

# Yes we can! Measuring newly graduated teachers' professional self-efficacy

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# 1 Introduction

## 1.1 *Self-Efficacy Beliefs*

The basic presumption of the social cognitive theory of psychology (Bandura, 1977) is that human beings are proactive agents with the ability to exercise control over their thoughts, motivation, and actions. The person is assumed to affect behavior and environment through five basic capabilities: symbolizing, forethought, observational learning, self-regulation, and self-reflection. Self-reflection concerns the capability to think about and analyze experiences and thought processes. According to Bandura (1977), the most valuable type of knowledge that humans can derive from self-reflection is self-efficacy beliefs about their ability to exercise control over the events that affect their lives. These task- and context-specific beliefs are assumed to determine human action by influencing cognitive, motivational and affective processes, as well as by influencing a person's selection of environment (Bandura, 1989, 2001). Given appropriate level of skills, the theory says that no individual characteristic is more important than beliefs of self-efficacy to determine which course of action is taken, and what the outcome will be (Bandura, 1977).

## 1.2 *Professionals self-efficacy beliefs*

Cherniss seminal research (1980) found that professionals during the initial period of their working life experienced high levels of role-related stress and anxiety. The primary stressor for these new professionals was a sense of insecurity about competence and uncertainty about performance. Cherniss came to call this a "crisis of competence". To cope with the stressful situation the new professionals typically worked overtime, adopted less ambitious goals, restricted their personal involvement in their jobs, shifted responsibility for shortcomings from themselves to factors out of their control, became less idealistic and trusting and more "objective" and "professional", and increased their concern for self-protection and self-enhancement (Cherniss, 1980). These means of coping with the stressors of the new profession often lead to a process of burnout characterized by emotional exhaustion, disengagement and strengthened feelings of inefficacy (i.e. lower mastery), as well as job turnover. Professionals who were successful in dealing with the stressors of the new profession, and who did not enter a burnout process, characteristically had a more realistic perception of their level of competence and the demands that they were to encounter in their new profession (Cherniss, 1980). Cherniss (1980) concluded, as did Bandura (1977), that when people believe that they can cope well with stressors (i.e. when their beliefs of self-efficacy are strong), the situations are not perceived as threats and are dealt with effectively. It has been suggested that the development of a sense of efficacy is one of the most important tasks for new professionals to be able to perceive demands of the profession as manageable challenges and avoid exhaustion, disengagement, decreased mastery and intention to leave the profession (Cherniss, 1980).

### **1.3 Teachers' sense of self-efficacy**

Teachers' sense of self-efficacy refers to teachers' beliefs about their capabilities to bring about desired outcomes of student engagement and learning, even among students who may be unmotivated or difficult (Tschannen-Moran & Woolfolk Hoy, 2001). Teachers' sense of efficacy has been found to be positively related to students' learning, controlling for actual competence (Bandura, 1997), teachers' level of experimentation in teaching, and willingness to try new strategies in order to better meet the needs of students and facilitate learning (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Moreover, teachers' self-efficacy has been associated with teachers' experience of stress when students are not behaving properly, the way they criticize students for making errors (Tschannen-Moran & Woolfolk Hoy, 2001; Tschannen-Moran et al., 1998; Tsouloupas, Carson, Matthews, Grawitch, & Barber, 2010), as well as their organizational and planning skills, fairness, clarity, enthusiasm about teaching, commitment to the profession (Tschannen-Moran et al., 1998), and job satisfaction (Skaalvik & Skaalvik, 2010). Novice teachers who feel efficacious in their professional role express higher satisfaction about their work, and a more positive attitude about staying in the field of teaching than new teachers who doubt their professional capabilities (Tschannen-Moran et al., 1998).

### **1.4 The shifting role of teachers**

The role of teachers varies between different countries, and the role of novice teachers vary to that of experienced teachers. As beliefs of self-efficacy are task- and context specific, this must be acknowledged in measurements. No measure has previously been available to measure the professional self-efficacy of novice teachers in Sweden. The competencies included in the professional role of novice teachers in Sweden are defined by the Higher Education Ordinance issued by the Swedish National Agency for Higher Education based on the European Qualifications Framework (Bologna Working Group on Qualifications Framework Ministry of Science Technology and Innovation, 2005). The Higher Education Ordinance covers 12 aspects of the teaching profession, sub-grouped into four major areas. In this study, each one of the 12 competencies were transformed into a self-efficacy item as described by Bandura (2006) in order to investigate newly graduated teachers' beliefs of professional efficacy. The content of the items represented four central and major aspects of the teaching profession. The instrument is called NTSE (Newly graduated Teachers' beliefs of Self-Efficacy) and was developed within the prospective longitudinal PATH study (Prospective Analysis of Teachers' Health) where roughly 3000 Swedish teachers were followed with annual surveys from their second-last year of formal training to their third year in the professional field (Hultell & Gustavsson, 2011). The purpose of this current study was to carry out a process of validation of the NTSE.

## **1.5 Hypothesis**

### **1.5.1 Hypothesis 1**

Relations of scores on the NTSE are reflected by a hierarchal model with four first order factors and one second order factor. This hypothesis is based on the theory of self-efficacy, the content of the Higher Education Ordinance, the characteristics of the instrument, and the assumptions of data from classic test theory. The four factors are efficacy for instructional strategies, efficacy to give special support to individual students, efficacy for classroom management, and efficacy for teacher-parent interaction. In addition, the hierarchal model is expected to be a better solution than a one-factor model, as indicated by the self-efficacy theory (1977).

### **1.5.2 Hypothesis 2**

The NTSE scores are concurrently and prospectively negatively related to exhaustion, disengagement, and turn over intention, and positively related to mastery, as indicated by Bandura (1977) and Cherniss (1980).

## 2 Method

### 2.1 Procedure and participants

In the Swedish longitudinal PATH study, teaching students are followed during their last two years of studies, and their first three years of the profession (Hultell & Gustavsson, 2011). Data used in the present study originated from the second follow-up of the PATH study and were collected when participants were one year into the profession (spring of 2008). The study sample consisted of 1489 participants that completed at least 2/3 of the NTSE items (85 % of the 1747 participants of the second follow-up; 53 % of the 2798 participants at baseline). The typical participant was female, age 28, currently teaching classes of less than 20 children of younger ages (preschool to elementary school) in a school with a total of less than 300 students. Throughout the Swedish higher education for teachers, students choose courses to get proficient in teaching specific subjects and students of certain age. In this study, the typical participant was teaching the subjects he/she was trained to, to children of the chosen ages.

### 2.2 Attrition analysis

An attrition analysis using logistic regression with attrition (versus responding) as dependent variable; and sex, age, and age of students (younger versus older), during the first wave of measurement as independent variables showed that males (OR=0.75;  $p < .001$ ) and younger participants (OR=0.98;  $p < .001$ ) were more likely to not participate in the second follow-up of the PATH-study. However, the estimated amount of explained variance in attrition was only 1.6%, indicating that it was not very likely that this had any considerable effect on the generalizability of the results of the study.

### 2.3 Ethical approval

The Research Ethics Committee in Stockholm granted permission to carry out the PATH study. All participants had given their informed consent.

### 2.4 Measurements

The NTSE includes 12 items targeting various competencies that novice teachers are expected to hold when entering the working field as newly graduated professionals (Bologna Working Group on Qualifications Framework Ministry of Science Technology and Innovation, 2005). Items, and the four-factor structure, are presented in Table 1. Respondents record their level of certainty to perform each task on a scale ranging from 0 (*cannot do at all*), via 50 (*moderately certain can do*), to 100 (*highly certain can do*) as described by Bandura (2006). The mean score of the NTSE in this study was 78.55 ( $SD = 11.91$ ). Cronbach's  $\alpha$  was .93. The internal dropout varied between 1% and 3.5% across the items. Descriptives of variables used in correlation analyses are presented in Table 2. All variables were computed from items included in the PATH survey.



**Table 1.** Expected factors and NTSE items

Factor	Item	
	No	How do you perceive your level of performance in the following tasks? Can you...
<b>Efficacy for instructional strategies</b>	1	...use your knowledge of the subjects so that students learn and develop?
	2	...organize and carry out work so that each student develops according to his or her potential?
	3	...analyze and evaluate student learning and development?
<b>Efficacy to give special support to individual students</b>	4	...give special support to pupils with learning difficulties of any kind?
	6	...give special support to pupils who live in a socially difficult situation of any kind?
	12	...motivate students who show a lack of interest in their studies?
<b>Efficacy for classroom management</b>	5	...create a good working climate in the student group?
	7	... actively discourage bullying, harassment and abuse among students?
	11	...deal with unexpected demands that affect the teaching situation?
<b>Efficacy for teacher-parent interaction</b>	8	...carry out development discussions in order to promote students' cognitive and social development?
	9	...lead parent-teacher meetings that invite the parents to participation and engagement?
	10	...carry out discussions with parents who are which are rooted in some sort of problem with the student?

**Table 2.** Scale name, sample items, source, range, *M*, *SD* and  $\alpha$  (from baseline) of variables included in correlation analyses.

Scale name	Sample item	Source	Range	Baseline <i>M</i> ( <i>SD</i> )	3 Y <i>M</i> ( <i>SD</i> )	$\alpha$
<b>Exhaustion</b>	There are days when I feel tired even before I go to work.	Demerouti et al (2001)	1-4 <sup>2</sup>	2.33 (0.63)	2.34 (0.63)	.72
<b>Disengagement</b>	It happens more and more often that I talk about my work in a derogatory manner.	Demerouti et al (2001)	1-4 <sup>2</sup>	1.75 (0.57)	1.79 (0.56)	.77
<b>Mastery</b>	I am satisfied with the quality of the work I do.	Dallner et al. (2000)	1-5 <sup>1</sup>	4.05 (0.61)	3.27 (1.69)	.75
<b>Turnover intention</b>	I often think of changing profession.	Hellgren et al. (1997)	1-5 <sup>3</sup>	1.41 (0.76)	2.41 (1.92)	.82

<sup>1</sup>Rarely or never - Often or always

<sup>2</sup>Agree to a very little degree - Agree to a very high degree

<sup>3</sup>Totally accurate - Not accurate at all

## 2.5 Data Analysis

The expected hierarchal four-factor structure is presented in Figure 1 in section 3.1. The fit of the hypothesized model and the alternative one-factor model was evaluated using confirmatory factor analysis (CFA) using LISREL Version 8.80 (Jöreskog & Sörbom, 2006). Because items in the instrument were ordinal variables, without origins or units of measurement, polychoric correlations and asymptotic covariances were estimated using PRELIS Version 2.80 before the analyses were performed, as suggested by Jöreskog (2005). Robust maximum likelihood was used as estimation method.

In common factor models groups of items are expected to correlate because of their common association with a specific latent factor (Brown, 2006; McDonald, 1999). Once the common variance has been extracted, no additional correlations among the items should remain. In addition, when models include numerous latent factors (as is the case in the hypothesized hierarchal model), items should only correlate with their designated factor. Finally, there should be no relations among the items that are not explained by any of the latent factors included in the model (Brown, 2006; McDonald, 1999).

It is recommended that the evaluation of model fit is based on multiple sources of information about the model (Brown, 2006). In this study, the standardized root mean square residual (SRMR) were used to assess the absolute fit of the model. The root mean square error of approximation (RMSEA) was used to evaluate the parsimonious fit, and the comparative fit index (CFI) was used to compare the hypothesized model with a null model. These fit indices were chosen based on their sensitivity to sample size and model misspecification (Hu & Bentler, 1998). Recommended cut-off values for good model fit are a SMRM value of .08 or lower, a RMSEA value of .06 or lower, and a CFI value of .95 or

higher (Hu & Bentler, 1999). It has however been suggested that RMSEA values up to .08 may be interpreted as adequate model fit (Brown, 2006), and that values ranging from .08 to .10 indicate a mediocre fit not to be rejected (MacCallum, Browne, & Sugawara, 1996).

Concurrent and predictive relationships between the NTSE, exhaustion, disengagement, mastery, and turn over intention, were investigated by correlation analyses using Pearson's  $r$ . Included in the predictive analyses were those with a NTSE score from 2008 who completed the third follow-up PATH survey in 2010 (N=1483; age M 29.9 (SD 7.4); 86 % female; 63 % working as teachers).

### 3 Results

The fit of the hypothesized hierarchal four-factor model of data was evaluated and compared to a one-factor solution using CFA. As indicated by the results presented in Table 3, the hierarchal four-factor model provided the best fit.

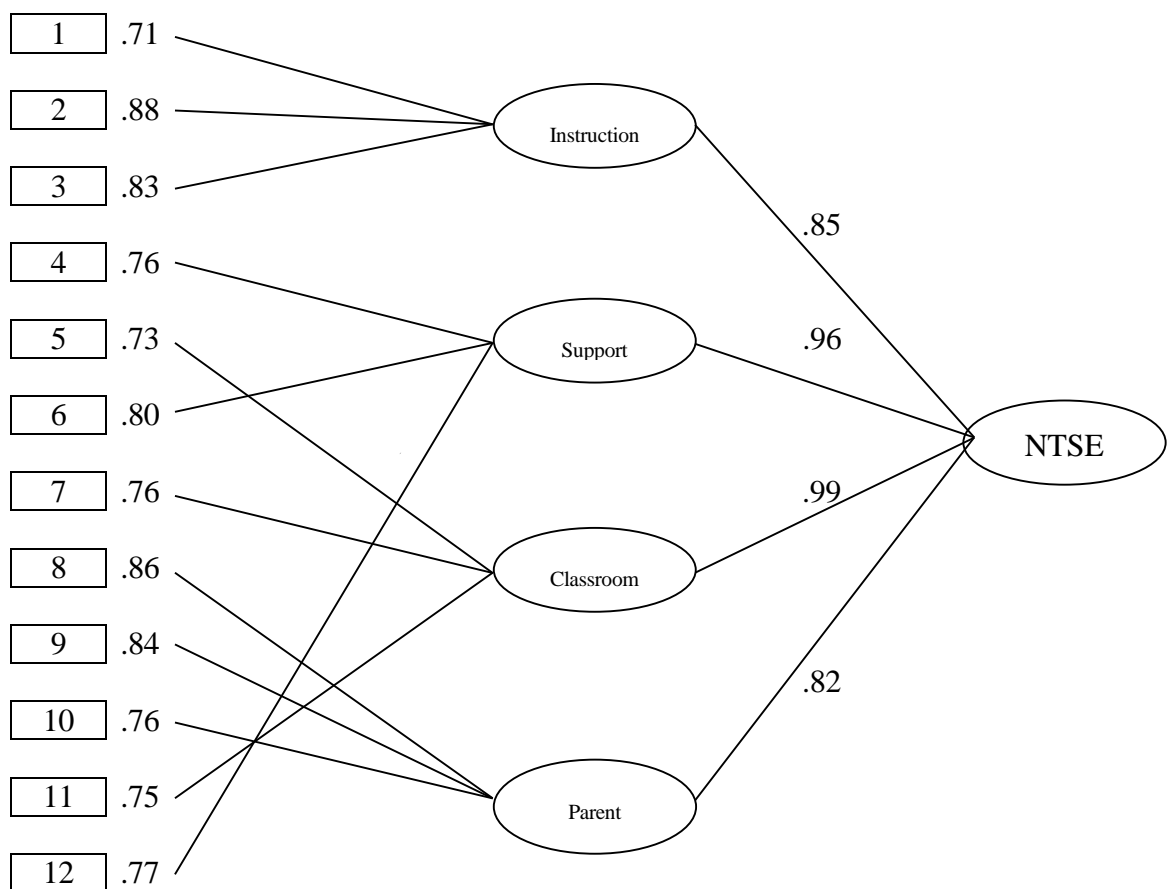
**Table 3.** Fit values for the evaluated models.

Model	SB $\chi^2$	df	p	SRMR	CFI	RMSEA (CI)
Hierarchal four-factor	595.06	50	< .001	0.048	.98	.087 (.081-.094)
One-factor	1269.69	54	< .001	0.067	.95	0.13 (0.12-0.13)

SB  $\chi^2$ , Satorra-Bentler Scaled  $\chi^2$ ; SRMR, standardized root mean square residual; CFI, comparative fit index; RMSEA, root mean square error of approximation

In Figure 1 the hierarchal model is presented with standardized first and second order factor loadings. Cronbach's alpha for the NTSE was .92 and varied between .77 and .84 for the four different factors. Correlations among the first order factors ranged between .57 – .75.

**Figure 1.** Hierarchal four-factor model



1-12=NTSE items (see Table 1). Instruction=Efficacy for instructional strategies, Support=Efficacy to give special support to individual students, Classroom management=Efficacy for classroom management, and Parent interaction=Efficacy for teacher-parent interaction. NTSE=Newly graduated teachers' professional self-efficacy.

The NTSE was significantly related to all variables concurrently as well as predictively. At the first year of practice, the NTSE was moderately related to exhaustion and disengagement, strongly related to mastery, and weakly related to turnover intention. Looking at predictive relations, scores of NTSE measured at the first year in the profession was weakly related to all studied variables at the third year in the profession. As hypothesized, the relations were negative for exhaustion, disengagement, and turnover intention, and positive for mastery. The results of the concurrent and prospective correlation analyses are presented in Table 4.

**Table 4.** Concurrent and prospective correlations  $r$  between the instrument NTSE and exhaustion, disengagement, mastery, and turn over intention scales.

Scale	$r$ concurrent (N)	$r$ prospective (N)
Exhaustion	-.32** (1469)	-.25** (983)
Disengagement	-.36** (1469)	-.25** (983)
Mastery	.52** (1485)	.14** (1143)
Turnover intention	-.25** (1483)	-.08** (1146)

\*\* $p < .001$  level (2-tailed).

## 4 Discussion

A measurement specifically focusing on newly graduated teachers' beliefs of professional efficacy, not previously available, was developed and two sources of validity evidence were investigated: internal structure by use of CFA, and relations to other variables, concurrently and prospectively, using correlation analyses.

### 4.1 *Internal Structure*

Careful examination of the internal structure of an instrument is important to ensure the validity of scores. The NTSE, unlike many other efficacy scales, has been evaluated using CFA. Based on the content of the items and the characteristics of the instrument, as well as the theory of self-efficacy and assumptions of data from classic test theory, it was hypothesized that data would be represented by a hierarchical four-factor model. CFA confirmed that this model appropriately reflected the internal structure of data and all factor loadings were higher than .70. Given the high correlation estimates of the first order factors on the second order factor the measurement may be interpreted as one dimensional. A similar hierarchical structure has previously been shown in a measurement of teachers' professional self-efficacy with overlapping content called the Ohio State Teacher Efficacy Scale (OSTES), developed in the United States (Tschannen-Moran & Woolfolk Hoy, 2001).

### 4.2 *Relations to other variables*

Beliefs of self-efficacy contribute essentially to the way individuals cope with stress, and the extent to which they experience consequences such as exhaustion, disengagement, decreased mastery, and intention to leave the profession (Bandura 1977; Cherniss, 1980). Based on these previous results, relationships between scores on the NTSE and exhaustion, disengagement, mastery, and turnover intention were investigated, concurrently and prospectively, and confirmed by correlation analyses ( $r$  (concurrent) ranging from  $-.25$  to  $.52$ ,  $p < .001$ ;  $r$  (prospective) ranging from  $-.08$  to  $.25$   $p < .001$ ). The strongest concurrent correlations were found for the scales assessing mastery (i.e perception of professional performance), which is conceptually closest to the teachers' self-efficacy construct. The weakest concurrent correlation was seen for intention to leave the profession, which is an expected outcome of an individual struggling with low professional efficacy, but conceptually furthest away from the construct of the included variables. The relationships between NTSE at the first year in the profession and the studied variables at year three were significant but of small sizes. Based on the analyses performed in this study it can be concluded that the NTSE provides a promising measure of newly graduated teachers' professional self-efficacy that may be used as a predictor of burnout processes exhaustion, disengagement, mastery, and intention to leave the profession during the early years of practice.

### **4.3 Limitations**

The major limitation of the study concerns uninvestigated relations. Based on the theory of Bandura (1977) a measurement of self-efficacy should relate to the likelihood that teachers choose to engage in as opposed to avoid tasks in the teaching profession, the effort they will put into the execution of the task, how long they will persist when faced with difficulties, and finally their success in performance. It would have been valuable to relate scores on the NTSE to objective indices of teachers' performance, and the performance of the teachers' students. If scores on the NTSE reflect teachers' beliefs of self-efficacy they are expected to be positively related to students' learning (Bandura, 1997; Skolverket, 2006) and teachers' willingness to try new strategies in order to better meet the needs of students and facilitate learning (Tschannen-Moran et al., 1998). However, since all data in the PATH study are self-reports, no objective measures were available.

### **4.4 Suggestions for future research**

Future analyses of information concerning test content and response processes may provide additional reassurance of the validity of the proposed interpretation of scores. Logical analyses by experts in the teaching profession may provide evidence for the validity of the test content. Interviewing a number of teachers about their thought processes as they answer the questions may be a useful approach to investigating the validity of response processes. In addition, future studies may examine the developmental course of professionals' self-efficacy during the early years in the field, and further conclude in which ways individuals are affected by their differing levels of self-efficacy when entering the professional field, possibly generating ideas of interventions to improve self-efficacy in those novice teachers where beliefs are weak.

### **4.5 Conclusions**

In this study it was concluded that the NTSE constitutes a valid measure of newly graduated teachers' beliefs of professional self-efficacy.

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