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Source: *Journal of Organizational Behavior*, Mar., 1990, Vol. 11, No. 2 (Mar., 1990), pp. 151-157

Published by: Wiley

Stable URL: https://www.jstor.org/stable/2488120

JOURNAL OF ORGANIZATIONAL BEHAVIOR, Vol 11, 151–157 (1990)

Research Note

The validity and reliability of the Teacher Stress Inventory: A re-analysis of aggregate data

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Introduction

The speculation has long existed that teaching provides its own particular rewards . . . and its own stress-related problems. For over a decade, both the data-based phenomenon of teacher stress (Anderson, 1981; Fimian and Santoro, 1983) and non-databased perspectives (Bloch, 1978; Styles and Cavanagh, 1977) have been adequately documented. The majority of those works, however, discussed the problems in only general terms. When valid and reliable psychometric constructs were employed, they were devised to measure burnout, or the end-result of long-term stressful experiences. It was apparent that a more clearly defined, valid, and reliable psychometric definition of teacher stress was needed in order to clarify and resolve the problem of teacher stress.

In an attempt to better define and measure teacher stress, Fimian earlier developed the Teacher Stress Inventory (TSI, Fimian, 1984, 1985, 1988), an instrument measuring the perceived strength of different stress experiences related to teaching roles. It was the intent of this investigation to: (a) reanalyze the aggregate data that has been collected on the TSI since 1980; (b) re-examine emerging stress factors; (c) re-evaluate the alpha reliability estimates for each and (d) study the interrelationships among these factors.

Method

Teacher sample

Some 3401 teachers representing 21 individual samples from seven states in the eastern United States provided data for this study. Thirteen of these samples were sent inventories through the mail; the balance were surveyed either at workshops or through regional surveys. Of the 13 distributed by mail, the majority were statewide samples randomly selected from state teacher

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0894–3796/90/020151–07 $05.00

Received 26 January 1988
Final Revision 20 December 1988

rolls. All surveys were completed on a voluntary basis, none of the subjects were paid. Of these, 962 classified themselves as regular education teachers (that is, 743 from the all-regular education plus 219 from the combined samples) and 2352 as special education teachers (that is 1778 from the all-special education plus 574 from the combined samples); 87 did not classify themselves one way or the other. The majority of the teachers were female, the minority (21 per cent) males. Over one-third (38 per cent) were in their twenties, with the remainder in their thirties (41 per cent), their forties (11 per cent), or fifty or older (10 per cent). The minority had achieved a bachelor's degree (13 per cent), the balance an advanced degree.

Instrumentation

The TSI resulted from earlier stress-identification work conducted by Fimian (1984, 1985). One Likert-type measure for 49 stress-related items served to assess the strength of each event. The stress strength scale ranged from 1 ('no strength; not noticeable') to 5 ('major strength; extremely noticeable'). The survey also included 13 demographic items; thus the inventory consisted of 62 questions formatted on the front and back of one page.

Design and procedures

A 'cross-sectional' survey design was used with each of the teacher samples. Using paper-and-pencil procedures, each participant voluntarily responded between May, 1980 and May, 1987, either *via* mailed questionnaires or as part of workshops and in-service training.

Statistical analyses

Preliminary principal components factor analyses followed by oblique and varimax rotations were conducted using the stress data collected in questions 1 through 49. The alpha reliability estimates for the TSI subscales and scale were examined using Cronbach's (1951) coefficient alpha. The relationships among these factors were then investigated using Pearson product–moment correlational analyses. Only factors with *eigen* values exceeding 1.0 were retained. Items were retained that: (a) had factor loadings of 0.35 or greater; (b) loaded clearly on only one factor and (c) did not reduce the scale/subscale internal consistency reliability. SPSS-X analyses were used (Nie, Hull, Jenkins, Steinbrenner and Bent, 1975).

Results

Factorial validity

Table 1 contains the 49 retained and abbreviated item stems, with their component loadings and communalities, that emerged from the oblique rotations for the stress strength measures. The 10 component solution accounted for 58.0 per cent of the total stress strength variance. It was evident that: (a) 10 discrete and interpretable factors resulted and (b) all 49 items exceeded the 0.35 loading criterion and all but two exceeded 0.40. The percentage of explained variance per factor was calculated by summing each of the squares of their correlation coefficients and then dividing this sum by the number of entries (i.e. 49). The subscales are reported in descending order according to the relative proportion of explained teacher stress variance.

Table 1. Item numbers and abbreviated stems, component loadings, communalities, eigen values, alpha reliabilities, item means, and standard deviations for the ten-factor solution

Item No.	Abbreviated item stem	Component loading	Communality	$\bar{X}$	S.D.
Factor I: Professional investment (eigen = 11.38; alpha = 0.75)					
11	Personal opinions not sufficiently aired	0.54*	0.57	2.6†	1.3
13	Lack control over decisions	0.53	0.55	3.0	1.4
14	Not emotionally/intellectually stimulated	0.44	0.42	2.5	1.3
15	Lack opportunities for improvement	0.39	0.37	2.7	1.4
Factor II: Behavioral manifestations (eigen = 3.86; alpha = 0.82)					
29	Using over-the-counter drugs	0.77	0.71	1.4	0.9
28	Using prescription drugs	0.73	0.70	1.4	1.0
29	Using alcohol	0.69	0.71	1.4	0.9
27	Calling in sick	0.27	0.54	1.5	1.0
Factor III: Time management (eigen = 2.77; alpha = 0.83)					
47	Easily over commit myself	0.70	0.48	3.2	1.3
45	Become impatient	0.70	0.53	3.1	1.2
44	Do more than one thing at a time	0.68	0.57	3.6	1.2
46	Have little time to relax	0.67	0.62	3.7	1.2
48	Think about unrelated matters	0.66	0.54	2.8	1.2
49	Feel uncomforatable wasting time	0.66	0.48	3.6	1.3
43	Not enough time to get things done	0.58	0.59	3.5	1.3
42	Rush in my speech	0.45	0.36	2.4	1.3
Factor IV: Discipline and motivation (eigen = 2.22; alpha = 0.86)					
17	Discipline problems in my classroom	0.79	0.64	2.7	1.3
16	Having to monitor pupil behavior	0.77	0.64	3.0	1.4
19	Teaching students who should do better	0.77	0.58	3.2	1.3
18	Teaching students who are poorly motivated	0.76	0.59	3.3	1.3
20	Inadequate or poorly defined discipline policies	0.62	0.46	2.7	1.4
21	Authority rejected by pupils/administrators	0.61	0.55	2.7	1.4
Factor V: Emotional manifestations (eigen = 1.82; alpha = 0.87)					
22	Feeling insecure	0.86	0.69	2.5	1.3
24	Feeling vulnerable	0.84	0.69	2.4	1.3
23	Feeling unable to cope	0.74	0.64	2.4	1.3
25	Feeling depressed	0.69	0.63	2.8	1.3
26	Feeling anxious	0.65	0.57	3.0	1.3
Factor VI: Work-related stressors (eigen = 1.57; alpha = 0.80)					
1	Little time to prepare	0.70	0.58	3.1	1.3
3	Too much work to do	0.68	0.59	3.4	1.2
5	Schoolday pace is too fast	0.67	0.48	2.7	1.3
4	Caseload/class is too big	0.66	0.47	2.8	1.4
2	Personal priorities being shortchanged	0.58	0.50	3.3	1.3
6	Too much administrative paperwork	0.43	0.32	3.7	1.3
Factor VII: Gastronomical manifestations (eigen = 1.38; alpha = 0.88)					
35	Stomach cramps	0.86	0.78	1.7	1.1
34	Stomach pains of extended duration	0.83	0.79	1.7	1.1
39	Stomach acid	0.82	0.67	1.9	1.3
Factor VIII: Cardiovascular manifestations (eigen = 1.22; alpha = 0.78)					
32	Feelings of increased blood pressure	0.78	0.66	1.9	1.3

Table 1. Item numbers and abbreviated stems, component loadings, communalities, eigen values, alpha reliabilities, item means, and standard deviations for the ten-factor solution

Item No.	Abbreviated item stem	Component loading	Communality	$\bar{X}$	S.D.
33	Feelings of heart pounding or racing	0.75	0.69	2.1	1.3
30	Rapid/shallow breath	0.62	0.64	1.6	1.1
Factor IX: Fatigue manifestations (eigen = 1.14; alpha = 0.82)					
40	Sleeping more than usual	0.69	0.59	2.2	1.3
41	Procrastinating	0.65	0.55	2.6	1.3
38	Becoming fatigued in short time	0.58	0.68	2.6	1.4
36	Physical exhaustion	0.47	0.67	3.0	1.4
37	Physical weakness	0.39	0.58	2.1	1.3
Factor X: Professional distress (eigen = 1.14; alpha = 0.82)					
7	Lack promotion or advancement opportunities	0.77	0.64	2.9	1.5
8	Not progressing rapidly in job	0.68	0.59	2.5	1.4
9	Need more status and respect	0.65	0.62	3.0	1.4
12	Receive an inadequate salary	0.62	0.49	3.7	1.4
10	Lack recognition	0.51	0.55	3.3	1.4

*Items have been sequenced from the largest to smallest component loading within factors.
†Item means have been adjusted for missing cases, then rounded to the nearest tenth. Means are based on the following rating scale: 1 = no strength, not noticeable; 3 = medium strength, moderately noticeable; 5 = major strength, extremely noticeable.

Internal consistency reliability

Table 1 contains the alpha reliability estimates for each derived TSI subscale and scale. All but one of the subscale alphas exceeded 0.70; the whole scale alpha was 0.93.

Scale/subscale intercorrelations

Intercorrelations among the derived subscale and total scale scores indicate that low to moderate positive correlations exist between and among these scores. The *r*s ranged from a low of 0.20 to a high of 0.62; almost 60 per cent of the possible correlations exceeded 0.40. All correlations were significant at or beyond the 0.001 probability level.

Means and standard deviations

The stress source means (ranging from 2.7 to 3.2) were larger than were those of the stress manifestations (ranging from 1.5 to 2.6); thus the strength of the sources of teacher stress exceeded that of the manifestations of teacher stress.

Subscale descriptions

The TSI defines 10 stress-related problems in teachers. These are noted in terms of their relative impact upon teachers, as listed in Table 1.

Professional investment
Professional investment explains the largest share of the teacher stress construct. Teachers who score high on this subscale feel that they are not allowed to be personally involved in their job; that their personal opinions are not sufficiently aired; that they lack control over decisions made about what occurs in their classrooms; that they are not emotionally or intellectually stimulated by their teaching positions; and that they lack opportunities for future professional improvement. In short, they have been distanced from or are otherwise minimally invested in their careers for one reason or another.

Behavioral manifestations
Behavioral manifestations describes the different inappropriate ways in which teachers cope with their occupational stress. High scores on this subscale may use over-the-counter drugs, prescription drugs, or alcohol, and may call in sick in response to stress. In this fashion, they respond behaviorally to stressful situations and instances.

Time management
Time management addresses the 'balancing act' aspects of teachers' roles. Those who feel stressed by time problems are those who easily overcommit themselves, become impatient when others do things too slowly, feel they have to do more than one thing at a time, have little time to relax during the workday, think about unrelated matters during conversations, feel uncomfortable wasting time, do not have enough time to get things done, and tend to rush in their speech.

Discipline and motivation
Discipline and motivation incorporates two facets of teacher–student relationships. With respect to the first of these — discipline — high scorers depict teachers who are sensitive to discipline problems in the classroom, continually monitor pupil behavior, deal with inadequate or poorly-defined discipline policies in their schools, and perceive their authority as being rejected by pupils and/or administrators. The second aspect of this problem is related to motivation problems; high scores on this factor suggest that some teachers experience stress when instructing students who are poorly motivated and who would do better if they tried harder.

Emotional manifestations
Emotional manifestations describes the varied ways in which teachers respond emotionally to stressful work situations. Those scoring high on this subscale report that they strongly feel insecure, vulnerable, unable to cope, depressed, and anxious.

Work-related stressors
Work-related stressors represents a number of environment-specific events that act as sources of stress for teachers. These include having little time to prepare; having too much work to do; having to deal with too much administrative paperwork; and feeling that the schoolday pace is too fast, that their caseloads or class sizes are too big, and that their personal priorities are being shortchanged due to job demands.

Gastronomical manifestations
Gastronomical manifestations is comprised of a number of stomach disorders apparent in teachers under stress, including stomach pain of extended duration, stomach cramps, and stomach acid.

Cardiovascular manifestations
These present a range of cardiovascular problems related to stress. High-scorers on this subscale report feelings of increased blood pressure, feelings of one's heart pounding or racing, and shallow or rapid breathing during times of stress.

Fatigue manifestations
Fatigue manifestations encompasses a number of stress-related fatigue problems. Those scoring high on this subscale find that they sleep more than usual, procrastinate, become fatigued in a relatively short period of time, feel physically exhausted, and experience physical weakness.

Professional distress
Professional distress represents the ways in which teachers perceive themselves as professionals, and is similar to a 'professional self-concept' index. The following responses typified teachers under stress: lacking promotion or advancement opportunities, not progressing in one's job as rapidly as one would like, needing more status and respect, receiving an inadequate salary, and lacking recognition.

Collectively, these stress factors comprise the overall construct termed 'teacher stress'.

Discussion

This study described the updated development and validation of an instrument that measures the strength of occupational stress in teachers. Factor analyses followed by varimax and oblique rotations were conducted. Ten discrete factors resulted, each of which was internally consistent and significantly related to the others. In ascending order to their impact upon teachers, these are: time management, work-related stressors, professional distress, discipline and motivation, professional investment, emotional manifestations, fatigue manifestations, cardiovascular manifestations, gastronomical manifestations, and behavioral manifestations. The first five factors are stress sources; the second five, stress manifestations. Overall, the stress sources were experienced at stronger levels than were the stress manifestations. Correlational analysis indicated that each of the stress factors was significantly related to each of the others, and that each was related even more strongly to the total strength of stress. Additional details regarding this study are included in Fimian (1988).

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