared aims of the education systems developed in the Nordic countries. Traditionally, there have been many similarities and links between the Nordic countries through their historical connections and geographical proximity. The model is based on the concept of *Education for All*, where equity, equal opportunities, and inclusion are consistently cited as the goal of schooling and orientation (Lundahl, 2016). The Nordic countries still have an equal provision of education at all levels, based on the idea that parents' lack of economic resources should not prevent their children from receiving good quality education. Moreover, streaming is largely absent from compulsory education and special education has been moved from separate classes into an inclusive school, integrated into teaching

regular classes. This corresponds to the egalitarian idea of a classless society, which is characterized by individual democratic participation, solidarity, and mutual respect and appreciation for all (Frønes et al., 2020). The Nordic countries have a higher degree of socio-economic variation within compulsory schools than the OECD countries on average (OECD, 2014). This means relatively few students choose a school outside one's neighborhood, which limits educational divisions. There is some discussion about whether a Nordic model of education is a fact or a myth, and whether it is relevant to distinguish Nordic countries (Adams, 2023). Nevertheless, the egalitarian ideas – underlying education in the Nordic countries might influence both teachers' perceptions of the school environment and the extent to which teachers are satisfied with their school and teaching profession in general.

The current study contributes insights into this alleged Nordic model of education and its consequences for the relationship between teachers' school environment and their job satisfaction. It examines differences between the Nordic countries as well as differences between the Nordic countries and the rest of Europe. Comparison of the Nordic countries and other European countries provides an understanding of country-specific relationships and findings that are similar across countries. This can be helpful for further research into school environment factors that influence teachers' job satisfaction. The comparison of each of the Nordic countries with the rest of Europe might also help to break through the so-called Nordic gaze. This refers to a preference of the general public and policymakers to compare educational performances in their country to the other Nordic countries (Kresjler, 2023).

2. School environment and teachers' job satisfaction

2.1. Teachers' school environment

The school environment is an important factor in determining teachers' satisfaction with their school and their teaching profession in general. It can be understood as the psychosocial context in which teachers work and teach (Fisher & Fraser, 1990). In general, three dimensions can be distinguished: (1) Relationship dimension, which refers to the extent to which relevant stakeholders (teachers, school leaders, parents, and students) support and help each other; (2) Personal growth dimension, which refers to the extent to which personal growth and self-enhancement tend to occur; and (3) System maintenance and change dimension, which indicates the extent to which the environment is orderly, clear in expectation, controlled, and responsive to change. All three dimensions should be considered when trying to gain an understanding of working environment in schools (Fraser et al., 1988; Moos, 1979).

Based on these three dimensions, various questionnaires have been developed, such as the Work Environment Scale (WES; Moos, 1979) and the School-Level Environment Questionnaire (SLEQ; Fisher & Fraser, 1990). The latter is revised in several stages and includes five dimensions of how the school environment can be addressed (Johnson et al., 2007): (1) Collaboration referring to teachers working together, sharing experiences and communicating, (2) Student relations referring to engaged students and good relationships between students and teachers, (3) School resources referring to adequate supply of equipment and resources, (4) Decision making referring to teachers' participation in school decisions, and (5) Instructional innovations referring to new ideas and approaches tried out in school. In general, teachers from different types of schools agreed in what they would prefer their school environment to be like, but teachers' perceptions of their actual school environment varied significantly in all dimensions (Docker et al., 1989).

Teachers' school environment has been found to be connected to many significant student outcomes. Studies have shown that a positive school environment is associated with academic achievement, motivation for learning, reduced aggression, lower suspension rates, and many other positive student outcomes (Cohen et al., 2009; Maag Merki et al., 2015; Thapa et al., 2013). The explanation for this relationship between school environment and positive student outcomes relates to teachers'

instructional quality, their motivation to teach and their satisfaction with their job (Nilsen et al., 2016). Safety, relationships, teaching and learning, institutional environment, and school improvement process, all distinguished as dimensions of the school environment (Thapa et al., 2013), are significant factors influencing instruction quality in school (Kaya & Selvitopu, 2022; Scherer & Nilsen, 2016). A positive school environment has also been found to be connected to lower perceptions of stress and higher efficacy among teachers (Collie et al., 2012). In addition, the findings from a study conducted by Ingersoll (2001) suggested that creating a more positive school environment could also be a way to reinforce teacher retention.

2.2. Teachers' school environment and their job satisfaction

The relationship between school environment and teachers' job satisfaction is confirmed in several studies, both in the Nordic countries and other parts of the world. For example, in an Australian study with 781 high-school teachers (Aldridge & Fraser, 2016), the School-Level Environment Questionnaire (SLEQ; Johnson & Stevens, 2001) was used to measure six dimensions of the school environment, each with eight items: (1) Affiliation (the extent to which teachers feel that they can obtain assistance and encouragement and feel accepted by colleagues), (2) Work pressure (the extent to which work pressure and time constraints dominate the school environment), (3) Staff freedom (the extent to which teachers are free to set rules, guidelines, and procedures, and be innovative in their classrooms), (4) Resource adequacy (the extent to which support personnel, facilities, finance, equipment, and resources are suitable and adequate), (5) Goal consensus (the extent to which teachers agree with and are committed to the mission and goals of the school) and (6) Principal support (the extent to which teachers feel that the school's leadership team is approachable and supportive). The authors show that Work pressure (negatively), Resource adequacy and Principal support (both positively) affected teachers' job satisfaction directly, Affiliation and Goal consensus had an indirect positive influence on job satisfaction (through teacher's self-efficacy) and Staff freedom was not related to teachers' job satisfaction.

In the same vein, Huang and Waxman (2009) examined student–teachers' perceptions of the school environment in which they teach and their intention to take up teaching after graduation, which can be understood as a form of job satisfaction. These authors used an adapted version of the Science Teacher School Environment Questionnaire (STSEQ; Huang, 2006) to study the perceptions of 216 student–teachers from 63 schools in a metropolitan area in Taiwan. They found that professional interest from colleagues and staff freedom was positively related with teaching satisfaction; gender equity attitudes, low work pressure and again staff freedom were positively associated with the number of years student–teachers plan to teach; and, finally, collegiality was positively related to whether student–teachers would like to teach at the placement school. These studies show the importance of school environment characteristics for job satisfaction of both in-service teachers and student–teachers. The findings of these studies are confirmed in other questionnaire studies in, for example, Malaysia (Ghavifekr & Pillai, 2016) and Portugal (Lopes & Oliveira, 2020).

2.3. School environment studies with TALIS 2018 data

The role of school environment for teachers' job satisfaction and related outcomes variables has been examined in other studies using the large-scale data set of TALIS 2018 (Admiraal & Kittelsen Røberg, 2023; Gouëdard et al., 2023). A common finding from the studies on factors that are related to teachers' job satisfaction is that individual teacher characteristics, such as motivation to teach and self-efficacy, are important, as well as how teachers perceive their working environment. Concerning the school environment, teachers' workload, student behavior, and collaboration with colleagues appeared to be the most influential ones. Other TALIS studies examined teachers' well-being. Based on the analysis of data from Alberta, the USA, Australia, and New Zealand, Jerrim and Sims (2021) show a statistically significant relationship

between teachers' working hours, on the one hand, and workload stress (positive) and well-being (negative), on the other hand.

Van den Borre et al. (2021) focused on early-career teachers in analyzing TALIS 2018 data. The authors examined the relationship of both individual teacher characteristics and school environment variables with early-career teachers' retention intention (in the number of years someone intends to continue teaching). Teachers' motivation to teach and become a teacher, their satisfaction with their salary, their perception of how the teaching profession is valued in society, their level of preparedness through initial teacher education, and collaborative school culture had a statistically significant and positive relationship with early-career teachers' retention intention; perceived barriers for professional development showed a negative relationship. Although all studies mentioned above included several countries, no significant differences were reported between countries in the relationship between school environment factors and teachers' satisfaction with their school or the teaching profession in general.

2.4. School environment studies in the Nordic countries

Studies on school environment are also reported in the Nordic countries using various instruments. In a study with lower secondary school teachers in Finland, Malinen and Savolainen (2016) found a significant positive relationship between teachers' perceptions of school environment and their job satisfaction, which was also partly mediated by feelings of both individual and collective self-efficacy. School environment characteristics were measured by the Revised School Level Environment Questionnaire (R-SLEQ; Johnson et al., 2007) including items related to collaboration, student relations, decision making, and instructional innovation.

In a Swedish study, Hultin et al. (2021) showed the importance of the school environment for the occurrence of bullying amongst students. In schools with the most favorable school environment, fewer students reported being bullied. In that study, school environment characteristics were measured by the PEdagogical and SOcial Climate (PESOC; Hultin et al., 2019). With PESOC, school environment characteristics are assessed through two key informants, teachers and students, with separate complementary instruments. Toropova et al. (2021) also examined teacher perceptions in Sweden using data from the TIMMS 2015 (Trends in International Mathematics and Science Study). Teachers' perceptions of support from school principals, student discipline in school, the access to school resources, and teacher collaboration were positively related to their job satisfaction. This was also the case for teachers' perceived workload, although a little less strong.

The findings with respect to the importance of teacher collaboration were confirmed in a study of Larsen and Hesby Mathé (2023) who examined teachers' perceptions of their school as a democratic school. Based on a questionnaire study with 206 teachers from five schools in Eastern Norway, these authors found that both teacher collaboration and collaboration between teachers and school principals had a positive relationship with the perceived state of democracy in their schools. Also in Norway, Skaalvik and Skaalvik (2017) examined upper-secondary school teachers' perceptions of working conditions in school and their job satisfaction. In three counties of central Norway, 546 teachers completed a questionnaire. Using the Job Demands and Resources theory, the authors found significant positive relationships of time pressure and social school climate with teachers' job satisfaction.

3. This study

A common finding from the studies mentioned above is that a collaborative and participative school climate and good relationship between and amongst students and teachers are the main factors of a school environment showing positive relationships with teachers' job satisfaction. Yet the studies do not give clear insight into the relationships between the school environment factors and teachers' job satisfaction in the Nordic countries and whether this relationship is

different within the Nordic countries and between the Nordic countries and other European countries. The different measurements of both school environment and job satisfaction mainly caused this lack of clarity. The Nordic countries share a collaborative and participative culture in general (c.f. Frønes et al., 2020), which might suggest that teachers and schools might differ from their counterparts in other European countries. Yet teachers in the Nordic countries not only differ in their perceptions of job satisfaction (Zakariya, 2020), schools might also differ in the work environment they provide for their teachers. In addition, the importance of these working conditions in school for teachers' job satisfaction might also differ between the Nordic countries. Analyses of the TALIS 2018 teacher data can contribute to more clarity about the relationship of school environment with teachers' job satisfaction in the Nordic countries. The following research questions directed this study:

(1) To what extent do teachers in the Nordic countries differ in their job satisfaction from other European countries?
(2) To what extent do schools in the Nordic countries differ in teachers' perceptions of their school environment from other European countries?
(3) How are teachers' perceptions of the school environment in Nordic and other European countries related to their satisfaction with their school?

In order to study the relationship between school environment and teachers' job satisfaction (research question 3), we focus on teachers' satisfaction with the school they are working in as an indicator of their job satisfaction. Satisfaction with school appeared to be one of the most important factors why teachers stay in the profession (Federičová, 2021).

4. Methods

4.1. Procedure

The procedure for the development and administration of the TALIS 2018 questionnaire is reported in a technical report (OECD, 2019). This report also describes how the data collection has been monitored and which quality checks have been carried out. The current study focused on the data for lower secondary education as in the TALIS teacher data set much more data is available for lower secondary education than for primary education and no data on primary education have been gathered in Norway. Data from Iceland were withdrawn from the international database to protect participants' privacy, with no further information available in the technical report.

In most countries, a sample was drawn including 200 schools. Within each school, the questionnaire was distributed to 20 teachers or all teachers if fewer than 20 teachers were employed in a school. The number of students, denomination, and degree of urbanization were considered in the selection of schools. Selected schools were examined for a proportional distribution according to subject area, age, and gender of the teachers working in these schools. Data from a school were included in the final data file if at least 50% of the teachers contacted had completed a questionnaire. Various quality checks have been carried out that indicate that the final included data are representative. All documents that are relevant for information about TALIS 2018 (the questionnaires itself, the technical report on the data collection, the analysis plan containing the variables and possible analyses, and the conceptual framework underlying the questionnaire) can be accessed via the OECD website (https://www.oecd.org/education/talis/talis-2018-data.htm). In the description of the variables below, references are included to the specific items from the TALIS teacher questionnaire. The items that were used in the current study are included in the Appendix.

Table 1. Number of teachers (percentages between brackets) and schools, per country.

	$N_{schools}$ (sampled)	$N_{schools}$ (valid)	Response rate	$N_{teachers}$
Austria (A)	277*	246	89	4255 (5.5)
Belgium-Dutch (Bd)	200	182	91	3122 (4.0)
Belgium-French (Bf)	20	120	100	2135 (2.8)
Bulgaria (BG)	200	200	100	2862 (3.7)
Croatia (HR)	196*	188	96	3358 (4.3)
Cyprus (CY)	99	88	89	1611 (2.1)
Czech Republic (CZ)	219*	219	100	3447 (4.5)
Denmark (DK)	196*	141	72	2001 (2.6)
England (ENG)	192*	149	78	2327 (3.1)
Estonia (EST)	195*	195	100	3004 (3.9)
Finland (FIN)	148*	148	100	2851 (3.7)
France (F)	199*	176	88	3006 (3.9)
Hungary (H)	193*	189	98	3245 (4.2)
Italy (I)	193*	191	99	3612 (4.7)
Latvia (LV)	148*	135	91	2315 (3.0)
Lithuania (LT)	195*	195	100	3759 (4.9)
Malta (M)	58*	55	95	1656 (2.1)
Netherlands (NL)	146*	116	79	1884 (2.4)
Norway (N)	200	185	93	4154 (5.4)
Portugal (P)	200	200	100	3676 (4.8)
Rumania (RO)	199*	199	100	3658 (4.7)
Slovakia (SK)	199*	176	88	3015 (3.9)
Slovenia (SLO)	150	132	88	2094 (2.7)
Spain (E)	399	399	100	7407 (9.6)
Sweden (S)	192*	180	94	2782 (3.6)

*Some sampled schools were not eligible.

4.2. Participants

For lower secondary education, 77,285 teachers from 4,404 schools have completed the questionnaire. In Table 1, the number of schools and teachers is presented for each country. Response

Table 2. Background information participants TALIS 2018 secondary education (frequencies (f), percentages (%), mean scores (M) and standard deviations (SD)).

	f	%	M	SD
Gender (item 1)				
Female	55709	72.1		
Male	21575	27.9		
Highest level formal education completed (item 3)				
Lower SE or lower	154	0.2		
SE	1003	1.4		
Post SE	206	0.3		
Associate degree	2647	3.8		
Bachelor	25090	36.0		
Master	39452	56.6		
Doctorate	1135	1.6		
Employment (item 9)				
Tenured	63401	82.7		
Fixed more than 1 year	3602	4.7		
Fixed 1 year or less	9670	12.6		
Employment status (item 10b)				
Full-time (90% or more)	59120	80.4		
Part-time (71–80%)	6763	9.2		
Part-time (50–70%)	4567	6.2		
Part-time (less than 50%)	3082	4.2		
Teaching experience (item 11b)				
In years			17.6	11.1
Working hours per week				
In school (item 16)			36.8	14.9
In teaching (item 17)			18.9	7.7

rates at the school level varied from 72% in Denmark to 100% in many other countries. In Table 2, participants' background characteristics are summarized. Most teachers were female teachers, had a master's degree and had a full-time tenured position in school. In general, the teachers who completed the questionnaire had quite some teaching experience (15–17 years on average).

4.3. Measures

4.3.1. School environment

School environment was measured with a large selection of the items from the TALIS 2018 questions about five aspects related to the school as a place for learning, development, and support (or lack thereof; cf., Fisher & Fraser, 1990): (1) professional development, (2) collaboration with colleagues, (3) attitudes of colleagues toward innovations, (4) school climate, and (5) stressful working conditions. The first four aspects can be understood as *supportive* school environment characteristics (potentially showing *positive* relationships with teachers' job satisfaction) and the last aspect as an *adverse* school environment characteristic (potentially showing *negative* relationships with teachers' job satisfaction). The items that were selected from the TALIS 2018 teacher questionnaire are included in the Appendix. In the description of the five school environment factors and job satisfaction (see Section 4.4), we used the original item numbers to support transparency. Descriptive statistics and reliabilities are presented in Table 3.

4.3.1.1. Professional development. Teachers completed seven items on Barriers to professional development (PD barriers; item 28). After exploratory factor analyses with varimax rotation, the PD barriers items formed two scales explaining 54% of the variance in scores. After reliability analyses, these two scales have been merged into one scale measuring the perceived barriers to attend PD activities (Barriers PD; items 28a–g). Items were measured on a 4-point Likert-type scale with 1 = strongly disagree and 4 = strongly.

4.3.1.2. Collaboration with colleagues. Teachers also completed items about collaboration between teachers in school. Exploratory factor analysis with varimax rotation explaining 52% of the variance in scores suggested two scales: one about Joint work (team teaching, observing each other and providing with feedback, joint activities; items 33a–c) and one about sharing

Table 3. Teacher perceptions of school environment and job satisfaction with means (*M*) and standard deviations (*SD*; number of items and Cronbach's *α* between brackets).

	M	*SD*
School environment		
Barriers PD[1] (items 28a–g; *α* = 0.71)	2.16	0.55
Distress[2] (items 51a, c, d; *α* = 0.84)	2.11	0.77
High workload[2] (items 52a–c; *α* = 0.79)	2.21	0.79
Additional tasks[2] (items 52d, e, i; *α* = 0.75)	2.30	0.62
Innovations[1] (items 32a–d; *α* = 0.90)	2.90	0.61
Joint work[3] (items j33a–c; *α* = 0.56)	2.52	1.14
Sharing experiences[3] (items 33d–h; *α* = 0.75)	3.94	1.05
Participative climate[1] (items 48a–c; *α* = 0.82)	2.88	0.56
Collaborative climate[1] (items 48e–h; *α* = 0.80)	2.90	0.54
Safe school climate[1] (items 49a–e; *α* = 0.81)	3.22	0.43
Job satisfaction		
School[1] (items 53c, e, g; *α* = 0.79)	3.18	0.62
Career choice[1] (items 53a, b, d, f, j; *α* = 0.82)	3.07	0.59
Teaching profession[1] (items 53h, 54c–e; *α* = 0.79)	1.82	0.58

[1]1 = strongly disagree; 4 = strongly agree.
[2]1 = not at all; 4 = a lot.
[3]1 = never, 2 = once a year or less, 3 = 2–4 times a year, 4 = 5–10 times a year, 5 = 1–3 times a month and 6 = once a week or more.
[4]1 = not important at all; 4 = of high importance.

materials, activities, and experiences (Sharing experiences; items 33d–h). Items for joint work and sharing experiences were measured on a 6-point scale with 1 = never, 2 = once a year or less, 3 = 2–4 times a year, 4 = 5–10 times a year, 5 = 1–3 times a month and 6 = once a week or more.

4.3.1.3. Attitudes of colleagues toward innovations. Teachers indicated to what extent innovations are supported in school (Innovations; items 32a–d, new ideas for teaching and learning, open to change, new way to solve problems, new ideas are supported). This scale was extracted from exploratory factor analysis with varimax rotation explaining 76% of the variance in scores. Items on innovative culture were measured on a 4-point Likert-type scale with 1 = strongly disagree and 4 = strongly agree.

4.3.1.4. School climate. Exploratory factor analyses with varimax rotation on items related to school climate (items 48 and 49) resulted in three scales (65% explained variance): one scale about the participation of staff, parents, and students (Participative school climate; items 48a–c), one scale about mutual support and common beliefs and rules (Collaborative climate; items 48e–h) and one scale about trust and good relationships (Safe school climate; items 49a–e). One item (48d) was deleted because of cross-loadings. Items on participative climate, collaborative climate, and safe school climate were measured on a 4-point Likert-type scale with 1 = strongly disagree and 4 = strongly agree.

4.3.1.5. Stressful working conditions. Stressful working conditions refer to feelings of distress (items 51a–d) and a list of sources of stress (items 52a–k) of which teachers indicated to what extent they experienced these on a 4-point Likert-type scale with 1 = not at all and 4 = a lot. Based on exploratory factor analysis with varimax rotation, three scales could be extracted, explaining 59% of the variance in scores. First, Feelings of distress is a collection of three of the four original items (items 51a, c, d) referring to negative influences of work on mental and physical health. Item 51b was left out because of a low factor loading. Second, High workload refers to too many things to do (items 52a–c) and third Additional tasks to having additional tasks to teaching (items 52 d, e, i). The other items were deleted because of high cross-loadings.

4.3.2. Teachers' job satisfaction

Zakariya (2020) distinguished two aspects of teachers' job satisfaction based on analyses of the TALIS 2018 teacher data set (item 53): satisfaction with the work environment and satisfaction with the profession. However, item 54 with 5 statements about the societal recognition of the teacher profession has been left out of the analyses of Zachariya. In the current study, job satisfaction was measured based on 15 statements (both items 53 and 54) and sorted into three clusters after exploratory factor analysis with varimax rotation explaining 64% of the variance in scores. The first cluster of items concerned satisfaction with the school where one currently works (School). The second cluster of items concerned satisfaction with the choice of a career as a teacher (Career choice). The third cluster of items related to societal recognition of the teaching profession (Teaching profession). Items were measured on a 4-point Likert-type scale with 1 = strongly disagree and 4 = strongly agree.

The descriptive statistics and reliabilities for the three aspects of job satisfaction are summarized in Table 3. The correlations between the three indicators of job satisfaction were $r = 0.26$ (career choice and teaching profession), $r = 0.46$ (school and career choice), and $r = 0.15$ (school and teaching profession).

4.4. Analyses

All variables show a satisfying reliability with a Cronbach $\alpha > 0.70$ (cf. Nunnally, 1978), except for Joint work, which included only three items. In the current study, data have been analyzed from

four Nordic countries (Denmark, Finland, Norway, and Sweden) and 21 other European countries combined.

To answer the first research question about differences between the Nordic countries and other European countries with respect to teachers' job satisfaction multivariate analysis of variance and post-hoc analysis (Scheffé) have been performed with the countries as independent variable and the three indicators of job satisfaction as dependent variables.

To answer the second research question about differences between the Nordic countries and other European countries with respect to perceived school environment, all school environment factors have been aggregated to the school level to measure how schools can be characterized in terms of school environment. Then similar analyses were performed as for the first research question, now with the aggregated school environment factors as dependent variables.

To answer the third research question about the relationship between school environment and teachers' satisfaction with school two-level multi-level regression analyses have been performed with the aggregated school environment factors as predictors and teachers' satisfaction with school as dependent variable. These regression analyses have been performed separately for Denmark, Finland, Norway, Sweden, and Other European countries. For the latter, three-level regression analysis has been performed to split variance at the country level. The school environment factors were centered around the grand mean to facilitate interpretation of the coefficients. In total, five random intercepts models were run, one for each country or country group.

5. Findings

5.1. Teachers' job satisfaction

The results of the multivariate analysis of variance with respect to teachers' job satisfaction are summarized in Table 4. The differences in teachers' job satisfaction between the Nordic countries and between the Nordics and other European countries are significant, but very small (Wilks $\lambda(12, 69982) = 0.953$; $p < 0.001$; $\eta^2 = 0.016$). Teachers in Denmark and Norway are generally more satisfied, and teachers in Finland and Sweden are less satisfied with their schools than teachers in other European countries ($F(4, 69982) = 72.251$; $p < 0.001$; $\eta^2 = 0.004$). For satisfaction with their career choice, teachers in Finland and Norway are generally more satisfied and teachers in Denmark and Sweden less satisfied with their career choices than teachers in other European countries ($F(4, 69982) = 32.088$; $p < 0.001$; $\eta^2 = 0.002$). Finally, concerning satisfaction with the teaching profession in general, teachers in again Finland and Norway are generally more satisfied and teachers in Denmark are less satisfied than their colleagues in Sweden and other European countries ($F(4, 69982) = 3727.005$; $p < 0.001$; $\eta^2 = 0.04$). All significant differences are very small with less than 1% explained variance.

5.2. School climate

The results of the multivariate analysis of variance concerning school environment factors are summarized in Table 5. The differences in schools within the Nordic countries and between the Nordics

Table 4. Multivariate analyses of variance with respect to teachers' job satisfaction.

	Europe M (SD) N = 59046	Denmark M (SD) N = 1845	Finland M (SD) N = 2760	Norway M (SD) N = 3854	Sweden M (SD) N = 2578
Job satisfaction					
School	3.18 (0.62)	**3.32 (0.58)**	*3.10 (0.60)*	**3.30 (0.57)**	3.19 (0.62)
Career choice	3.08 (0.59)	*3.01 (0.62)*	**3.16 (0.57)**	**3.12 (0.57)**	*3.01 (0.62)*
Teaching profession	1.79 (0.57)	*1.65 (0.53)*	**2.27 (0.55)**	**2.08 (0.55)**	*1.76 (0.53)*

Mean scores printed **bold** are significantly **higher** than the mean scores in Europe (based on Scheffé post-hoc tests with $a < 0.05$). Significantly *lower* scores are printed in *italics*.

Table 5. Multivariate analyses of variance with respect to school environment.

School environment	Europe M (SD) N = 3533	Denmark M (SD) N = 141	Finland M (SD) N = 176	Norway M (SD) N = 185	Sweden M (SD) N = 180
Barriers PD	2.17 (0.27)	2.12 (0.21)	*2.07 (0.18)*	*2.07 (0.15)*	*2.08 (0.23)*
Distress	2.10 (0.38)	2.16 (0.31)	**2.20 (0.30)**	*1.91 (0.23)*	2.10 (0.27)
High workload	2.14 (0.37)	**2.69 (0.43)**	**2.46 (0.23)**	**2.25 (0.26)**	**2.35 (0.28)**
Additional tasks	2.29 (0.28)	2.36 (0.29)	**2.45 (0.19)**	*2.14 (0.22)*	**2.40 (0.23)**
Innovations	2.90 (0.28)	**2.97 (0.25)**	*2.83 (0.24)*	**2.97 (0.22)**	2.91 (0.30)
Joint work	2.48 (0.58)	**2.99 (0.63)**	**2.69 (0.53)**	**2.76 (0.61)**	**2.81 (0.59)**
Sharing experiences	3.87 (0.50)	**4.29 (0.46)**	*3.64 (0.31)*	**4.92 (0.34)**	**4.78 (0.35)**
Participative climate	2.89 (0.27)	*2.32 (0.27)*	*2.76 (0.25)*	2.94 (0.22)	*2.81 (0.26)*
Collaborative climate	2.92 (0.26)	*2.78 (0.26)*	*2.79 (0.25)*	2.91 (0.26)	2.89 (0.30)
Safe school climate	3.22 (0.19)	**3.37 (0.23)**	3.22 (0.20)	**3.40 (0.18)**	**3.30 (0.24)**

Mean scores printed **bold** are significantly **higher** than the mean scores in Europe (based on Scheffé post-hoc tests with *a* < 0.05). Significantly *lower* scores are printed in *italics*.

and other European countries concerning school environment are significant and in general large (Wilks $\lambda(40, 4214) = 0.495$; $p < 0.001$; $\eta^2 = 0.161$), although the size of the school differences significantly varies across the school environment factors.

Concerning a *supportive* school environment, three predictors stand out. The largest country differences relate to Sharing experiences with significantly higher scores for schools in Norway, Sweden, and Denmark, and lower scores for schools in Finland, compared to the other European countries ($F(4, 4214) = 383.944$; $p < 0.001$; $\eta^2 = 0.267$). Countries also significantly differ in schools perceived as a Safe school climate ($F(4, 4114) = 63.808$; $p < 0.001$; $\eta^2 = 0.057$) with relatively high scores for schools in Denmark, Norway, and Sweden and relatively low scores for schools in Finland and other European countries. Finally, schools in all four Nordic countries show significantly higher scores on Joint work than schools in other European countries ($F(4, 4214) = 49.810$; $p < 0.001$; $\eta^2 = 0.045$). The differences between schools from the different countries on the other three school environment factors are significant, but small with an effect size of 2% or lower.

For the *adverse* school environment factors, High workload is the predictor with the largest differences between countries ($F(4, 4214) = 115.854$; $p < 0.001$; $\eta^2 = 0.099$), with significantly higher scores for schools in the Nordic countries, compared to other European countries. Additional tasks is the predictor that shows the second largest differences between teachers from different countries ($F(4, 4214) = 36.393$; $p < 0.001$; $\eta^2 = 0.033$). Schools in Finland and Sweden have relatively high scores and schools in Norway have relatively low scores, compared to schools in Denmark and other European countries. The differences between schools in the different countries in the other two adverse school environment factors are significant, but small with an effect size of 2% or lower.

5.3. School environment and teachers' satisfaction with their school

The results of the multi-level regression analyses for school environment and school satisfaction per country are summarized in Table 6. Concerning *supportive* school environment, Safe school climate, Collaborative climate, and Participative climate are the three predictors that are significantly positively related to teachers' satisfaction with their school. Differences between the Nordic countries and between the Nordic countries and the rest of Europe are small. Schools in Finland show a relatively strong positive relationship between Safe school climate and school satisfaction ($\gamma_{10k} = 0.71$) and schools in Norway a relatively strong relationship between Participative climate and school satisfaction ($\gamma_{8k} = 0.29$).

Concerning an *adverse* school environment, schools with many teachers feeling distressed show a negative relationship with teachers' school satisfaction, which is the case for both the Nordic countries and the rest of Europe, with a relatively strong relationship for schools in Finland ($\gamma_{2k} = -0.56$). Schools in Finland also score relatively high on teacher feelings of distress (see Table

Table 6. Multi-level regression analyses for satisfaction with school (regression coefficient B with standard error between brackets).

School environment	Europe N = 59086	Denmark N = 1845	Finland N = 2720	Norway N = 3854	Sweden N = 2478
Intercept	**3.18 (0.03)**	**3.31 (0.01)**	**3.08 (0.02)**	**3.30 (0.01)**	**3.19 (0.01)**
Fixed parts					
Barriers PD, γ_{1k}	**−0.09 (0.02)**	−0.19 (0.10)	−0.05 (0.10)	0.06 (0.08)	−0.08 (0.07)
Distress, γ_{2k}	**−0.30 (0.02)**	**−0.30 (0.08)**	**−0.56 (0.07)**	**−0.33 (0.07)**	**−0.39 (0.07)**
High workload, γ_{3k}	**0.16 (0.02)**	**0.12 (0.05)**	**0.38 (0.09)**	0.10 (0.06)	**0.13 (0.05)**
Additional tasks, γ_{4jk}	**−0.08 (0.02)**	−0.07 (0.09)	0.10 (0.11)	−0.11 (0.08)	0.04 (0.08)
Innovations, γ_{5k}	**−0.08 (0.02)**	0.06 (0.08)	−0.12 (0.10)	−0.01 (0.09)	0.02 (0.08)
Joint work, γ_{6k}	**−0.03 (0.01)**	−0.02 (0.03)	0.02 (0.04)	0.03 (0.02)	−0.03 (0.03)
Sharing experiences, γ_{7k}	0.00 (0.01)	0.04 (0.05)	−0.10 (0.07)	0.06 (0.04)	0.09 (0.05)
Participative climate, γ_{8k}	**0.15 (002)**	**0.21 (0.07)**	−0.07 (0.08)	**0.29 (0.07)**	**0.18 (0.07)**
Collaborative climate, γ_{9k}	**0.35 (0.03)**	**0.30 (0.31)**	**0.35 (0.11)**	0.17 (0.09)	**0.33 (0.10)**
Safe school climate, γ_{10k}	**0.41 (0.03)**	0.20 (0.11)	**0.71 (0.14)**	**0.36 (0.10)**	**0.32 (0.10)**
Random part					
Country level, σ^2_{v0}	0.014 (0.004)	n.a.	n.a.	n.a.	n.a.
School level, σ^2_{u0}	0.010 (0.001)	0.007 (0.003)	0.020 (0.005)	0.005 (0.002)	0.003 (0.003)
Teacher level, σ^2_{e0}	0.322 (0.002)	0.282 (0.010)	0.364 (0.010)	0.293 (0.007)	0.323 (0.009)
Variance components model					
Country level, σ^2_{v0}	0.012 (0.004)	n.a.	n.a.	n.a.	n.a.
School level, σ^2_{u0}	0.045 (0002)	0.055 (0.009)	0.093 (0.013)	0.038 (0.006)	0.067 (0.010)
Teacher level, σ^2_{e0}	0.322 (0.002)	0.283 (0.010)	0.364 (0.010)	0.293 (0.007)	0.325 (0.010)

Significant effects ($a = 0.05$) are printed **bold**.

5). Remarkably, schools that are perceived as schools with high workload of their teachers show a significant *positive* relationship with school satisfaction in all countries, except Norway, and with a relatively strong relationship for schools in Finland ($\gamma_{3k} = 0.38$). Significant relationships of school satisfaction with Barriers for PD and Additional tasks are only found for the rest of Europe, not for the Nordic countries.

6. Discussion and conclusion

This study reports on the relationship between school environment of secondary schools and teachers' satisfaction with their school based on the analyses of TALIS 2018 teacher data with a focus on four Nordic countries (Denmark, Finland, Norway, and Sweden). Three types of job satisfaction have been examined (satisfaction with the school teachers work in, their satisfaction with teaching as a career choice and the societal recognition of the teaching profession) and 10 factors of the school environment have been distinguished, four adverse and six supportive ones. In general, findings are robust for differences between the Nordic countries and between the Nordic countries and other European countries. This lack of significant differences in teachers' job satisfaction between countries has been confirmed in Admiraal and Kittelsen Røberg (2023).

Teachers from the different Nordic countries differed in the three indicators of job satisfaction, although these differences were small. Teachers in Norway indicated relatively high scores on all three aspects of their job satisfaction, compared to teachers in other European countries. High scores were also found for teachers from Finland (for satisfaction with career choice and with the teaching profession) and from Demark (for satisfaction with their school). Teachers from Sweden rated all three aspects of their job satisfaction similar to teachers from other European countries. These findings add to the conclusions from previous work that shows that teachers in the Nordic countries vary in their satisfaction with their profession, with relatively high scores for Finnish teachers and relatively low scores for Swedish teachers, compared to teachers from other European countries (Zakariya, 2020). Yet in the work of Zakariya the emphasis was on what is labeled in the current study as satisfaction with career choice. The lower scores for Swedish

teachers might be related to marketization and privatazation practices in Sweden (Lundahl, 2016), which might lead to more stress amongst teachers to cope with their job.

Concerning a *supportive* school environment schools in all four Nordic countries were rated high on joint work. This is also the case for sharing experiences and safe school climate, except for schools in Finland. The other supportive school environment factors were rated similarly or somewhat lower for schools in the Nordic countries compared to the other schools in Europe.

For an *adverse* school environment schools in Finland and Sweden were rated relatively high on requesting additional tasks and schools in Finland were also rated relatively high on distress. Schools in all four Nordic countries were rated relatively high on high workload. For schools with barriers to professional development, schools in the Nordic countries were rated similarly or lower than schools in other European countries.

Finally, concerning the relationship between a *supportive* school environment and teachers' satisfaction with the school they work at safe school climate, collaborative climate, and participative climate were significantly and positively related to teachers' school satisfaction across countries, but differences between schools from different countries were small. These positive relationships are in line with what could be expected on the alleged Nordic model of education. Concerning an *adverse* school climate, schools in all European countries including the Nordic countries with a high number of teachers with feelings of distress were negatively related with teachers' satisfaction with their school. Schools with teachers with high workloads were – surprisingly – *positively* related to teachers' satisfaction with school. This relationship was significant for all countries except Norway.

6.1. Participatory and collaborative school climate in Nordic schools

The Nordic model of education (cf., Frønes et al., 2020) points into the direction of the importance of a participatory and collaborative climate in school for teachers' motivation, well-being, and job satisfaction. Yet the findings of the current study do not suggest a difference between Nordic countries and other European countries. Moreover, schools in the Nordic countries were perceived as having a less (Denmark and Finland) or similar (Norway and Sweden) participative and collaborative school climate compared to schools in other European countries.

Changes in school accountability, curriculum reforms, and societal changes such as migration and increasing student diversity in the Nordic countries might explain these unexpected findings as current teachers' expectations and experiences do probably not match with the traditional Nordic importance of participation and collaboration. This means that the alleged Nordic model of education with a focus on participation, collaboration, and equity might be called into question, which is already done in previous work on Nordic education (Frønes et al., 2020; Kresjler, 2023; Lundahl, 2016).

6.2. Ambiguous role of teachers' high work load

Supportive school environment factors of a participative, collaborative, and safe school climate were consistently significantly and positively linked to teachers' school satisfaction, but schools with a relatively high number of distressed teachers (i.e., teachers who experience negative influences of their work on mental and physical health) were more strongly and negatively related to teachers' satisfaction with their school. Again, no differences were found between the Nordic countries and between the Nordic countries and other European countries, although schools in Finland scored slightly higher and schools in Norway slightly lower on distress compared to schools in the other European countries.

Schools with high scores on distress can lead to high turnover of teachers (Federičová, 2021). This negative influence of these schools aligns with the importance of feelings of distress at the individual teacher level, which also shows a large negative effect on all aspects of teachers' job

satisfaction (Admiraal & Kittelsen Røberg, 2023). Yet it seems that schools with a high number of distressed teachers do not have a high workload of their teachers per se because a high workload showed a *positive* relationship with teachers' satisfaction with their school. Findings from previous work (Aldridge & Fraser, 2016; Toropova et al., 2021) are ambiguous concerning the role of workload or work pressure on teachers' motivation to teach and their job satisfaction. Probably, schools with a high workload for their teachers could also be perceived as vibrant school environments in which teachers can find different ways to satisfy their needs.

6.3. Limitations and directions for future research

The current study reports on analyses of TALIS 2018 data, without any additional data collection to validate the interpretations of the findings. Additional qualitative data, such as individual interviews, 360-degree feedback sessions or focus-group meetings with teachers in school as well as student evaluations of school climate characteristics, might add additional insights as well as provide explanations of some ambiguous findings. In particular, more detailed information about teachers' feelings of distress and the causes of these feelings, might give explanations of why schools with a high number of distressed teachers are associated with low teacher satisfaction with school.

A second limitation is the third variable problem. For example, the strong negative relationships between schools with a relatively high number of distressed teachers and teachers' satisfaction with schools might be caused by high correlations of both variables with, for example, characteristics of the school population or the urban setting of a school. Although in the current study inclusion of a variety of predictors of school environment in the regression analysis made the third variable problem less critical, some possibly relevant school environment predictors of teachers' job satisfaction were not covered, such as student behavior, school population, urban setting, and school size. A cross-national study specifically focused on school environment characteristics and the consequences for teachers' motivation for teaching, their job satisfaction and instructional quality can give a more comprehensive understanding of the importance of a supportive school climate for the teaching profession. The findings of the current study provide indications of which predictors should be covered and can be left out.

A third limitation is related to the measurement of the school environment factors. In the current study, these factors are measured by the aggregated answers of all teachers in one school, which provided stable measurements. Yet in TALIS 2018, a separate data set has been gathered from the school principals of the schools that are also included in the teacher questionnaire. In this principal questionnaire, school principals completed both similar and different items about school climate factors. This means that the school's principal data can provide additional school climate factors, which can be included in future analyses of the TALIS data.

6.4. Concluding remarks

The analyses of the TALIS 2018 teacher data with respect to school environment and teachers' job satisfaction did not show large differences between the Nordic countries and between the Nordic countries and other European countries. The positive relationships between schools with a participative, collaborative, and safe school climate, on the one hand, and teachers' satisfaction, on the other hand, were significant and of similar strength for the Nordic countries and the other European countries. This might call into question the Nordic model of education that stresses the importance of a participatory and collaborative school climate. Similarly, schools with a high number of teachers with feelings of distress showed a negative relationship with teachers' satisfaction with the school they work at for both the Nordic and other European countries. Further research is needed to understand the features of these schools and how these features relate to both student and teacher outcomes.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Data, materials and/or code availability

Data and materials available through the OECD website (https://www.oecd.org/education/talis/talis-2018-data.htm).

Authors' contribution

Author conceived and designed the analysis, performed the analysis and wrote the paper.

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