

# ***Teachers' health and the students' academic achievement: A systematic review of literature***

*La salud de los docentes y el rendimiento académico de los estudiantes: una revisión sistemática de la literatura*

Artículo de revisión

Recibido: 24/09/2023 – Aprobado: 08/11/2023- Publicado: 03/12/2023

ISSN - 2619-6336

DOI: <https://doi.org/10.30554/tempuspsi.7.1.5011.2024>

Volumen 7-1 2024

**Mónica Lorena Vargas Betancourt  
Ricardo León Gómez Yepes**

## Abstract

The purpose of this review was to synthesize available evidence on the relationship between school teachers' health and students' academic achievement. Methods. Systematic searches were conducted, through electronic searches until June 2017. Nine articles fit criteria for analysis. Results. Regarding teachers' health, all studies investigated variables related to teachers' mental health, such as: stress, mathematics anxiety, burnout, depression and wellbeing. As a measure of academic achievement, mathematics tests were the most common outcomes. Eight studies reported that students in classes with teachers suffering from mental health problems have lower scores on standardized tests. Conclusions. When teachers suffer mental health problems, they can negatively impact students' academic achievement. Further research is needed to understand the causes of mental health problems in teachers and to establish the best alternatives to prevent these issues.

**Keywords:** mental health, teachers, academic achievement, school students, literature reviews.

## Resumen

El propósito de esta revisión fue analizar la evidencia existente sobre la relación entre la salud de los profesores de primaria y secundaria y el desempeño académico de los estudiantes. Métodos. Se realizó una revisión sistemática de literatura a partir de una búsqueda electrónica con corte a 2017. Nueve artículos cumplieron con los criterios de inclusión. Resultados. Los artículos utilizaron como variable de salud, la salud mental; como medida de desempeño académico, las pruebas de matemáticas. Ocho estudios reportaron que en grados en que los profesores tenían problemas de salud mental, los estudiantes obtenían puntajes más bajos en pruebas estandarizadas. Conclusiones: Los profesores presentan problemas de salud mental que pueden afectar el desempeño de los estudiantes. Se requiere investigar las causas de estos problemas mentales y establecer procesos para prevenirlos.

**Palabras clave:** salud mental, profesores, desempeño académico, estudiantes, colegios

# ***Teachers' health and the students' academic achievement: A systematic review of literature***

## **Para citar este artículo**

Vargas Betancourt, M. L. & Gómez Yepes, R.L. (2024). Teachers' Health and the Students' Academic Achievement: A Systematic Review of Literature. *Tempus Psicológico*, 7(1), 158-189

**Mónica Lorena Vargas Betancourt <sup>1</sup>**  
**Ricardo León Gómez Yepes<sup>2</sup>**

---

<sup>1</sup> Universidad de Antioquia. Correo: lorena.vargas@udea.edu.co. ORCID: <https://orcid.org/0000-0001-7853-0915>

<sup>2</sup> Universidad de Antioquia. Correo: rleon.gomez@udea.edu.co ORCID: <https://orcid.org/0000-0002-2528-544X>

## Introduction

This systematic literature review is part of a large research project aimed at studying the relationship between inner-city public school teachers' working conditions, mental health, and students' academic achievement. The review draws from literature in the fields of education and occupational health, and is aimed at providing an overview of studies on the relationship between school teachers' health with student's academic achievement.

Researchers in education have long been interested in understanding the elements and mechanisms that can explain students' academic achievement. A preliminary review of the literature reveals a growing focus on teachers as one of the main factors for students learning particularly in relation to teachers' working conditions and their impact on academic achievement. Issues related to teachers working conditions that can have a negative impact on students' academic achievement include ineffective leadership style (Barragán Montaña et al., 2014; Levin & Lockheed, 2012; Moore Johnson et al., 2012), deficient co-workers relationships (Barragán Montaña et al., 2014; Borman & Dowling, 2008; Johnson & Stevens, 2006; Levin & Lockheed, 2012; Moore Johnson et al., 2012), absence of team work (Levin & Lockheed, 2012; Borman & Dowling, 2008; Vegas & Petrow, 2008), low administrative support (Borman & Dowling, 2008), low salary (Barret et al., 2006; Borman & Dowling, 2008), limited access to training (Barret et al., 2006; Levin & Lockheed, 2012) and resources (Barragán Montaña et al., 2014; Barret et al., 2006; Johnson & Stevens, 2006), and lack of opportunities to participate in decision-making (Johnson & Stevens, 2006). These findings are valuable for the field of education as they enhance our understanding of factors that affect the quality of students' educational outcomes.

A common thread of this line of inquiry has been to focus on job satisfaction as a mediating factor between teachers' working conditions and student achievement. However, the field of occupational health and safety has long been investigating how working conditions impact workers' health and has generated substantial evidence about "occupational diseases"— which are primarily caused by exposure to negative working conditions. Therefore, drawing from the field of

occupational health and safety, it is reasonable to hypothesize that negative working conditions can have repercussions on teachers beyond job satisfaction, affecting their health. A preliminary review of international literature seems to support this hypothesis:

For example, in Belgium, Bogaert et al. (2014), found that the prevalence of health problems associated with working conditions is higher among secondary school teachers compared to other occupational groups. In Germany, Bauer et al. (2007) found mental health problems associated with the presence of threatening events in 29.8% of 949 teachers. In Italy, Borrelli et al. (2014) reported that teachers' depression and anxiety were associated with high job demands and low social support at work.

In Chile, Cornejo (2008) reported depression, anxiety, burnout and stress as the main teachers' health problems. In Ecuador, 52.7% of 1538 teachers, reported health problems associated with their work; and stress and anxiety were the two more common mental issues (Morales Martinez et al., 2012).

In a study conducted in six Latin American countries Robalino & Körner (2005) found that in the six countries teachers had been diagnosed occupational stress by a doctor, ranging from 27% of teachers in Mexico to 48% of teachers in Ecuador.

In Colombia, Gómez et al. (2009) reported that 15.6% of 343 teachers in public schools had burnout, a syndrome associated with adverse psychosocial working conditions, and reported a 9.46% prevalence in at least one mental health diagnosis (anxiety and depression being the most diagnosed) in a sample of 877 official teachers.

The results of these studies described above allow us to recognize three important points: First, school teachers are exposed to negative working conditions which can affect students' academic achievement. Second, exposure to negative working conditions also impact teachers' health. And third, teachers –from different countries of the world, are already facing illnesses, with

most of them being mental. However, a central question that seems to remain unanswered is to what extent is teachers' mental health associated with students' academic achievement. With this systematic review we aim to identify and synthesize available evidence on the relationship between school teachers' health and students' academic achievement.

## **Methods**

### **Inclusion criteria**

Studies were included for review if they met the following criteria regarding population, setting, independent variables and outcomes.

#### *Population and setting*

The review included studies where participants were either school teachers or one of the populations under investigation, and were working at the time the research was conducted or the data were collected. Key terms selected for these criteria were: School, Teacher, K12, and Education.

#### *Independent variables*

The review included publications that assessed health indicators (physical health, mental health, stress, burnout, sickness, sickness absence, work accidents or injuries, symptomatology, happiness). Key terms selected for these criteria were: health, burnout, stress, depression, anxiety, happiness, wellbeing, sickness, accident, absenteeism, injury, symptomatology, medical incapacity, dysphonia, varicose vein, sickness, and illness.

#### *Outcomes*

The review included studies that used a measure of students' achievement or school effectiveness (associated to students' achievement) as one of the outcomes. Key terms selected for these criteria were: achievement, student growth, school effectiveness, quality, performance, accomplishment.

### **Type of studies**

Both quantitative and qualitative studies were included, because one of the expected results of this review was to characterize the research done in this area of interest.

### **Time and place**

The cutoff date of publication of the studies was June 2017. The review included studies conducted in any country, given its international education perspective.

### **Exclusion criteria**

Studies that did not measure the relationship between teachers' health and students' achievement.

### **Search strategy**

The literature search focused on academic studies, including peer reviewed articles, theses and dissertations. An electronic search was conducted using the following databases: Embase, ERIC, EBSCOHOST (for this database we selected the option "All databases", which included MEDLINE, PsycARTICLES, PsycBOOKS, and PsycINFO), PUBMED, Science Direct and Scielo. The appendix displays the full set of databases used, key terms and search strategy used in each database. The same key terms were used in all databases.

### **Data abstraction**

To record relevant information for the review, we used an extraction table. It included the following fields: author, title, year of publication, country where the research was conducted, study design, sample and setting, variables measured (independent, dependent), measures used for each variable, and main findings.

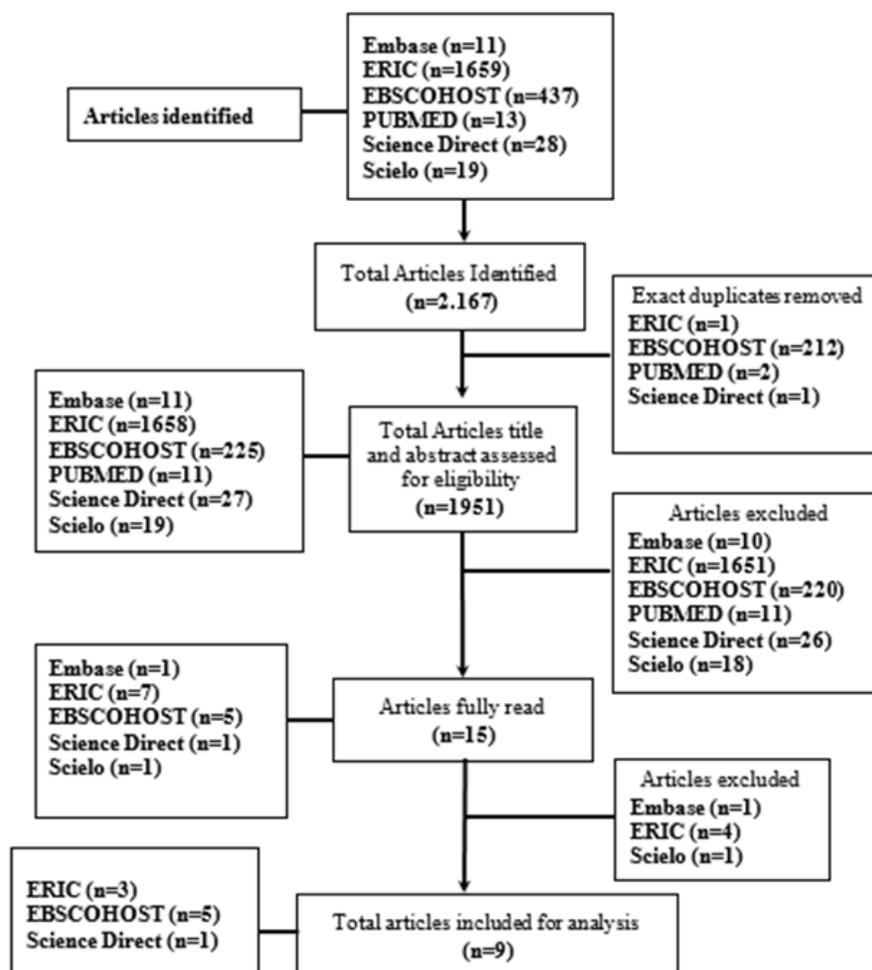
## **Results**

### **Study selection**

Using the presented search strategy, we identified 2167 articles. After removing the duplicates, 1951 studies were considered. We then reviewed all titles and abstracts and excluded all studies that did not meet our inclusion criteria. Finally, only the full text of 15 products met these criteria and were examined in detail. However, six of these articles were excluded as they did not entirely fit the criteria. Ultimately, we included nine articles for analysis. Figure 1 illustrates the detailed article selection process.

**Figure 1**

*Flow diagram of study selection.*



## Description of studies

This section provides a general description of each study included in the analysis and their main findings.

Bakewell et al., (1988): This study surveyed regular and special education teachers' perceptions of stress and support in their working environments and assessed the relationship between teacher stress and academic achievement. Researchers assessed teachers' stress, perceived family and administrative support, advantages and disadvantages in teaching and student academic achievement. The participants included 35 regular education teachers, 28 special education teachers and 58 students. Teachers were interviewed and then the information was coded and rated on Likert scales. Student academic achievement was collected in fall and spring. Results indicated that there was no relationship between teachers' stress and student academic achievement. A limitation was that the measure of stress was not validated.

Bush (1989): This research aimed to investigate whether teacher mathematics anxiety was related to students' mathematics anxiety and achievement, teaching practices, and teacher characteristics. Mathematics anxiety was measured using the Mathematics Anxiety Rating Scale for teachers (MARS) and for students (MARS-A). Students' achievement in Mathematics was assessed using the Mathematics Concepts and Mathematics Problem Solving sections of the Iowa Test of Basic Skills (ITBS). Additionally, for teachers' achievement in mathematics they used the sixth-grade version of the ITBS. Teaching practices were evaluated by audio-recording mathematics lesson and then coding time and frequency of different aspects of the lessons. A total of 31 teachers and 584 students completed all measurements. Mathematic anxiety and achievement measurements were taken twice (in September and May). Audio recording of "typical mathematics lesson" was performed 3 times (in October, January and March). Although the author did not explicitly report the results for the relationship between teacher mathematics anxiety and students' achievement, ANOVA results on students' ITBS and ITBS problem solving scores by type of teachers (teachers with mathematics anxiety vs teachers with no mathematics anxiety) show that students' scores are similar

in both groups of teachers and that teachers' level of anxiety only explains 1% of the variance in students' performance (ANOVA:  $R^2=0.01$ ).

The study of Goldman et al., (1997) aimed to identify the impact of the teachers' mental health consultation on educators and students of elementary schools. The authors measured teachers' readiness to use consultation and consultation effectiveness, students' cognitive competence and academic achievement. They worked with six schools, involving 209 students and 91 teachers who completed all measurements (answered in fall, spring (year 1) and spring (year 2)). The results indicated that teachers' consultation effectiveness has a highly significant positive association with student academic achievement.

The research conducted by Beilock et al., (2010) assessed the relationship between teachers' math anxiety and students' academic achievement using a longitudinal design. The participants included 17 female teachers' of first and second grade, 52 boys and 65 girls. The study measured math anxiety, students' math achievement, gender ability beliefs, and teachers' math knowledge. According to the results, teachers' math anxiety has a significant negative effect on girls' math achievement ( $r = -0.28$ ,  $p = 0.022$ ), but not on boys' math achievement ( $r = -0.04$ ,  $p = 0.81$ ).

In the research conducted by Hadley & Dorward, (2011) they investigated the relationship between teacher anxiety about mathematics, anxiety about teaching mathematics, student mathematics achievement, and instructional practices. General Mathematics Anxiety was measured using the MARS-R, while anxiety about teaching mathematics was assessed using a 12-point Likert scale. Classroom instructional practices were evaluated using a designed a scale, and student achievement was measured with the State end-of-year mathematics test. The study involved 692 elementary teachers and the authors found that students' mathematics achievement was not related to teachers' general anxiety about mathematics. However, there was a low but statistically significant relationship with teachers' anxiety about teaching mathematics ( $r = -.09$ ,  $p < .05$ ).

The study by Hoglund et al., (2015) investigated whether teachers' burnout and classroom quality predicted children's social and academic adjustment in high-needs schools, from kindergarten to 3<sup>rd</sup> grade. They evaluated teachers' burnout, classroom quality, externalizing behaviors, teacher-child relationship quality, school engagement and literacy skills (a measurement for academic achievement). The study involved 65 teachers and 461 children, with collected three times: in January, March/April and May/June. One of their results was that being exposed to more burned-out teachers predicted significantly less growth in children' literacy skills over the term ( $ES=.03$ ). More burned-out teachers also were related to classroom quality, child externalizing behaviors, teacher-child relationship and school engagement ( $ES =.03$ ; simple slope $=.03$ ,  $t[55]=1.99$ ,  $p <.05$ ).

The study conducted by McLean & Connor (2015), was aimed to explore whether teachers' depressive symptoms affected the quality of the classroom-learning environment and students' academic achievement in the third grade. Teachers' depression was measured with the Center for Epidemiologic Studies Depression Scale adapted for this purpose. Classroom Quality was assessed with CLE rubric and student achievement was determined using the Woodcock-Johnson III Test of Achievement (including letter-word identification, picture vocabulary, passage comprehension, math fluency, applied problems) and the Gates-MacGinitie Literacy Test (a reading test) for determined student achievement. The study involved 8 schools, 27 teachers and 523 third-grade students. The results showed that there was no change in student academic achievement as risk for depression increased in teachers (coefficient =  $-0.0005$ ;  $p = .896$ ). However, if students began the school year with weaker math skills and were with teachers who reported more depressive symptoms, there was a weaker math achievement.

The purpose of the study by Klusmann et al. (2016) was to examine the relationship between teachers' emotional exhaustion and students' mathematics achievement, as well as to identify the characteristics that moderate this relationship. The authors measure teachers' emotional exhaustion using the Maslach Burnout Inventory, and the students' achievement using a standardized national

test covering various mathematical topics, including numbers and operations, space and shape, pattern and structures, sizes and measurements, data, frequency and probability. The study involved 1102 mathematics teachers, 22,002 4<sup>th</sup>-grade students and 16,737 parents as participants. Researchers controlled for the characteristics of teachers, classroom and students. The results indicated a negative correlation between exhaustion and students' academic achievement ( $B = -4.56, p < 0.01$ ). Furthermore, this correlation was even stronger in classes with a high percentage of language minority students ( $B = -1.66, p < 0.05$ ).

In the study conducted by of Collie & Martin (2017), the authors initially examined whether teachers' perceived autonomy support (PAS) was associated with adaptability, well-being and organizational commitment. Subsequently, they determined if these constructs were related to student's numeracy achievement. Specifically, teachers' well-being was assessed using four items from Parker and Martin Scale, while student's achievement was evaluated using a multiple-choice test. The study involved 115 high school teachers for phase one and 100 high school teachers for phase two. Data were collected from 1685 students. According to the results, teachers' well-being was directly linked to students' numeracy achievement ( $\beta = 0.21, p = 0.031$ ). PAS was associated with students' numeracy achievement through its impact on teachers' well-being ( $\beta = 0.15, p = 0.03, 95\% \text{ CI } [0.04, 0.33]$ ) and also with adaptability via teachers' well-being ( $\beta = 0.17, p = 0.04, 95\% \text{ CI } [0.04, 0.35]$ ).

### **Context of the studies**

According to the results presented in Table 1, research regarding the relationship between teachers' health and students' academic achievement has primarily been conducted in the US (6), Canada (1), Germany (1), Australia (1) and South Africa (1). Research in this area began in the late 1980s, but it is in the last decade that the majority of the studies have been published, most of them appearing as a journal articles.

**Table 1***Summary of the studies included*

<b>Author</b>	<b>Title</b>	<b>Year</b>	<b>Region</b>	<b>Type of publication</b>
(Bakewell et al., 1988)	Teacher stress and student achievement for mildly handicapped students	1988	US	Research report
(Bush, 1989a)	Mathematics Anxiety in Upper Elementary School Teachers.	1989	US	Journal Article
(Goldman et al., 1997)	Teacher consultation: Impact on teachers' effectiveness and students' cognitive competence and achievement.	1997	US	Journal Article
(Beilock et al., 2010)	Female teachers' math anxiety affects girls' math achievement.	2010	US	Journal Article
(Hadley & Dorward, 2011)	Investigating the relationship between Elementary Teacher Mathematics Anxiety, Mathematics Instructional Practices, and Student Mathematics Achievement.	2011	US	Journal Article
(Hoglund et al., 2015)	Classroom risks and resources: Teacher burnout, classroom quality and children's adjustment in high needs elementary schools.	2015	Canada	Journal Article
(McLean & Connor, 2015)	Depressive Symptoms in Third-Grade Teachers: Relations to Classroom Quality and Student Achievement.	2015	US	Journal Article
(Klusmann et al., 2016)	Teachers' emotional exhaustion is negatively related to students' achievement: Evidence from a large-scale assessment study.	2016	Germany	Journal Article
(Collie & Martin, 2017)	Teachers' sense of adaptability: Examining links with perceived autonomy support, teachers' psychological functioning, and students' numeracy achievement	2017	Australia	Journal Article

**Design of the studies**

Table 2 presents a summary of the main elements of the design of each study. Six of the studies are primarily quantitative and longitudinal, while the remaining three are cross-sectional. Eight articles are non-experimental and one is quasi-experimental. Only one of the studies utilized

both qualitative and quantitative data. The teachers' samples varied from 17 to 1102 and the students' sample varied from  $n=58$  to  $n=22002$ . Eight studies were conducted in elementary schools (one of which included measures from a kindergarten) and one was conducted in high schools.

Regarding the variables assessed, all research studies proposed several variables and used different instruments. In terms of the health variable, one study measured stress, three studies measured mathematics anxiety (with one of them also measuring anxiety about teaching math), two studies measured burnout (with one only assessing emotional exhaustion), one study examined mental health consultation, one focused on depression and one on wellbeing. Concerning the output variables, eight studies measured student achievement using mathematics tests, and four of them also included reading and comprehension skills in their assessments.

Study	Type of Study	Sample and setting	Variables	Measurements	Main findings
(Bakewell et al., 1988)	Longitudinal, exploratory. Mixed methods	63 teachers (35 regular education, 28 special education) 58 students, grade 2-5 17 schools (urban and suburban school district)	1. Teacher stress * 2. Perceived family support 3. Perceived administrative support 4. Teaching advantages 5. Teaching disadvantages 6. Student achievement **	1. Likert scale: teachers rated 1-5 the amount of stress experienced in teaching in general 2. Likert scale: 1 (very little family support) to 4 (very much family support) 3. Likert scale: 1 (very little administrative support) to 4 (very much administrative support) 4. Number of advantages listed by teachers 5. Number of disadvantages listed by teachers 6. Basic Achievement Skills Individual Screener	No relationship between teachers' stress and student academic achievement.
(Bush, 1989a)	Longitudinal, exploratory.	31 teachers 584 Students (completed both batteries)	1. Teacher math anxiety* 2. Student math anxiety 3. Students' Achievement in Mathematics** 4. Teachers' Achievement in Mathematics 5. Time and frequency of teaching behaviors and classroom discourse.	1. Mathematics Anxiety Rating Scale (MARS) 2. Mathematics Anxiety Rating Scale (MARS-A) 3. Mathematics Concepts and Mathematics Problem Solving, Iowa Test of Basic Skills (ITBS), Form 6 4. Sixth-grade version of the ITBS 5. Audio-recorded mathematics lessons	Teachers' level of anxiety explained 1% of the variance in students' performance
(Goldman et al., 1997)	Longitudinal, Quasi-experimental	91 teachers 209 students 6 elementary schools	1. Teachers' readiness to use consultation 2. Teachers' use of consultation 3. Teachers' sense of professional effectiveness * 4. Students' cognitive competence 5. Students' academic achievement**	1. Consultation Readiness Scale (level of relationship between the consultant and the teacher) 2. Consultation Use (individual and group) 3. Consultation Outcome Scale (problem resolution, professional growth and consultee satisfaction). 4. Self-perception profile for children (only cognitive competence subscale) 5. California Test of Basic Skills	Positive relationship between consultation effectiveness and students' academic achievement

Notes: (\*) Concept related to mental health.

(\*\*) Concept related to student academic achievement.

Study	Type of Study	Sample and setting	Variables	Measurements	Main findings
(Beilock et al., 2010)	Longitudinal, non-experimental	17 female teachers (1 <sup>st</sup> and 2 <sup>nd</sup> grades) 52 boys 65 girls	1. Teachers' math anxiety* 2. Students' math achievement** 3. Gender ability beliefs 4. Teachers' math knowledge	1. Short Mathematics Anxiety Rating Scale (sMAPS) 2. Applied Problems subset of the Woodcock-Johnson III Tests of Achievement 3. Drawing a student from two stories: one student good in maths, the other student good in reading. 4. Content Knowledge for Teaching Mathematics (Elementary: Number Concepts and Operations)	Teachers' math anxiety has a negative effect on math achievement only in girls.
(Hadley & Dorward, 2011)	Cross sectional	692 elementary teachers	1. General Math Anxiety* 2. Anxiety about teaching mathematics* 3. Level of adherence to the NCTM (2000) standards for instructional practices. 4. Student Achievement**	1. Mathematics Anxiety Rating Scale-Revised 2. 12 Likert-scaled items for teacher anxiety about teaching mathematics (created). 3. Teacher mathematics instructional practices (measure created) 4. State end-of-year mathematics test	Math achievement was related with teachers' anxiety about teaching mathematics
(Hoglund et al., 2015)	Longitudinal, non-experimental	461 children 65 teachers	1. Teacher burnout* 2. Classroom Quality 3. Externalizing problems 4. Teacher-child relationship quality 5. Friendship quality 6. School engagement 7. Children literacy skills** 8. Child covariates 9. Teacher/classroom covariates	1. Maslach Burnout Inventory 2. Classroom Assessment Scoring System 3. Behavior Assessment System for Children II (aggression, hyperactivity, attention problems) 4. Student-Teacher Relationship Scale (closeness and conflict) 5. Friendship Quality Questionnaire (closeness and conflict) 6. School Engagement Questionnaire (emotional and behavioral) 7. Four items from the Early Childhood Longitudinal Study, Kindergarten Cohort of 1998-1999, 3rd grade assessment 8. Gender (boys, girls) and age (years) 9. Perceived social support, Lerner-centered pedagogy, Classroom ethnic diversity	Being exposed to more burned-out teachers predicted significantly less growth in children' literacy skills over the term

Notes: (\*) Concept related to mental health.

(\*\*) Concept related to student academic achievement

Study	Type of Study	Sample and setting	Variables	Measurements	Main findings
(McLean & Connor, 2015)	Longitudinal, exploratory.	27 teachers 523 students (3 <sup>rd</sup> grade) 8 schools	1. Teachers' Depression* 2. Classroom Quality 3. Student Academic Achievement**	1. Center for Epidemiologic Studies Depression Scale, adapted 2. CLE rubric 3. Woodcock-Johnson III Test of Achievement (Letter-word identification, picture vocabulary, passage comprehension, math fluency, applied problems) and Gates-MacGinitie literacy test (reading test)	Not change in student achievement as risk for depression increases in teachers. Students with weaker math skills at the beginning of the year and with teachers with more depressive symptoms had weaker math achievement.
(Klusmann et al., 2016)	Cross sectional	1102 mathematics teachers 22002 students 4th grade 16737 parents 1349 elementary schools	1. Teachers Emotional Exhaustion* 2. Teachers' gender 3. Teachers' experience 4. Teachers' subject matter knowledge 5. Students' achievement in mathematics** 6. Students' language minority background 7. SES of parents 8. Students' cognitive abilities	1. Maslach Burnout Inventory 2. Demographic information 3. Years of experience as a teacher 4. Teachers' certificate in mathematics 5. National educational standards in mathematics 6. Students' home language: spoke German at home (always to never) 7. International Socioeconomic Index 8. Subtest of the reasoning test "Kognitiver Fähigkeitstest"	Teachers' emotional exhaustion was negatively related to students' academic achievement.
(Collie & Martin, 2017)	Cross sectional	115 high school mathematics teachers (phase 1), 100 teachers for phase 2 1685 students	1. Teachers' perceived autonomy support 2. Teachers' sense of adaptability 3. Teachers' well-being* 4. Teachers' organizational commitment 5. Students' numeracy achievement** 6. Covariates (Gender, age, teaching experience, seniority, school type, amount of extra duties, and grade).	1. 6-item short form of the Work Climate Questionnaire 2. 9-item Adaptability Scale 3. 4 items from Parker and Martin 4. 4 items from Vandenberghe and Bentein 5. 10 items on basic mathematics skills 6. Demographic information	Teachers' well-being was directly associated with students' numeracy achievement

Notes: (\*) Concept related to mental health.

(\*\*) Concept related to student academic achievement

## Quality of the studies

The quality of the studies was assessed using the "Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies" (NIH, 2014). According to this guide, the overall quality score for a research point to the potential for bias in the studies, thereby reflecting the internal validity of the research. For the assessment, each criterion (question) was rated using Y (Yes), N (No), CD (Cannot Determine), NR (Not Reported) and NA (Not Applicable).

Table 3 presents the results of the quality assessment for each study. All studies presented the research question or objectives, defined the population and selected subjects from similar populations, but none of the studies presented a justification of the sample size. Only four studies stated inclusion and exclusion criteria. Furthermore, in all studies, exposure measures were reliable and measured across all participants. Only one study did not clearly define the exposure measure. Concerning the outcome measure, in all studies dependent variables were clearly defined, valid and reliable. Longitudinal studies had at least one-year period; thus, there was sufficient time to expect to see an association between the independent variables and the outcome.

As an overall quality rating, five studies obtained a "less likely for bias" rating (Collie & Martin, 2017; Hadley & Dorward, 2011; Hoglund et al., 2015; Klusmann et al., 2016; McLean & Connor, 2015). This means that results presented by these five studies have more probability to reflect the true relationship between variables. The studies of Bakewell et al. (1988), Bush (1989), Goldman et al. (1997) and Beilock et al. (2010), obtained a "more likely for bias" rating. This suggests that their results are more likely to not accurately represent the true relation between the assessed variables.

**Table 3**

*Quality Assessment for the studies included*

Items	(Bakewell et al, 1988)	(Bush, 1989)	(Goldman et al, 1997)	(Bellock et al, 2010)	(Hadley & Dorward, 2011)	(Hoglund et al, 2015)	(McLean & Connor, 2017)	(Klusmann et al, 2016)	(Collie & Martin, 2017)
Was the research question or objective in this paper clearly stated?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Was the study population clearly specified and defined?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Was the participation rate of eligible persons at least 50%?	N	CD	CD	Y	CD	Y	Y	Y	Y
Were all the subjects selected or recruited from the same or similar populations (including the same time period)?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Were inclusion and exclusion criteria for being in the study prespecified and applied uniformly to all participants?	N	N	Y	N	N	Y	Y	Y	CD
Was a sample size justification, power description, or variance and effect estimates provided?	N	N	N	N	N	N	N	N	N
For the analyses in this paper, were the exposure(s) of interest measured prior to the outcome(s) being measured?	N	N	N	N	N	N	Y	N	N
Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?	Y	Y	Y	Y	NA	Y	Y	NA	NA
For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure, or exposure measured as continuous variable)?	N	N	N	N	NA	N	N	Y	NA
Were the exposure measures (independent variables IV) clearly defined?	N	Y	Y	Y	Y	Y	Y	Y	Y
Were the exposure measures (IV) valid?	NR	Y	Y	Y	Y	Y	Y	Y	Y

4.4

Items	(Bakewell et al., 1988)	(Bush, 1989)	(Goldman et al., 1997)	(Bellock et al., 2010)	(Hadley & Dorward, 2011)	(Hoglund et al., 2015)	(McLean & Connor, 2012)	(Klusmann et al., 2016)	(Collie & Martin, 2017)
Were the exposure measures (IV) reliable?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Were the exposure measures (IV) assessed consistently across all study participants?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Was the exposure(s) assessed more than once over time?	CD	N	Y	Y	NA	Y	N	NA	NA
Were the outcome measures (dependent variables DV) clearly defined?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Were the outcome measures (DV) valid?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Were the outcome measures (DV) reliable?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Were the outcome measures (DV) assessed consistently across all study participants?	CD	Y	Y	Y	Y	Y	Y	Y	Y
Were the outcome assessors blinded to the exposure status of participants?	NA	N	NA	N	NA	N	NA	CD	NA
Was loss to follow-up after baseline 20% or less?	CD	Y	CD	CD	NA	Y	Y	NA	NA
Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?	N	Y	N	Y	Y	CD	Y	Y	Y

## Conclusions of the studies

Of the nine studies included in the analysis, one (Bakewell et al., 1988) reported no association between the independent and dependent variables, specifically teachers' stress and students' academic achievement (spelling, math and reading).

Four studies (Collie & Martin, 2017; Goldman et al., 1997; Hoglund et al., 2015; Klusmann et al., 2016) reported an association between teachers' mental health outcomes and student achievement. Collie & Martin (2017) reported a positive association between teachers' well-being and students' numeracy achievement ( $\beta = 0.21$ ,  $p = 0.031$ ). Goldman et al. (1997) found an increment of students' scores when teachers' consultation effectiveness were moderate and high [Moderate:  $F(1,16) = 16.33$ ,  $p < .001$ ; High:  $F(1, 14) = 15.35$ ,  $p < .01$ ]. According to Hoglund et al. (2015), teacher burnout predicted significantly less growth in students' literacy skills ( $ES = .03$ ). Klusmann et al. (2016) concluded that students' with more exhausted teachers obtained lower scores on their mathematics tests ( $\beta = -4.56$ ,  $p < .01$ ), even when controlling for teachers' years of experience ( $\beta = 3.34$ ,  $p < .05$ ), teaching certificate in mathematics ( $\beta = 7.46$ ,  $p < .01$ ), and individual student characteristics.

Four studies presented "not conclusive" results in the sense that they all reported association between teachers' health and student achievement; however, in the case of Bush (1989), he found that only 1% of the variance of student achievement was explained by teachers' health. Beilock (2010), reported that teachers' mathematic anxiety was associated with girls' mathematic achievement ( $r = -0.28$ ,  $p = 0.022$ ) but not boys ( $r = -0.04$ ,  $p = 0.81$ ). Hadley & Doward (2011), concluded that there was an association between students' achievement and teachers' anxiety about teaching ( $r = -.09$ ,  $p < .05$ ) but not with teachers' anxiety. Finally, McLean & Connor (2015), reported an association between teachers' depression and student achievement but only for those students that had low mathematics scores from the beginning of the year (coefficient =  $-0.009$ ;  $p = .030$ ).

## **Studies' recommendations**

Three types of recommendations emerged from the results of the different studies. Authors of earlier studies (Bakewell et al., 1988; Bush, 1989) suggested more research (longitudinal) on teachers' mental health and student achievement. Two studies (Beilock et al., 2010; Hadley & Dorward, 2011) proposed better training new and current teachers for their professional development and improvement of their skills, specifically in mathematics teaching. Finally, five studies advocated for the implementation of mental health programs for teachers at schools (Collie & Martin, 2017; Goldman et al., 1997; Hoglund et al., 2015; Klusmann et al., 2016; McLean & Connor, 2015).

## **Discussion**

This systematic literature review was part of a large research project aimed at studying the relationship between public school teachers' working conditions, mental health, and students' academic achievement in Colombia. The goal of this review was to identify and synthesize the available evidence regarding to the relationship between school teachers' health and students' academic achievement. Nine studies met the criteria for inclusion in the analysis. From the results, several points are worth highlighting.

First, interest in the relationship between teachers' health and student academic achievement appears to be stronger in the United States than in other regions of the world, with some research conducted in Canada, Europe and Australia (Collie & Martin, 2017; Hoglund et al., 2015; Klusmann et al., 2016). It is interesting to note that even though we used one of the most important scientific databases for Latina America and the Caribbean, we found no publications on the topic. This result presents an important opportunity for our project to contribute evidence on this international and comparative education subject, as the issue of teachers' health and students' academic achievement is a concern for many educational systems worldwide.

Second, regarding measures of teachers' health, all studies focused on mental health variables. None of the studies included physical health variables, such as voice disorders, varicose

veins, cardiovascular diseases or musculoskeletal disorders, which are also prevalent in this occupational group (Scheuch et al., 2015). Stress (Bakewell et al., 1988), mathematics anxiety (Beilock et al., 2010; Bush, 1989; Hadley & Dorward, 2011), burnout (Hoglund et al., 2015; Klusmann et al., 2016), depression (McLean & Connor, 2015) and well-being (Collie & Martin, 2017) were the variables used in the studies. It is important to note that mental health problems have been studied in the field of occupational health and safety, particularly their association with working conditions (specifically exposition to psychosocial risk factors), to the point that the International Labour Organization (ILO) finally included mental and behavioral disorders in the occupational diseases list (Kim & Kang, 2013).

Third, math scores in standardized tests were the main measure of students' academic achievement and were used in eight of the reviewed studies. The debate over whether standardized test should be the main measure for students' learning and whether mathematics or literacy skills (such as reading and comprehension) are the main competences expected from an educational system continues. Some authors, such as Arnove et al., (2013) and Hopson et al., (2009) are proposing alternative ways to evaluate students' achievement, including valuing students' differences and designing evaluations adapted to the local characteristics of individual educational systems in each country. However, at least on the issue analyzed in this review, scores in standardized tests were the chosen measure for students' academic achievement.

Fourth, the analysis of the methodological aspects of the studies shows that research on this topic is mostly quantitative. Only one study included a qualitative component (Bakewell et al., 1988). Six studies used longitudinal designs. Although longitudinal designs are more robust than cross-sectional designs because they allow researchers to gather more information in multiple points in time and observe participants' behavior at different moments, the three cross-sectional studies included in this review obtained a "less likely for bias" score.

Regarding the findings on the relationship between mental health and students' achievement, only Bakewell et al. (1988) did not find an association. However, this study received a "more

likely bias” score during the quality assessment. Specifically, in this study the instrument used for measuring stress was not validated, making it impossible to determine whether it measured stress or another construct. On the other hand, all studies with higher quality assessment scores reported an association between teachers’ mental health and student achievement. In other words, students in classes with teachers experiencing mental health problems also had lower academic achievement scores in standardized tests.

Another point of interest in this review is the recommendations proposed by researchers. The most common recommendation is to implement training activities and consultation after detecting mental health problems. While these activities are relevant for assisting teachers in the short term, they may not be sufficient. The field of occupational health and safety has shown that it is important not only to attend the cases of workers who already have an illness, but also to implement programs that prevent workers from being exposed to risk factors (Tsutsumi & Shimazu, 2016). This means that if working conditions are affecting teachers’ health, then it is also essential to change these working conditions or the exposure to them. Identifying which workings conditions may be related to teachers’ mental health is one step in this direction.

As stated at the beginning of this paper, this review is part of a larger research project aimed at contributing to the understanding of factors that are associated with students’ academic achievement. It is a research that bridges the fields of education and occupational health and the results of this systematic review provide further motivation to continue this line of inquiry, as the results indicate that teachers’ poor mental health can have a negative impact on students’ achievement. We also hope to raise awareness of this subject in the field of international and comparative education, as research is showing that teachers’ health and their working conditions is not a local concern, but global issues shared by different countries. Finally, we aim to draw attention in the field of occupational health, which, at least in Colombia, has not yet thoroughly examined the working conditions and health of this specific group.

## **Conclusion**

According to this review, teachers are suffering mental health problems and it can become a factor that negatively impacts students' academic achievement. Further research is needed to understand the causes of mental health problems in teachers and to establish the best alternatives to aid them to overcome such problems.

- Arnove, R. F., Torres, C. A. & Franz, S. (2013). *Comparative education: the dialectic of the global and the local*. Rowman & Littlefield Publishers.
- Bakewell, D., McConnell, S., Ysseldyke, J. & Christenson, S. (1988). *Teacher stress and student achievement for mildly handicapped students*. University of Minnesota. <https://files.eric.ed.gov/fulltext/ED304815.pdf>
- Barragán Montaña, L., García Jaramillo, S., Maldonado Carrizosa, D., Perry, G., Rodríguez Orgales, C., Saavedra Calvo, J. E., Segovia Ospina, I., Camacho Álvarez, P. & Londoño Amaya, C. (2014). *Tras la excelencia docente: cómo mejorar la calidad de la educación para todos los colombianos*. Fundación Compartir. <https://www.fundacioncompartir.org/pdf/Tras%20la%20excelencia%20docente%20-%20estudio%20final.pdf>
- Barret, A. M., Chawla-Duggan, R., Lowe, J., Nickel, J. & Ukpo, E. (2006). *The concept of quality in education: a review of the “international” literature on the concept of quality in education*. EdQual. [https://www.edqual.org/publications/workingpaper/edqualwp3.pdf/at\\_download/file.pdf](https://www.edqual.org/publications/workingpaper/edqualwp3.pdf/at_download/file.pdf)
- Bauer, J., Unterbrink, T., Hack, A., Pfeifer, R., Buhl-Griesshaber, V., Müller, U., Wesche, H., Frommhold, M., Seibt, R., Scheuch, K. & Wirsching, M. (2007). Working conditions, adverse events and mental health problems in a sample of 949 German teachers. *International Archives of Occupational and Environmental Health*, 80(5), 442–449. <https://doi.org/10.1007/s00420-007-0170-7>
- Beilock, S. L., Gunderson, E. A., Ramirez, G. & Levine, S. C. (2010). Female teachers’ math anxiety affects girls’ math achievement. *Proceedings of the National Academy of Sciences*, 107(5), 1860–1863. <https://doi.org/10.1073/pnas.0910967107>

- Bogaert, I., De Martelaer, K., Deforche, B., Clarys, P. & Zinzen, E. (2014). Associations between different types of physical activity and teachers' perceived mental, physical, and work-related health. *BMC Public Health*, 14(1), 1-9. <https://doi.org/10.1186/1471-2458-14-534>
- Borman, G. D. & Dowling, N. M. (2008). Teacher Attrition and Retention: A Meta-Analytic and Narrative Review of the Research. *Review of Educational Research*, 78(3), 367–409. <https://doi.org/10.3102/0034654308321455>
- Borrelli, I., Benevene, P., Fiorilli, C., D'Amelio, F. & Pozzi, G. (2014). Working conditions and mental health in teachers: a preliminary study. *Occupational Medicine*, 64(7), 530–532. <https://doi.org/10.1093/occmed/kqu108>
- Bush, W. S. (1989). Mathematics Anxiety in Upper Elementary School Teachers. *School Science and Mathematics*, 89(6), 499–509. <https://doi.org/10.1111/j.1949-8594.1989.tb11952.x>
- Collie, R. J. & Martin, A. J. (2017). Teachers' sense of adaptability: Examining links with perceived autonomy support, teachers' psychological functioning, and students' numeracy achievement. *Learning and Individual Differences*, 55, 29–39. <https://doi.org/10.1016/j.lindif.2017.03.003>
- Cornejo, R. (2008). Salud laboral docente y condiciones de trabajo. *Revista Docencia*, 16(35), 77–85. [https://367f779f7e.cbaul-cdnwnd.com/731432c0f445527840ec620c39123f40/200000006-0614d070dc/Cornejo\\_%20Entre%20el%20sufrimiento%20individual%20y%20los%20sentidos%20colectivos\\_salud%20laboral%20docente%20y%20condiciones%20de%20trabajo.pdf](https://367f779f7e.cbaul-cdnwnd.com/731432c0f445527840ec620c39123f40/200000006-0614d070dc/Cornejo_%20Entre%20el%20sufrimiento%20individual%20y%20los%20sentidos%20colectivos_salud%20laboral%20docente%20y%20condiciones%20de%20trabajo.pdf)

- Goldman, R. K., Botkin, M. J., Tokunaga, H. & Kuklinski, M. (1997). Teacher consultation: Impact on teachers' effectiveness and students' cognitive competence and achievement. *American Journal of Orthopsychiatry*, 67(3), 374–384. <https://doi.org/10.1037/h0080240>
- Gómez, C., Rodríguez, V., Padilla, A. C. & Avella, C. B. (2009). El docente, su entorno y el síndrome de agotamiento profesional (SAP) en colegios públicos en Bogotá (Colombia). *Rev Colomb Psiquiatr*, 38(2), 279–93. <https://www.redalyc.org/pdf/806/80615421005.pdf>
- Hadley, K. M. & Dorward, J. (2011). Investigating the Relationship between Elementary Teacher Mathematics Anxiety, Mathematics Instructional Practices, and Student Mathematics Achievement. *Journal of Curriculum and Instruction*, 5(2), 27-44. <https://doi.org/10.3776/joci.2011.v5n2p27-44>
- Hoglund, W. L. G., Klinge, K. E. & Hosan, N. E. (2015). Classroom risks and resources: Teacher burnout, classroom quality and children's adjustment in high needs elementary schools. *Journal of School Psychology*, 53(5), 337–357. <https://doi.org/10.1016/j.jsp.2015.06.002>
- Hopson, R. K. M., Yeakey, C. C. & Boakari, F. M. (2009). *Power, voice and the public good Schooling and education in global societies*. Emerald Group Publishing Limited.
- Johnson, B. & Stevens, J. J. (2006). Student achievement and elementary teachers' perceptions of school climate. *Learning Environments Research*, 9(2), 111–122. <https://doi.org/10.1007/s10984-006-9007-7>
- Kim, E. A. & Kang, S. K. (2013). Historical review of the List of Occupational Diseases recommended by the International Labour organization (ILO). *Annals of Occupational and Environmental Medicine*, 25(1), 1-10. <https://doi.org/10.1186/2052-4374-25-14>

- Klusmann, U., Richter, D. & Lüdtke, O. (2016). Teachers' emotional exhaustion is negatively related to students' achievement: Evidence from a large-scale assessment study. *Journal of Educational Psychology*, 108(8), 1193–1203. <https://doi.org/10.1037/edu0000125>
- Levin, H. M. & Lockheed, M. E. (2012). *Effective schools in developing countries*. Routledge. <http://site.ebrary.com/id/10569284>
- McLean, L. & Connor, C. M. (2015). Depressive Symptoms in Third-Grade Teachers: Relations to Classroom Quality and Student Achievement. *Child Development*, 86(3), 945–954. <https://doi.org/10.1111/cdev.12344>
- Moore Johnson, S., Kraft, M. A. & Papay, J. P. (2012). How context matters in high-need schools: the effects of teachers' working conditions on their professional satisfaction and their students' achievement. *Teachers College Record*, 114(10), 1–39. <https://scholar.harvard.edu/mkraft/publications/how-context-matters-high-need-schools-effects-teachers'-working-conditions-their>
- Morales Martinez, E. S., Merchan, M. G. & Parra, J. (2012). Condiciones laborales y de salud de los docentes del Ecuador – 2011-2012. *Revista Retratos de La Escuela*, 6(11), 379–390. <https://doi.org/10.22420/rde.v6i11.239>
- NIH. (2014). *Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies*. <https://www.nhlbi.nih.gov/health-pro/guidelines/in-develop/cardiovascular-risk-reduction/tools/cohort>
- Robalino, M. & Körner, A. (2005). *Condiciones de trabajo y salud docente: estudios de casos en Argentina, Chile, Ecuador, México, Perú y Uruguay*. UNESCO Oficina Regional de Educación para América Latina y el Caribe. <https://unesdoc.unesco.org/ark:/48223/pf0000142551>

- Scheuch, K., Haufe, E. & Seibt, R. (2015). Teachers' Health. *Deutsches Ärzteblatt International*, 112(20), 347–356. <https://doi.org/10.3238/arztebl.2015.0347>
- Tsutsumi, A. & Shimazu, A. (2016). Guidelines for Primary Prevention for Mental Health at Work. In A. Shimazu, R. Bin Nordin, M. Dollard, & J. Oakman (Eds.), *Psychosocial Factors at Work in the Asia Pacific* (pp. 61–75). Springer International Publishing. [https://doi.org/10.1007/978-3-319-44400-0\\_4](https://doi.org/10.1007/978-3-319-44400-0_4)
- Vegas, E. & Petrow, J. (2008). *Raising student learning in Latin America: the challenge for the 21st century*. The World Bank.

### Appendix. Databases included and key terms used

Database	String
<b>Embase</b>	'health':ab OR 'burnout':ab OR 'stress':ab OR 'depression':ab OR 'anxiety':ab OR 'happiness':ab OR 'wellbeing':ab OR 'accident':ab OR 'absenteeism':ab OR 'injury':ab OR 'symptomatology':ab OR 'medical incapacity':ab OR 'dysphonia':ab OR 'varicose veins':ab OR 'sickness':ab OR 'illness':ab AND ('school':ab OR 'teacher':ab OR 'k12':ab OR 'education':ab) AND ('achievement':ti OR 'student growth':ti OR 'school effectiveness':ti OR 'quality':ti OR 'performance':ti OR 'accomplishment':ti) AND 'teacher':ti
<b>ERIC</b>	abstract:(health OR burnout OR stress OR depression OR anxiety OR happiness OR wellbeing OR sickness OR accident OR absenteeism OR injury OR symptomatology OR “medical incapacity” OR dysphonia OR “varicose veins” OR sickness OR illness) AND abstract:(School OR teacher OR K12 OR Education) AND title:( achievement OR “student growth” OR “school effectiveness” OR quality OR performance OR accomplishment) AND title:teacher
<b>EBSCOHOST</b> (including MEDLINE, PsycARTICLES, PsycBOOKS, PsycINFO <sup>1</sup> )	AB ( health OR burnout OR stress OR depression OR anxiety OR happiness OR wellbeing OR sickness OR accident OR absenteeism OR injury OR symptomatology OR medical incapacity OR dysphonia OR varicose vein OR sickness OR illness ) AND AB ( School OR teacher OR K12 OR Education ) AND TI ( achievement OR “student growth” OR “school effectiveness” OR quality OR performance OR accomplishment ) AND TI Teacher

<sup>1</sup> Using this options the following databases also were included: Academic Search Premier, AMED, America: History & Life Articles & books, American Bibliography of Slavic and East European Studies, American Doctoral Dissertations, Arctic & Antarctic Regions, Art Full Text , Art Index Retrospective, ATLA Religion Database with ATLASerials, Audiobook Collection (EBSCOhost), Bibliography of Asian Studies, Business Source Premier, CINAHL, Communication & Mass Media Complete, eBook Academic Collection (EBSCOhost), eBook Collection (EBSCOhost), EconLit, GreenFILE, Historical Abstracts, L'Année philologique, Library, Information Science & Technology Abstracts, MAS Ultra - School Edition, MathSciNet via EBSCOhost, Military & Government Collection, MLA Directory of Periodicals, MLA International Bibliography, New Testament Abstracts, Old Testament Abstracts, Philosopher's Index, Primary Search, PsycCRITIQUES, Psychology and Behavioral Sciences Collection, Regional Business News, RILM Abstracts of Music Literature (1967 to Present only), SocINDEX

---

**Scielo**

(ab:(health OR burnout OR stress OR depression OR anxiety OR happiness OR wellbeing OR sickness OR accident OR absenteeism OR injury OR symptomatology OR "medical incapacity" OR dysphonia OR varicose vein OR sickness OR illness)) AND (ab:(school OR teacher OR k12 OR education)) AND (ti:(teacher)) AND (ti:(achievement OR "student growth" OR "school effectiveness" OR quality OR performance OR accomplishment))

---