
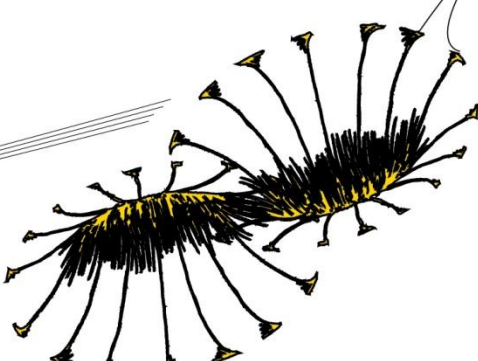





MASTER THESIS

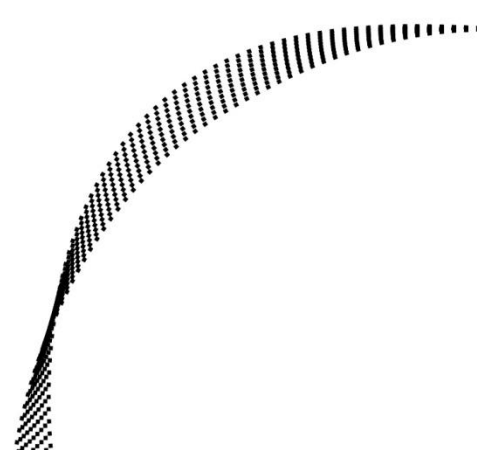
Investigating the effects of 'being a type of
starting teacher' on Teacher Self-Efficacy
and the Mediating role of its Sources



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Hengelo, August 2015



Abstract

Teacher self-efficacy (TSE) has proven to be a powerful predictor of teacher practice. Previous studies revealed that the TSE levels of starting teachers are significantly lower compared to experienced teachers. Hence, insight in TSE levels of starting teachers and effective ways to increase these levels is essential. Thus far, TSE has been investigated mostly among novice teachers. However, as a teacher, one can be a starter in multiple ways. Being a novice is the most classic one. Yet, switching from school or schoollevel, or being a substitute may also imply a new start within a teacher's career, with lower TSE levels as a result. Therefore this study investigated differences in self-efficacy for multiple starter-groups on three dimensions of TSE (instruction, class management and student engagement), while controlling for age, gender and school-board. Additionally the mediating effects of the four sources of self-efficacy, identified as being the major influences on TSE in social-cognitive theory, were examined. In total, 696 primary teachers from 11 school-boards in the Netherlands participated in this study. Participants were categorized as 1) the novices group (teachers with less than 3 years of working experience); 2) substitutes, and 3) the experienced teachers in an unstable situation group (teachers who transferred to a new school or a new schoollevel) or to the control group (non-starters). Data were gathered by use of an online questionnaire. ANOVA's as well as structural equation modeling were used to investigate group differences between TSE and sources of TSE. Results revealed that non-starters outperformed all starters for all dimensions of TSE. Importantly however, the starter-groups differed as well. Experienced unstable teachers scored significantly higher than novices on all three dimensions of TSE. Furthermore, substitute teachers had significantly lower levels of TSE for instruction and student engagement compared to experienced unstable teachers. Moreover, mastery experiences appeared to mediate the relation between novices and substitutes and the three dimensions of TSE. Furthermore, physiological arousal mediated the effects that being a novice has on TSE for instruction and student engagement. The structural model fitted the data well and explained 42% (instruction), 50 % (student engagement) and 56 % (class-management) of the variance in TSE. It can be concluded that this study has provided initial evidence for the relevance of distinguishing between various groups of starting teachers. Furthermore, this study provided some primary indications on how this support may be shaped for each of the groups, based on the hypothesized sources of TSE.

Keywords: Teacher Self-Efficacy (TSE), sources of TSE, starting teachers, primary education, SEM

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Introduction

The perceived problems of starting teachers have led to increasing numbers of starters leaving the profession early. International statistics indicate discouraging attrition rates with up to 50% of starting teachers leaving teaching within the first five years of teaching (Lindqvist, Nordanger, & Carlsson, 2014; Ingersoll, 2012). A recent survey, commissioned by the Dutch union for education (AOB startersenquête, 2014) revealed the seriousness of this problem in the Netherlands as well. Over sixty percent of the participating starters in primary education seriously consider leaving the profession. It is important to note however, that teacher attrition is not limited to the first years of service. In his literature review on the career cycle of teachers Eros (2011) emphasizes the risk for valuable experienced teachers leaving the profession due to insufficient or inappropriate professional development. Teacher attrition is considered to be a serious problem in many developed countries (Tynjälä & Heikkinen, 2011). For example, the disruption of program continuity and planning in schools that comes along with high attrition rates does not only impact school effectiveness but also brings significant costs to school-boards for recruiting and managing new teachers (Hong, 2010). Additionally, taking into account that the teaching population in Dutch primary schools is rapidly aging and that significant teacher-shortages are expected in years to come (Melser, 2004), the prevention of teacher attrition by means of adequate support and/or professional development becomes even more critical.

The problems perceived most often by starting teachers, according to a deliberate review by Veenman (1984), included: motivating students, organization of class-work, insufficient and/or inadequate teaching materials and supplies and dealing with problems of individual students. Experiencing those problems often leads to feelings of low self-efficacy, or in other words a lack of beliefs in one's abilities as a teacher (Veenman, 1984; Bandura, 1977). Subsequently, those teachers who leave teaching are found to have significant lower self-efficacy scores than teachers who remain in teaching (Glickman & Tamashiro, 1982). Although dated these results appear to be still relevant today since a recent review revealed decreased self-efficacy as one of the major challenges that starting teachers meet in the early stages of their career (Tynjälä & Heikkinen, 2011). Yet, it seems logical to expect that teachers are more likely to stay in the profession if they develop greater beliefs about their perceived capabilities (Pendergast, Garvis & Keogh, 2011). Therefore the focus of the current study is starting teacher's self-efficacy (TSE) and its development.

Teacher self-efficacy

Influenced by Bandura's (1977) social cognitive theory, Teacher Self-Efficacy (TSE) has been defined as "a teacher's belief in his or her capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context" (Tschannen-Moran, Woolfolk-Hoy & Hoy, 1998, p.233). TSE beliefs are assumed to grow in spiraling cycles i.e. higher TSE levels motivate teachers to expend more effort and to persist in the face of setbacks, leading to better performances that subsequently further bolster their TSE (Tschannen-Moran et al., 1998). Furthermore it is important to note that TSE is a

construct that is based on self-perception. Therefore it may be either higher or lower than teachers' actual level of competence (Bandura, 1997). Yet, given the cyclical nature of how TSE grows, a slight overestimation of their real teaching skills seems to be most conducive in order to make the most of their actual capabilities (Bandura, 1997).

Moreover, since teaching is a multifaceted profession which requires a large variety of knowledge and skills, TSE is best evaluated with respect to three underlying components: TSE for *instructional strategies*, for *student engagement* and for *classroom-management* (Tschannen-Moran and Woolfolk-Hoy, 2001). TSE for instructional strategies concerns teachers' beliefs about their ability to effectively use various teaching strategies, whereas TSE for classroom management reflects how teachers judge their ability to regulate students' behavior during class. Finally, self-efficacy regarding student engagement refers to teachers' beliefs in their ability to motivate students to value and actively participate in the learning process.

A large body of empirical research has already related TSE to many meaningful educational outcomes and TSE proved to be one of the few individual characteristics that reliably predict teacher practice. For example TSE is believed to positively influence teachers' instructional performance (Skaalvik & Skaalvik, 2007; Tschannen-Moran & Woolfolk-Hoy, 2001). Furthermore, high efficacious teachers use effective strategies more frequently (Chacon, 2005), they are more willing to implement innovative teaching methods (Guskey, 1988) and they focus more on autonomy supportive behavior with students, in contrast to less efficacious teachers who are more authoritarian in their classrooms (Woolfolk, Rosoff & Hoy, 1990). It was also found that TSE is related positively to students' academic performances (Abernathy, Dyer, Ortlieb & Cheek, 2013; Guo, Piasta, Justice, & Kaderavek, 2010; Muijs & Reynolds, 2002) and motivation (Midgley, Feldlaufer, & Eccles, 1989). Moreover, high efficacious teachers tend to be more satisfied with their job (Klassen et al., 2009; Skaalvik & Skaalvik, 2010), they appear to be more committed to teaching (Coladarci, 1992), and experience lower levels of burnout (Betoret, 2006; Skaalvik & Skaalvik, 2010). Finally, they are more likely to stay in teaching (Burley, Hall, Villeme, & Brockmeier, 1991). Clearly, a growing body of literature indicates the benefits associated with TSE. Less is known, however, about its development. In other words: what makes teachers believe that they can be successful in the complex task of teaching? Thus, investigating the sources (Bandura, 1997) that are hypothesized to underlie the TSE beliefs of teachers might provide insight in how to increase starting teachers' TSE.

Sources of teacher self-efficacy

Because TSE has been related to many positive classroom-outcomes, researchers have turned toward investigating the origins of teachers' efficacy beliefs for gaining important insights in how to foster it. However, no clear consensus has been reached yet on how to increase TSE (Morris, 2010). Bandura (1997) proposed the following four sources of self-efficacy: (1) mastery experiences, (2) vicarious experiences, (3) social persuasions, and

(4) physiological arousal. Understanding these potential sources of TSE, can help identifying factors to target in teacher support initiatives (Ruble, Usher, & McGrew, 2011). It is expected that the direct relation between starters and their TSE levels is mediated by these four sources, in other words that this relation can be better explained by examining the underlying sources.

Interpretation of *mastery experiences*, or individuals' performances on previous tasks, is thought to be the most influential source of self-efficacy because they provide the most authentic evidence that one can master whatever it takes to succeed in a particular field (Bandura, 1997). People who view their past efforts as successes are more likely to approach similar tasks with confidence, whereas those who believe they have failed or succeeded only through extensive help of others may develop less confidence in their abilities (Morris, 2010). Research already confirmed that mastery experiences are the most potent source of TSE for experienced teachers (Tschannen-Moran & McMaster, 2009; Tschannen-Moran & Woolfolk-Hoy, 2007) but for starters, when fewer mastery experiences are available, it seems likely that other sources play a larger role. This corresponds with Gabrielle and Joram (2007) who concluded that experienced elementary school teachers in a teacher development program differed from novices, not only in the proportion of successful events they reported, but also in events they chose to emphasize as evidence for success and in the way they chose to describe those events. It seems therefore, that experienced teachers benefit more from their mastery experiences in increasing their TSE than less-experienced teachers do.

Secondly, *vicarious experiences* are derived from witnessing the successes and failures of similar others performing a task. Because teaching lacks absolute measures of adequacy, teachers must appraise their capabilities in relation to the performance of others (Tschannen-Moran & McMaster, 2009). A role model provides the standard which can help the observer set goals for his or her own teaching. The greater the assumed similarity between the observer and the model the more persuasive will be the belief that one possesses the capabilities to master comparable activities (Tschannen-Moran & McMaster, 2009). However, vicarious experiences have proved difficult to measure and their relative influence on TSE is still unclear (Usher & Pajares, 2009). In light of the current study however, it is expected that starters are more inclined to compare their performances to significant others in order to raise their TSE than teachers with more experience who can rely on more mastery experiences.

Thirdly, *Social persuasions* are verbal interactions that a teacher receives about his performance and prospects for success from important others in the teaching context such as administrators, mentors, colleagues, parents and students. (Tschannen-Moran & Woolfolk-Hoy, 2007). Teachers often receive social persuasions in the form of professional development workshops that provide knowledge as well as persuasive claims about its usefulness. In another form, teachers receive social persuasions as feedback from

supervisors or colleagues designed to convince them that they will be successful at some task (Tschannen-Moran & McMaster, 2009). Compared to experienced teachers, starters' TSE seems to be more influenced by social persuasion (Tschannen-Moran & Woolfolk-Hoy, 2007). For the present study it is therefore anticipated that social persuasions have more effect on the relation between starters and their levels of TSE than on the relation between experienced teachers and their TSE levels.

Physiological arousal, finally, may also influence one's TSE. The feelings of joy and pleasure experienced from a successful lesson may increase TSE, whereas high levels of stress and anxiety associated with a fear of losing control may result in lowered TSE levels (Tschannen-Moran & Woolfolk-Hoy, 2007). Thus far, however, research on the four sources of TSE has often neglected the influence of physiological arousal (Morris, 2010). This may be due to difficulties inherent in measuring physiological states and emotions, since, as noted by Bandura, physiological states can be interpreted in multiple ways, with differential effects on individuals' self-efficacy (1997). Nevertheless, this study aims to identify whether the physiological states as experienced by starters affects their TSE levels.

Teacher self-efficacy in various groups of starting teachers

Most studies on TSE, thus far, focused on pre-service teachers and novices in their first years of teaching (Wyatt, 2014). This was derived from the fact that TSE is theorized to be most malleable early in learning (Bandura, 1997) and TSE levels are expected to become quite fixed once established; unless a 'jarring' experience provokes a reassessment (Bandura, 1997). If, however, feelings of TSE are indeed context and task specific as argued by Bandura (1986), it seems plausible to presume that TSE beliefs are not that immutable. Accordingly, a Canadian study found evidence for a nonlinear relationship between TSE and years of experience; self-efficacy increased from 0 to about 23 years of experience and then declined as years of experience increased. These results suggest that teachers gain confidence in their teaching skills through their early years and into the mid-career years but that these levels of confidence may decline as teachers enter the later stages of their careers (Klassen & Chiu, 2010). Furthermore, prior research suggests that teacher self-efficacy tends to increase during teacher education enrolment (Hoy & Woolfolk, 1990; Wenner, 2001) but decrease after graduation to the end of the first year of teaching (Moseley, Reinke & Bookour, 2003; Woolfolk Hoy, 2000). The present study expands on this, assuming that experienced teachers can get into the position of starting teachers again at certain points in their careers with lower TSE levels as a consequence. Therefore, in addition to the *classic novices* with less than three years of working experience, a second group of starters will be investigated, namely *experienced teachers in an unstable situation*. Hence, a transfer to another school or schoollevel may be the kind of shocking experience that causes a decrease in the TSE levels of experienced teachers. This would be in line with Chester and Beaudin (1996) who found that experienced elementary teachers generally saw a decrease in their self-efficacy in their initial year of teaching in a different (urban) setting. In addition, a study in which four high school teachers were followed as they made the transition from teaching

ability grouped to mixed ability grouped mathematics classes, found a negative impact on TSE over the course of one year (Ross, McKeiver, and Hogaboam-Gray, 1997).

Finally, a third group of starting teachers that will be distinguished in the current study consists of *substitute teachers*. Few studies have focused on the experiences of substitute teachers (Duggleby and Badali, 2007) and no studies were found that investigated substitutes TSE levels. The primary purpose of a substitute is to ensure that learning continues in the absence of the classroom teacher, but this goal is not always possible because of the itinerant nature of the job (Duggleby & Badali, 2007). Research in an Australian setting found that substitutes have a difficult role. Continually starting in new schools, getting used to routines and neither knowing the students' names nor their specific needs hinder proper class-management and the development of positive relationships with students (Jenkins, Smith & Maxwell, 2009). Furthermore, taking into account that many substitutes reported not to receive the support they required in order to achieve success and that they are mostly deployed to hard-to staff schools (Jenkins et al. 2009), it is conceivable that their TSE levels are accordingly lower.

Summarizing the above it is expected that the TSE levels of the aforementioned starter-groups will be lower compared to experienced teachers who are not in a starting position (non-starters). Additionally, differences are expected to be found between the three starter-groups as well between both the TSE levels and the way the sources influence these levels. Classic novices for example have had less mastery experiences and therefore fewer opportunities to increase their TSE compared to teachers in the more experienced starter-groups. The impact of sources like vicarious experiences and social persuasions on the other hand may be larger for this group compared to the experienced teachers in an unstable situation. With respect to substitutes additionally, who mostly lack social persuasions like official support through induction, mentoring or professional development (Jenkins et al, 2009) and who often feel alienated and isolated (Duggleby and Badali, 2007) it may be possible that the negative impact of physiological arousal is more significant in their TSE development.

The current study: research questions, hypotheses and research model

No previous study has focused on the direct relationship between various types of starting primary school teachers (novices, substitutes and experienced teachers in an unstable situation) and their perceived TSE levels for instruction, for class-management and for student engagement. In addition it has not been investigated before, if and how the relationship between TSE and the distinguished groups of starting teachers is influenced (i.e. mediated) by the four sources. Therefore, to guide the current study, the following research questions were formulated:

1. To what extend do various types of starting teachers and non-starters differ concerning their TSE levels for instruction, class-management and student engagement?

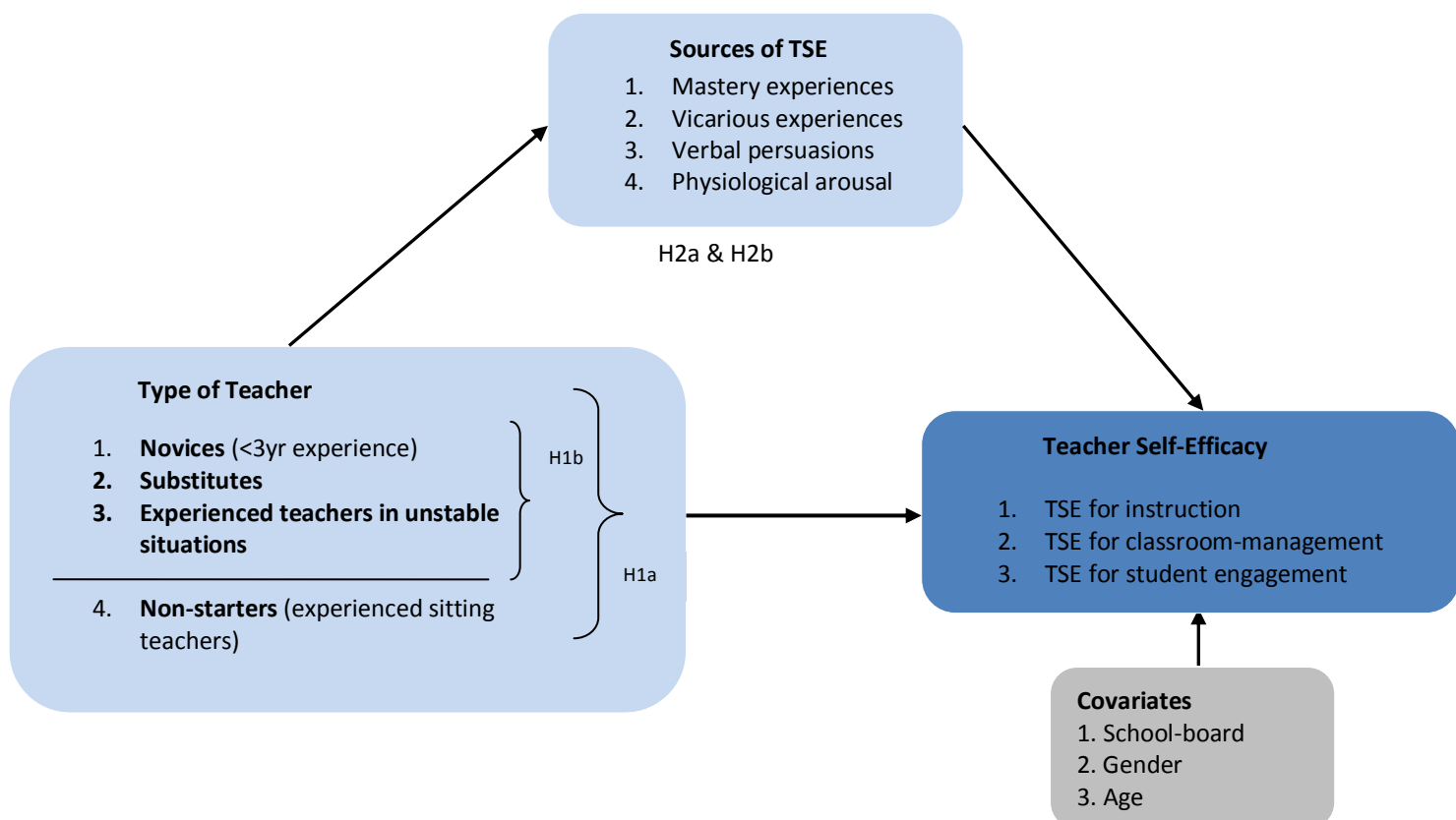
2. To what extent can the differences in the levels of TSE between the different types of starting teachers be explained by the mediating role of the four sources?

The research questions will be answered by exploring the following hypotheses:

- H_{1a}) The TSE levels of teachers in the starter-groups are significantly lower than the TSE levels of non-starters.
- H_{1b}) The three starter-groups differ significantly between each other concerning their TSE levels for instruction, class-management and student engagement.
- H_{2a}) The sources of TSE have a mediating influence on the relationship between the types of starting teachers and TSE, at least partially.
- H_{2b}) The extent to which each of the sources mediates the relationship between the types of teachers and TSE varies per type of starting teacher.

The associated research model of this study is depicted in Figure 1. The personal teacher characteristics '*gender*' and '*age*' are included in the model as covariates in order to control for their possible influence on TSE since in a study by Klassen and Chiu, (2010) female teachers scored lower on TSE for classroom-management and an overall decreased level of TSE was measured for older, late-career teachers. The covariate 'school-board' was included in order to control for its possible influence on TSE, caused by school-board-specific administrative policies for the support of starting teachers.

■ **Figure 1.** Research model



Methods

Context

This research was conducted among teachers serving at 12 school-boards for primary education in Twente, a region in the Eastern part of the Netherlands. These school-boards are collaborating on major policy issues. The study is part of the project 'strengthening cooperation schools and teacher training' that was initiated and funded by the Dutch ministry of Education. The main goal of the project was to facilitate the transition from teacher training to practice for newly qualified teachers in order to provide them from leaving the profession early. However, based on the shared experience of the schoolleaders and school-boards joined in the consortium, teachers that have experienced major changes in their work-environment are considered starting teachers as well.

Research design

This study aimed to investigate the differences in TSE of the three groups of starting teachers, both within the starter-groups and across starters and non-starters. In addition the study aimed to investigate the mediating effect of the sources that are theorized to underlie TSE. Therefore a causal-comparative design was set up. Causal-Comparative research is a non-experimental investigation seeking to identify the causes or consequences of differences that already exist between groups. In other words, causal-comparative research is an attempt to identify a causative relationship between an independent variable (type of teacher) and a dependent variable (TSE). A major advantage of this design is that it allows studying cause and effect relationships under conditions where experimental manipulation is difficult or impossible (Gall, Gall & Borg, 2006). A survey method will be conducted to gather quantitative data from primary school teachers by use of an online questionnaire. Surveys are an adequate way to measure attitudes and characteristics of large populations. Additionally it may be possible to make generalizations to broader groups beyond the sample (Swanson & Holton, 2005).

Participants

Of the 12 school-boards one did not participate in the study because of organizational issues that needed priority. It was estimated that the study was sent out to 2800 teachers. With 695 completed questionnaires a response rate of approximately 25% was achieved. Starting teachers were classified in three groups: the novices group (less than 3 years experience) consisted of 45 (6.7%) teachers ($M_{age} = 27.13$, $SD = 5.93$; 86.7% women). The substitutes group consisted of 32 (4.8%) teachers ($M_{age} = 29.78$, $SD = 6.12$; 81.3% women; finally 144 (21.6%) teachers were assigned to the group: 'experienced teachers in unstable situations' ($M_{age} = 42.99$, $SD = 11.08$; 89.6% women). The remaining 66.9% ($n = 446$) teachers were non-starters ($M_{age} = 45.28$, $SD = 11.43$; 88.3% women). Teachers who indicated that they were re-integrating ($n = 28$) were excluded from the sample since too many ambiguities existed about the reasons for their absence and the support these teachers may have received already. It was unclear therefore if teachers in this group did fit into the concept of

starting teachers as defined for this study. Therefore, the final sample consisted of 667 teachers (588 women; 79 men) from 11 school-boards. Their ages ranged from 22 to 65 years with an average of $M_{age} = 43.04$ ($SD = 12.10$).

Procedure

First, the consortium manager introduced the survey to all school-boards and schoolleaders during a staff-meeting. Around the same time the universities Ethical board approved the research proposal and a pilot-test confirmed that teachers were able to fill in the questionnaire in 10-15 minutes. Additionally, school-boards were informed per e-mail two weeks in advance of the official distribution of the online survey. They were asked to introduce the study to all school leaders ahead of the formal invitation and to ask for their cooperation in informing and inviting teachers to participate. Two weeks thereafter the school-boards received a second e-mail with a brief introduction on the purpose of the study and the link to the online questionnaire attached to it. This e-mail was forwarded to the schoolleaders who in their turn forwarded the message to all teachers. Teachers were given three weeks to complete the questionnaire. In the second week a reminder was sent to the school-boards with the question to forward this to the schoolleaders and teachers. Teachers were requested to fill in the questionnaire at a quiet time. In the accompanying letter as well as in the short introduction of the questionnaire the purpose of the study was shortly explained. Additionally it was mentioned that participation was voluntarily and anonymous and that results were used confidentially and for research purposes only. Finally, teachers were asked to agree with these terms for the purpose of informed consent.

Instruments

The online questionnaire consisted of a short introduction followed by a demographics section including ten questions concerning type of teacher, school-board, gender and age for classification purposes and in order to measure the covariates (gender, age and school-board). Additionally all model variables were measured by use of the TSE-scale (TSES) and a sources of TSE-scale (STSES)¹. The translated TSE scale se scale was used with the permission of the respective author. Forward- and back-translations were performed to secure reliable translations of the items from English into Dutch.

Teacher Self-Efficacy Scale (TSES)

TSE was measured by means of the TSES (Tschannen-Moran & Woolfolk-Hoy, 2001) that was translated into Dutch by Mainhard (2010). This scale consisted of 12 items, 4 items for each of the subscales: TSE for instruction, TSE for student engagement, and TSE for classroom-management. All items were scored on a nine-point Likert scale with anchors at 1=not at all, 3= very little, 5=some influence, 7= quite a bit, and 9= a great deal. Sample items include: "How much can you do to craft good questions for students" for TSE for

¹ The instruments used in this study were part of a larger survey that also consisted of three scales to measure teachers' identification with the profession, teachers' need to belong and need to be distinct.

instruction; “How much can you do to help students value learning?” for TSE for student engagement and “How much can you do to control disruptive behavior in the classroom?” for TSE for classroom-management. Cronbach’s alpha for the original scale has been reported to be .90, with reliabilities of the three subscales ranging from .81 to .86 (Tschannen-Moran & Woolfolk Hoy, 2001). Researchers have additionally found evidence of the scale’s external validity across a variety of cultural settings which demonstrates its usability outside the US (Klassen et al. 2009). See Appendices for all survey items used in the research (in Dutch). In total, seven negatively-worded items were reverse coded prior to analysis.

Sources of Teacher Self-Efficacy Scale

Up to now, no reliable and validated scales were published to measure the sources of TSE. Therefore guidelines provided by Morris were used (2010) to compose a new scale out of two existing scales that were both considered promising but not able to withstand empirical scrutiny when they were validated in the first instance (Morris, 2010; Kieffer & Henson, 2001). All chosen items were in accordance with Bandura’s theory and created and evaluated by experts in the field of TSE (Morris, 2010; Kieffer & Henson, 2000). Combining both scales resulted in a promising 34-item scale to measure the sources of TSE.

In total, the scale consisted of four subscales: nine items to measure teachers’ mastery experiences, for example: “I have always been good at teaching”; eight items to test vicarious experiences like “By watching excellent teachers around me, I often learn better ways to approach my own teaching”; Nine items for social persuasions like: “I have been recognized for excellence in teaching”. Finally physiological arousal was measured by eight items like “I feel relaxed when I am teaching”.

Data-analysis

First, in order to examine validity and reliability of the scales for TSE and its sources, exploratory and confirmatory factor analyses (EFA and CFA) as well as reliability analyses (Cronbach’s alpha) were conducted using SPSS 22 and AMOS 22. Furthermore, to explore the data and relations between the variables descriptive statistics (means and standard deviations) and correlations were examined. In addition ANOVA’s were conducted in order to answer the first research question concerning the differences in TSE between the groups under study, a next step in the data-analysis was to create a structural model. Therefore, following Hayes and Preacher (2014) on mediation analyses with multicategorical independent variables (and not dichotomous as required for regular path-analyses) dummy-coding was used. Three dummy variables were constructed for the three starter-groups that were set to 1 when a case is in the group and a 0 if a case did not belong to the group. The non-starters group was not explicitly coded, meaning all three dummy variables are set to 0 for cases in that group (Table 1). This group functions as the reference group in the analysis and all parameters pertinent to group differences are quantifications relative to this

reference group. Figure 2 shows the structural model including these dummy variables as it was tested for goodness-of-fit.

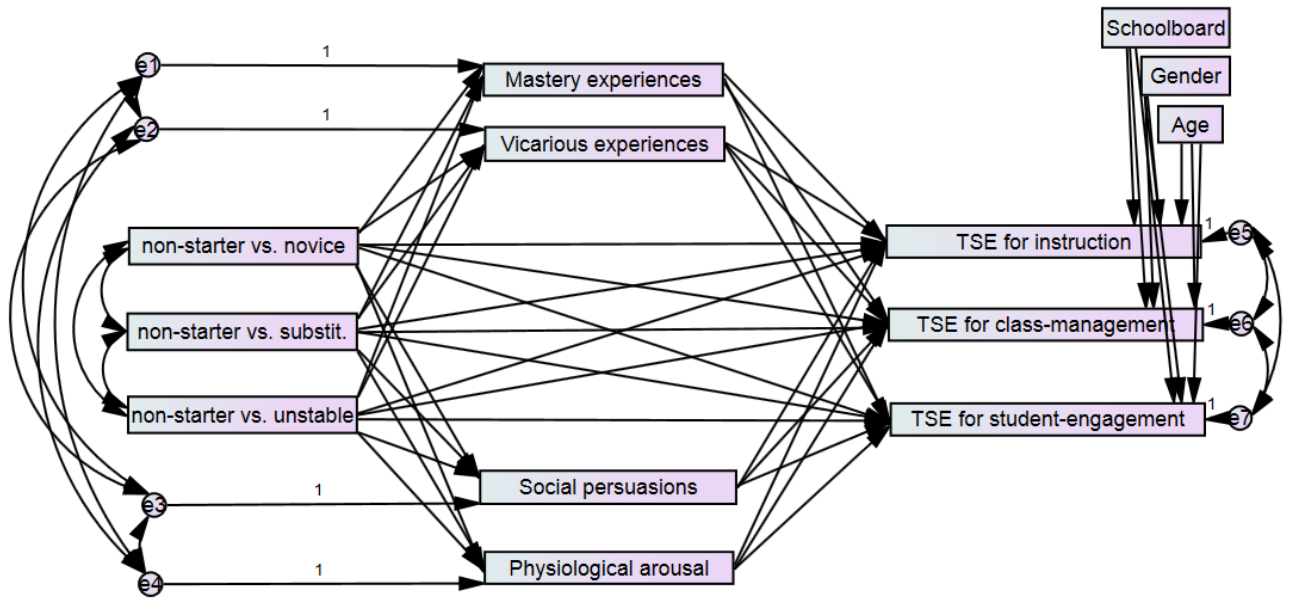
■ Table 1. Dummy coding

Group	Dummy 1	Dummy 2	Dummy 3
	Novices vs. non-starters	substitutes vs. non-starters	Unstable vs. non-starters
Novices	1	0	0
Substitutes	0	1	0
Unstable situations	0	0	1
Non-starters (reference group)	0	0	0

Note: Dummy coding for the three independent variables: novices, substitutes and experienced unstable teachers with non-starters as a reference group.

Additionally this structural model (See Figure 2.) was improved by trimming all insignificant paths stepwise (each time eliminating the least significant path) while testing for goodness-of the fit after each elimination (Kline, 2011). The parsimonious model (See Figure 5 in the results section.) was tested for goodness of fit and used for the final analysis.

Finally, in order to answer the second research question on the mediating role of the sources on the relation between type of teacher and TSE, a mediation analysis was conducted with the AMOS 22 program using maximum likelihood estimation. Hayes and Preacher (2014) urgently advise, based on recent statistical literature, to use formal inferential tests over the, until recently, commonly used causal steps approach. Therefore 95% bias-corrected bootstrap confidence intervals (CI) were constructed wherein evidence that an indirect effect is different from zero (i.e. the CI does not straddle zero) supports the conclusion that a source mediates the effect of starter type on a subscale of TSE.



Results

First this study aimed to investigate the differences in TSE levels between different types of starting teachers. It is to be expected that starters have lower TSE scores compared to non-starters. Additionally it is hypothesized that starter-groups differ amongst each other as well. Secondly, theory suggests that TSE is influenced by four sources; mastery experiences, vicarious experiences, social persuasions and physiological arousal. This study examines whether these sources have a mediating role on the effect that being a starting teacher has on TSE. Herewith TSE is split up into three dimensions namely TSE for instruction, TSE for class-management and TSE for student engagement.

Scale validation: TSES

The construct validity of the TSES was tested first with an exploratory factor analysis (EFA) using SPSS 22. A Principal Components Analysis with oblimin rotation revealed only one underlying factor (TSE) with factor loadings between .51 and .79 for all 12 items, accounting for 50.4% of the variance.

However, since the theory assumes a three factor model, additionally a confirmatory factor analysis (CFA) was conducted to compare the one-factor model from EFA against a three factor model as it is proposed by the developers of the scale (Tschannen-Moran and Woolfolk-Hoy, 2001). To assess model fit, well-established indices were used such as the χ^2 , χ^2/df ratio, Comparative Fit Index (CFI) and root mean squared error of approximation (RMSEA). For good model fit the p value of χ^2 should exceed .05. Furthermore, for the χ^2/df ratio values of less than 3 are considered adequate (Kline, 2011). For the CFI, values greater than .90 are typically considered acceptable and values greater than .95 indicate good fit to the data (Hu & Bentler, 1999). For well specified models, an RMSEA of .06 or less reflects a good fit (Hu & Bentler, 1999). Additionally, to test if the model of the three factor model fits the data better compared to the one factor model, χ^2 difference is calculated whereby a significant $\Delta \chi^2$ ($p < .05$) indicates a significant improvement.

The one factor model showed a poor fit with $\chi^2(54)=414.13$, $p < .001$, $\chi^2/54=7.63$; CFI= 0.91 and RMSEA=.098. The three factor model fitted considerably better with $\chi^2(51)=211.64$, $p < .001$, $\chi^2/51=4.15$; CFI= 0.96 and RMSEA=.069. This improvement appeared to be significant with $\Delta \chi^2(3)=198.42$, $p < .001$. Based on these results and in accordance with literature on TSE, the three factor model is used for further analysis. Reliability of the three scales was tested using Cronbach's α , resulting in: TSE for instruction $\alpha=.76$; TSE for class management $\alpha=.79$ and TSE for student engagement $\alpha=.81$. The total TSE scale revealed a good reliability of .90.

Scale validation: Sources of Teacher Self-efficacy Scale

Since the 'sources of teacher self-efficacy scale' (STSES) used in this study was new its validity and the underlying structure among the variables was tested using both exploratory and confirmatory factor analyses (EFA and CFA).

Prior to the EFA all items were tested for normality by examining the Skewness, and Kurtosis scores, in addition the correlations with the item-total were checked. None of the initial 34 items exceeded the extremes for kurtosis [3] and Skewness [10] as identified by Kline (2011). Two items from the Vicarious Experiences scale were eliminated due to correlations below .30 with the item-total (Morris, 2010).

Although the scale was designed to parallel the four sources as hypothesized by Bandura (1997), EFA was employed to determine how many of latent factors accounted for most of the variance in the data. Although eight factors had eigenvalues over 1, examination of the Scree Plot (see appendices) justified the literature based assumption that four factors could be extracted to represent each of the four sources of TSE. Factor 1 accounted for 26.3% of the variance, factor 2 accounted for 10.2%, factor 3 for 9.0% and factor 4 accounted for 5.2% of the variance.

Based on several reruns of the EFA restricted to these four factors, another twelve items were eliminated one by one because of weak loadings on all factors (less or equal to |.35|) or because they loaded high (>|.45|) on more than one factor (Morris, 2010). Additionally the model fit of the most optimal factor structure was tested with a CFA using AMOS 22. The model showed an acceptable fit with $\chi^2/203=4.00$, CFI=.86 and RMSEA=.067 according to the criteria set by Hu and Bentler (1999). Table 2 shows the factor loadings of the items on the four components that represent the four hypothesized sources of TSE

The final scale, used for further analyses, consisted of 22 items. Reliability of the four scales varied from appropriate to good with $\alpha=.81$ for mastery experiences (ME, n=7), .62 for vicarious experiences (VE, n=5), .81 for social persuasions (SP, n=5) and .73 for psychological arousal (PA, n=5).

■ Table 2. Factor loadings sources of TSE scale

Item	Loading			
	ME	PA	VE	SP
• I usually succeed at creating an environment in which students exhibit on task-behaviors	,674			
• I have been successful at minimizing class disruptions due to student misbehavior	,672			
• At the end of a class I usually feel that my use of instructional strategies has been successful	,653			
• Teaching is a part of who I am	,640			
• I have succeeded at getting through to even the most difficult students	,624			
• I do feel as though I have developed enough strategies to perform my job well	,609			
• I have always been good at teaching.	,580			
• Just entering the school building makes me feel stressful and nervous.		-,739		
• Teaching makes me exhausted.		-,728		
• I tend to get depressed when I think about going to school.		-,728		
• I look forward to going to work each day		-,648		
• Working with difficult students puts me in a bad mood.		-,531		
• By watching excellent teachers around me, I often learn better ways to approach my own teaching.			,706	
• My colleagues help make challenging teaching problems seem more manageable.			,689	
• I often compare my own abilities to other teachers			,658	
• Watching other teachers make mistakes has taught me how to be a more effective teacher			,589	
• I often think or talk through difficult teaching problems I might encounter.			,476	
• I have been recognized for excellence in teaching.				-,817
• My administrator has told me that I am a good teacher.				-,808
• My colleagues have told me that I am a good teacher.				-,772
• I am often asked by others for advice on teaching				-,477
• Most of my students' parents believe I'm a good teacher				-,449

Descriptive statistics

Table 3 shows correlations between the model variables as well as statistical means and standard deviations. Small but significant effects were found for the relations between novices and substitutes and the three dimension of TSE. The relations between experienced teachers in an unstable position and the three dimensions of TSE revealed insignificant.

The correlations between mastery experiences, social persuasions and physiological arousal and the three dimensions of TSE were all significant at a $p=0.01$ level. Vicarious experiences however correlated only weakly with TSE for instruction and TSE for student engagement whereas the correlation with TSE for class-management was insignificant. The relations will be further explored in a mediation analysis in order to test the hypotheses.

■ Table 3: Descriptive statistics and Pearson's correlations between research variables.

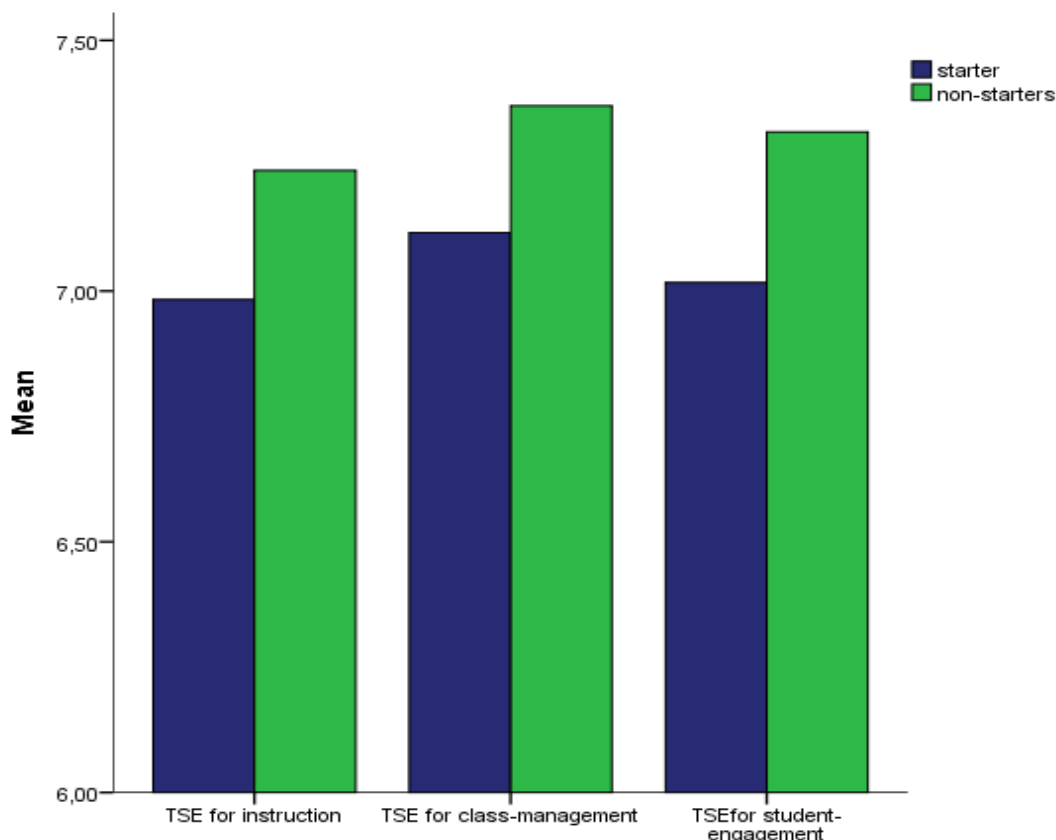
Study variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. TSE for instruction	7.16	.76	-	.624**	.716**	.631**	.090*	.467**	.153**	-.085*	-.031	-.016	-.183**	-.121**	-.010
2. TSE for class-management	7.29	.76		-	.694**	.743**	.015	.496**	.297**	-.056	-.056	-.033	-.164**	-.063	-.045
3. TSE for student-engagement	7.22	.71			-	.696**	.091*	.469**	.191**	.011	-.088*	.020	-.186**	-.094*	-.066
4. Mastery experiences	7.16	.78				-	.072	.649**	.374**	.014	-.078*	-.006	-.176**	-.117**	-.058
5. Vicarious experiences	6.30	1.12					-	.137**	-.006	.075	-.123**	-.037	.056	.055	.001
6. Social persuasions	6.85	1.06						-	.261**	-.006	-.002	-.029	-.149**	-.036	-.046
7. Physiological arousal	7.29	1.23							-	.084*	-.059	-.042	.106**	.027	-.051
8. Gender	1.88	.33								-	-.014	.008	-.012	-.010	-.045
9. School-board	5.58	3.03									-	-.054	-.066	-.002	.084*
10. Age	43.04	12.10										-	-.045	-.009	-.003
11. Novice (dummy)	.07	.25											-	-.060	-.141**
12. Substitute (dummy)	.05	.21												-	-.118**
13. Unstable (dummy)	.22	.41													-
Note (1). **. Correlation is significant at the 0.01 level (2-tailed).															
*. Correlation is significant at the 0.05 level (2-tailed).															
Note (2) Gender (men=1, women=2), School-boards were randomly numbered 1-11															

Differences between groups on three dimensions of TSE

To investigate whether expected differences exist in the level of TSE between starters and non-starters (hypothesis 1a); an ANOVA was conducted with TSE for instruction, class-management and student engagement as dependent variables and type of starter as independent variables. The ANOVA revealed the expected negative effect of being a starting teacher on TSE; given the lower TSE means of the starters. Figure 3 depicts the mean differences between teachers that were assigned to the starter-groups ($n=221$) versus the non-starters ($n=446$). For TSE for instruction the mean score of starters was 6.98, against a mean score of 7.24 for non-starters this difference was significant with $F(1,666)=17.70$ and $p<.0001$. For TSE for class- management the differences between starters ($M=7.12$) and non-starters ($M=7.37$) were significant as well ($F(3,666)=16.39$ $p<.0001$). Finally, the mean scores of starters ($M=7.02$) for TSE for student engagement appeared to differ significantly from non-starters ($M=7.32$) as well ($F(3,666)=27.49$ $p<.0001$).

In addition the effect sizes were calculated in order to examine what part of the differences in TSE can be accounted for by the independent variable (being a starter or not). For one way ANOVA, Cohen's (1988) guidelines indicate $\eta^2=.02$ to be a small effect, $\eta^2=.06$ a medium and $\eta^2=.13$ a large effect. With effect sizes of respectively: $\eta^2_{is}=.03$, $\eta^2_{cm}=.03$ and $\eta^2_{se}=.04$ the effect of being a starting teacher accounts for approximately 3 to 4 percent of the difference in TSE between starting teachers and non-starters

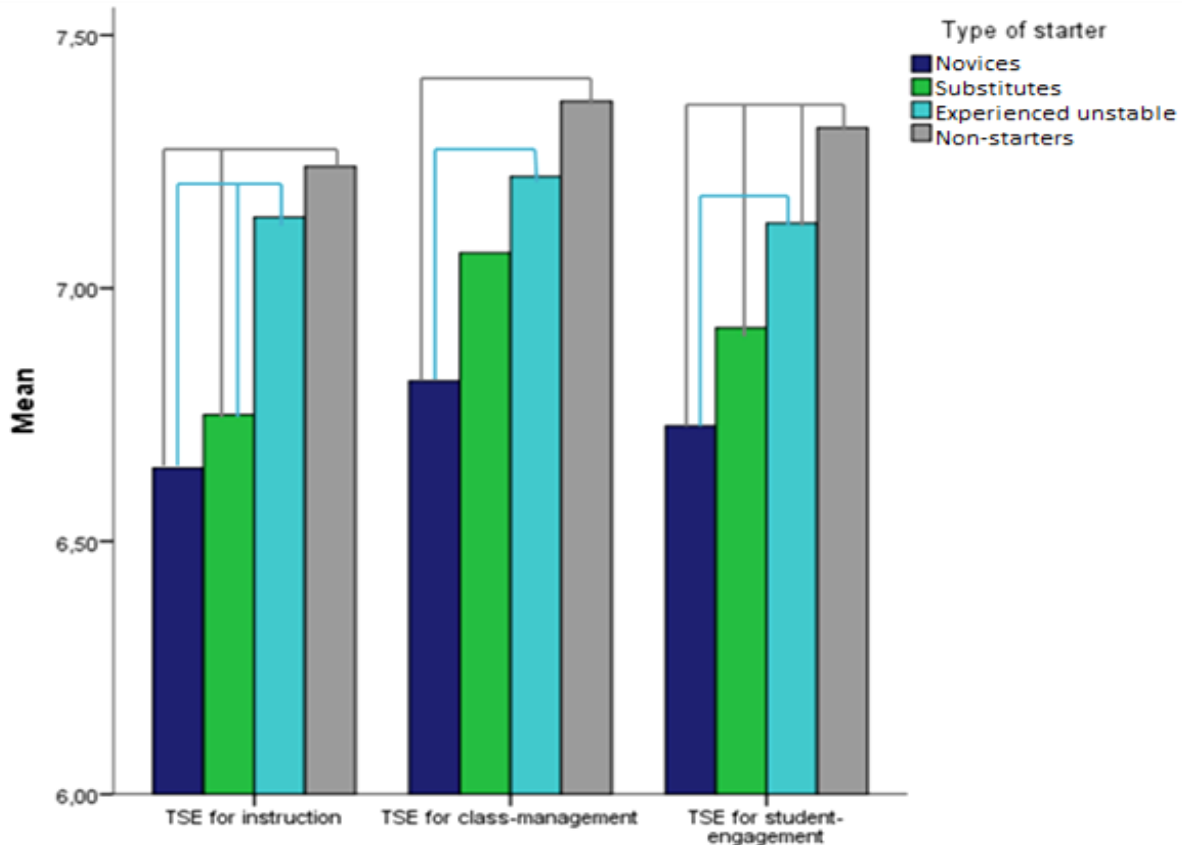
■ Figure 3. Significant mean differences on three dimensions of TSE between all starters and non-starters



In addition ANOVA's were conducted in order to test for variance between the three starter-groups on the three dimensions of TSE. The ANOVA's for all dimensions of TSE were significant at a $p < .0001$ level with $F(3,666)=12.53$ for TSE for instruction; Class-management: $F(3,666)= 8.85$ and finally $F(3,666)=13.39$ for TSE for student-engagement. With, according to Cohen's (1988) guidelines, small to medium effect sizes of respectively: $\eta^2_{is}=.05$, $\eta^2_{cm}=.04$ and $\eta^2_{se}=.06$, it can be assumed that approximately 5% of the difference in TSE levels can be accounted for by the independent variables 'type of starting teacher'.

Moreover, pair wise comparisons (Bonferroni-corrected) between means of the three starter-groups reveal that novices scored significantly ($p < .05$) lower on all three forms of TSE ($n=45$; $M_{is} = 6.64$, $SD=.66$; $M_{cm} = 6.82$, $SD= .83$; and $M_{se} = 6.73$, $SD=.75$) compared to non-starters ($n= 446$; $M_{is} = 7.24$, $SD=.65$; $M_{cm}= 7.37$, $SD= .67$; and $M_{se}= 7.32$, $SD=.60$) and experienced teachers in an unstable situation($n=144$; $M_{is} = 7.14$, $SD=.86$; $M_{cm}= 7.22$, $SD= .87$; and $M_{se}= 7.13$, $SD=.81$). Furthermore, substitutes ($n=32$; $M_{is} = 6.75$, $SD=.1.21$; $M_{cm}= 7.07$, $SD= 1.11$; and $M_{se}= 6.92$, $SD=1.02$) scored significantly lower on TSE for instruction than experienced unstable teachers and non-starters. Additionally the mean difference on TSE for student engagement was significantly lower for substitutes than for non-starters. The experienced teachers in an unstable situation significantly differed from non-starters on TSE for student-engagement only. In Figure 4 the significant differences between mean scores for the three dimensions of TSE are depicted (groups that differ significantly at $p < .05$ are connected).

■ Figure 4: Mean differences on three dimensions of TSE for the three starter-groups and non-starters



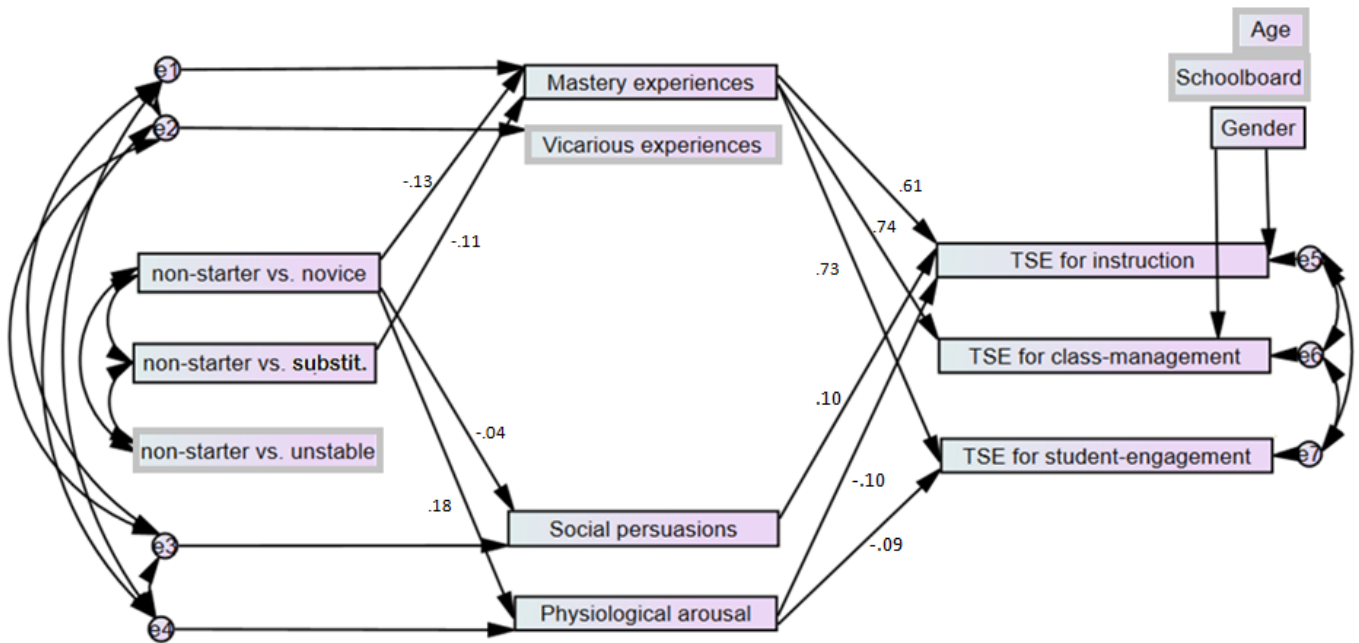
Concluding this section it can be stated that the results confirm the assumption made in hypothesis 1a: all teachers assigned to one of the three starter-groups have lower TSE levels for instruction, class management and student engagement compared to non-starters. Secondly hypothesis 1b assumed that the scores on TSE significantly differ amongst the three distinguished starter-groups. This hypothesis can be largely confirmed since novices score significantly lower compared to experienced teachers in an unstable position on all three dimensions of TSE, and substitutes significantly differ from teachers in an unstable situation on TSE for instruction.

Structural Equation Modeling (SEM)

Finally, to test hypothesis 2a and 2b concerning the influence of the hypothesized sources on the relation between type of starter and TSE, a SEM analysis was conducted. First the initial structural model (Figure 2, page 14) was evaluated using Hu and Bentlers (1999) indicators and thresholds for measures of goodness of fit: $\chi^2 > .05$, χ^2/df ratio wherein a score below 3 indicates a good fit, CFI where scores above .95 indicate very good fit and finally RMSEA which should not exceed .06 for good fit. The structural model appeared to fit the data very well with: $\chi^2 = 44.38$, $p = .07$, $\chi^2/24 = 1.85$, CFI = .99 and RMSEA = .04.

The parameter estimates between the model variables were investigated and eventually 30 insignificant paths ($p > .05$) were eliminated stepwise, each time omitting the least significant path. The model fit of the most parsimonious model was $\chi^2 = 89.99$, $p = .002$, $\chi^2/54 = 1.67$, CFI = .99 and RMSEA = .03. Compared to the initial model this final model improved significantly; $\Delta \chi^2(30) = 45.61$, $p < .05$. Figure 5 reports this parsimonious model with all significant standardized regression coefficients. The model shows significant paths between the dummies used for novices, and for substitutes and TSE through the sources mastery experiences, social persuasion and physiological arousal. This may indicate that novices and substitutes have lower TSE scores because they experience less of these sources compared to non-starters. Given the insignificant correlations between unstable and TSE (see Table 2) and between vicarious experiences and TSE, it is not surprising that these variables became negligible in the parsimonious model. The same applies to the covariates school-board and age.

■ Figure 5. Parsimonious structural model, all insignificant paths eliminated and variables with no relevant paths are marked grey.

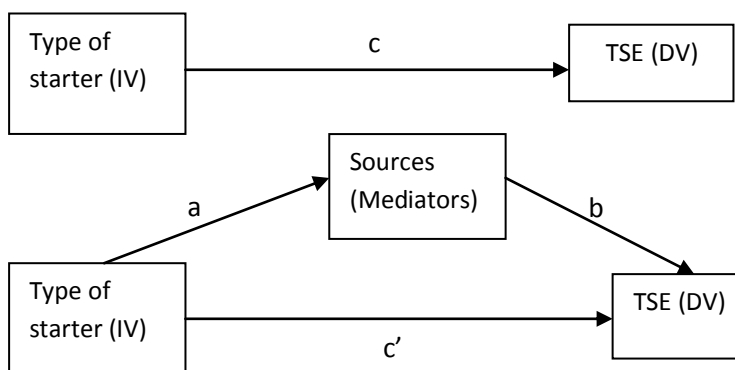


Mediation analysis

As outlined in hypotheses 2a and 2b it was anticipated that the effects of being a type of starting teacher on TSE for instruction, class-management and student engagement would be mediated by the hypothesized sources. To evaluate these hypotheses, a multiple mediation analysis was conducted using AMOS 22. Prior to the mediation analysis the Baron and Kenny's (1986) conditions for mediation were checked, these require all a-paths (between Independent variables(IV) and mediators), b-paths: (between mediators and dependent variables (DV)) and c paths (between IV's and DV's without mediators in the model) in the model to be significant (see Figure 6.). Since it appeared that all c paths were significant at a $p < .05$ level the first condition was met. Because, additionally, all insignificant paths from the parsimonious model were already omitted there is also compliance with the other conditions for mediation analysis since all remaining a- and b- paths in this model are significant.

All relative direct (c'), indirect (ab), and total effects ($c' + ab$) of the parsimonious model are presented in Table 4 on the next page.

■ Figure 6: Simple structural model in path diagram form.



■ Table 4. Relative standardized direct (c'), relative standardized indirect effects (ab) and relative total effects(c'+ab) for independent variables (Novices, substitutes and unstable), mediating variables (mastery experiences, vicarious experiences, social persuasion and physiological arousal) and the dependent variables (TSE for instruction, class-management and student engagement) (N=667).

	TSE for instruction			TSE for class-management			TSE for student engagement		
Independent and mediating variables on dependent variables	Direct	Indirect	Total effect	Direct	Indirect	Total effect	Direct	Indirect	Total effect
Novice	-.06*	Me:-.08** Pa: -.02** Sp:-.004 Me+Pa+Sp:-.14**	-.19**	-.03	Me:-.09** Me+Pa+Sp:-.14**	-.17**	-.06*	Me:-.09** Pa:-.02** Me + Pa: -.08** Me+Pa+SP:-.15**	-.20**
Substitutes	-.05	Me:-.07**	-.12**	.02	Me:-.08**	-.06**	-.02	Me:-.08**	-.10**
Unstable	.01	-	.-	-.00	-	-	-.04	-	-
Mastery experiences	.58	-	.58**	.73**	-	.74**	.71**	-	.71**
Social persuasions	.10*	-	.10*	-	-	-	-	-	-
Physiological arousal	-.09	-	-.09**	-	-	-	-.08*	-	-.08
	Mastery experiences			Social persuasions			Physiological arousal		
Independent variables on mediating variables	Direct	Indirect	Total effect	Direct	Indirect	Total effect	Direct	Indirect	Total effect
Novice	-.19**	-	-.19**	-.16**	-	-.16**	.11*	-	.11*
Substitutes	-.11*	-	-.11*	-	-	-	-	-	-
Note: * effects are significant at p<.05 **effects are significant at p<.001									

Additionally a mediation analysis with bootstrapping (based on 5000 samples) was conducted in AMOS 22 yielding 95% bias-corrected confidence interval's (CI) for the relative indirect effects (Table 5). Yet, a mediation effect can be considered significant if the CI for the relative standardized effect does not comprise zero, in other words zero is not between the lower level (LL) and the upper level (UL) of the CI.

■ Table 5: 95% bootstrapping CI's for the relative standardized effects based on 5000 samples

IV on DV through mediating variables	TSE for instruction		TSE for class- management		TSE for student engagement	
	LL CI	95 UL CI	LL CI	95 UL CI	LL CI	95 UL CI
Novice through ME	-.120	-.040*	-.143	-.049*	-.141	-.048*
Novice through PA	-.035	-.006*	-	-	-.033	-.007*
Novice through SP	-.015	.001	-	-	-	-
Novice through Me+Pa+Sp	-.195	-.085*	-.206	-.080*	-.212	-.088*
Substitutes through ME	-.114	-.029*	-.133	-.035*	-.132	-.029*

Note: * The relative indirect effect is deemed statistically different from zero

Based on the aforementioned results it may be concluded that relative to non-starters, novices and substitutes have lower levels for TSE for Instruction, TSE for class-management and TSE for student engagement which can be explained by the negative mediating influence of mastery experiences. In other words, because novices and substitutes have experienced less mastery experiences, compared to non-starters, their TSE levels are lower. The same applies to the, small but significant, mediating effect of physiological arousal on the relation between the dummy novices and TSE for instruction and TSE for student engagement. This indicates that compared to non-starters, novices experience more negative feelings (stress, anxiety etc) towards their work which explain their lower TSE levels for instruction and for student engagement.

These results partly confirm hypothesis 2a since only two of the four sources, mastery experiences and physiological arousal had a mediating role in the model. For the sources vicarious experiences and social persuasions H2a is rejected. Hypothesis h2b on the other hand can be accepted since the results show that the extent to which the sources mediate the relation between independent variables and dependent variables is not the same for the starter-groups. For novices the sources seem to have a stronger negative effect on TSE i.e. the negative effects of having less mastery experiences and experiencing less positive feelings towards their jobs (physiological arousal) are stronger for novices than for substitutes. Whereas for experienced teachers in an unstable situation the mediating effects of all the sources are insignificant.

A final remark based on the mediation analysis concerns the paths between novices and TSE for instruction through social persuasions. Although this path turned out to be significant in the SEM analysis, zero was part of the associated 95% CI(-.015 to .001. This, surprisingly, indicates no significant mediating effect for social persuasions. However, including all significant mediators from the SEM model into the mediation analysis simultaneously, shows significant negative indirect effects that are larger than the indirect effects of the individual mediators ($B=-.14$ for instruction, $B=-.14$ for class-management and $B=-.15$ for student engagement). This might indicate that these three sources reinforce one another as mediators.

Influence of the covariates on TSE

The subsequent conclusions concern the three covariates that were taken into account because of their assumed influence on the independent variables in the initial model. However, only two paths remained in the final model since all other paths revealed insignificant. Only gender had a small but significant negative effect on TSE for instruction ($B=.09$, $p<.001$) and TSE for class-management ($B=-.07$, $p<.001$) indicating that females scored slightly lower on TSE for instruction and class management. Thus, these results indicate that the TSE levels of teachers neither were affected by age nor the school board they work for.

Explained variance

The final results concern the explained variance. In Table 6 the percentages of explained variance for the sources (mediating variables) and the three dimensions of TSE (dependent variables) are presented. These results indicate that the model explained a considerable proportion of the variance in TSE for class-management (56%), for student engagement (50%) and for instruction (42%). For the sources the variance was low: for mastery experiences 4% of the variance was explained by the model, 3% for Social persuasions and 1 % for Physiological arousal.

■ Table 6. Percentage of explained variance for structural equation model on the mediating role of the sources on the effect being a starter has on TSE

Variable	R ²
TSE for Class-management	.56
TSE for Student engagement	.50
TSE for Instruction	.42
Mastery experiences	.04
Vicarious experiences	-
Social persuasions	.03
Physiological arousal	.01

Conclusions and Discussion

The first goal of this study was to investigate starting teachers' TSE levels for instruction, class-management and student engagement. Based on the results it can be concluded that, in accordance with the first hypothesis (H1a), the TSE levels for instruction, class-management and student engagement of starters are significantly lower compared to non-starters. Additionally it may be concluded that the three starter-groups differ between each other as well (H1b). Namely, novices scored significantly lower compared to experienced teachers on all three dimensions of TSE. Furthermore, novices also scored lower than the substitutes; however these differences were not significant. Finally, substitutes scored significantly lower on TSE for instruction than the experienced teachers in an unstable situation whereas the differences for TSE for class-management and student engagement were insignificant.

The second research question concerned the mediating roles of the four sources that are assumed to influence TSE. This study revealed that two of the four sources, i.e. mastery experiences and physiological arousal, acted as mediators in the model whereas vicarious experiences and social persuasions appeared to have no mediating influence. Mastery experiences appeared to be the strongest mediator, influencing the relations between both novices and substitutes (both dummy variables in the model) and TSE for instruction, class-management and student engagement. This means that the lower TSE scores of novices and substitutes compared to non-starters can be explained by the negative mediating influence of mastery experiences. In other words, because novices and substitutes experienced less mastery experiences compared to non-starters, their TSE levels are lower. Moreover, physiological arousal had a smaller but significant influence on the relation between novices and TSE for instruction and TSE for student engagement. Thus, compared to non-starters, novices had lower scores on TSE for instruction and student engagement due to the mediating influence of physiological arousal.

Overall it may be concluded that the results of the current study confirmed the relevance of the distinction between various groups of starters since significant differences were found between the groups concerning both, their TSE levels and the mediating influence of the sources. Therefore, the theoretical implications of these results will be discussed in the next section for each of the starter-groups separately.

Theoretical implications

Novices

The results of this study provide evidence for the assumption that novice teachers scored significantly lower on TSE for instruction, class-management and student-engagement compared to experienced teachers who are not in a starting position. For novices with less than three years experience these results are mostly in line with former research; except that in one study no differences were found for TSE for student engagement (Wolters & Daugherty, 2007). Participants in that study however, were teachers

from both elementary and middle school teachers in the US. Whereas in another US setting, no significant differences were found between novices and experienced teachers for TSE for class-management (Tschannen-Moran & Woolfolk-Hoy, 2007). However, as the authors suggest, these results may be caused by the fact that, in 2007, the education field had only recently begun to focus on the importance of student-engagement (Tschannen-Moran & Woolfolk-Hoy, 2007).

A first explanation for the higher means of experienced teachers TSE may be the higher attrition among low self efficacy teachers. As Bandura (1997) stated, those teachers who decide to leave the profession are less skilled and less confident in their abilities than those who continue in it. It might be possible therefore, that teachers who did not succeed in improving their teaching performance over time, already left the profession resulting in higher mean scores for experienced teachers. This would be in line with earlier research that found that teachers who leave the profession score significantly lower on TSE (Glickman & Tamashiro, 1982). Since attrition rates in the Netherlands are high, this explanation seems worth considering. Having this in mind, the results indicate the necessity of support programs for novices in order to increase their levels of TSE for instruction, class-management and student engagement.

A second possible cause for the lower TSE scores of novices is that teachers with a longer tenure in the profession have had more opportunities to develop the skills needed to be successful teachers through additional direct experiences. That is, they are exposed to and have overcome more challenging situations (Wolters & Daugherty, 2007). In other words they have had more mastery experiences that might have provoked their feelings of efficacy. This explanation can be confirmed by the results of the current study. Mastery experiences appeared to be the most important mediator to influence the difference in TSE between novices and non-starters. Compared to experienced teachers, novices have had fewer mastery experiences leading to lower TSE scores.

The same applies to physiological arousal. In the current study, novices compared to non-starters, were found to experience more negative arousals, meaning that for instance, they experience more feelings of work-related stress and anxiety that affect their TSE scores for instruction and student engagement. Ruble et al. (2011) also found evidence for the relation between TSE and physiological arousal, which they examined by stress and burnout, in their study among US teachers of students with autism. However, a remarkable difference with the current study is that Ruble et al. (2011) only found a significant relation between physiological arousal and TSE for class-management. These results are in concert with research among American pre-service primary school teachers (Oh, 2011) who also found a significant relation between physiological states and TSE for class-management. However authors from both articles admit that their studies were limited by their small sample size and the adequacy of the scales used for measurement.

The third source that was expected to mediate starting teachers' effect on TSE was social persuasion. Solely in the model, social persuasions did not significantly influence the three relations between novices and TSE indicating no mediation effect. However, together with mastery experiences and physiological arousal the indirect effect of the relations between novices and the three dimensions of TSE increased considerably. This finding is in accordance with Tschannen-Moran and McMaster (2009) who stated in a review from the literature that social persuasion alone may not be a powerful source of TSE; however, in partnership with other sources of efficacy, it may provide teachers the encouragement necessary to expend effort towards realistic goals aimed at strengthening their teaching skills. Furthermore, Bruce and Ross (2008), who explored how the sources of TSE operated in elementary school teachers, found evidence for the influence of all four sources on TSE and concluded that these sources reinforced one another and led to continued implementation of new and challenging teaching strategies.

The finding that vicarious experiences have no influence on TSE for starters is in contrast with theory-based expectations. Especially when fewer mastery experiences are available to build efficacy on, as is the case for novices, vicarious experiences are supposed to influence TSE (Bandura, 1997). However, other researchers focusing on the sources of TSE ran into the same problems. In their extensive literature review on the sources of TSE, Usher and Pajares (2008) concluded that factor analytic results and the consistently low reliability of scores on the vicarious experience subscales reported across studies suggest that measures used to assess this source have been inadequate. On the other hand, it could be argued that teachers lack the opportunities for observing colleagues and therefore consider modeling not a valuable efficacy raising source.

Substitutes

The second group under investigation in the current study consists of those teachers who are substitutes. As far as known no previous studies investigated this group in relation to TSE and the sources. Nevertheless, the current study emphasizes the significance of analyzing this group of teachers since the results reveal significantly lower scores on TSE for instruction and student engagement compared to non-starters. It is remarkable that for TSE for class-management no significant differences were found between substitutes and non-starters. An explanation may be found in the type of job substitutes have. Substitute positions are often characterized by flexible deployment. Depending on the needs for substitution in schools, substitutes can be deployed in kindergarten one day and in the upper classes the next day (Duggleby & Badali, 2007). Succeeding in such a wide variety of situations might provide these teachers with the mastery experiences that provoked the increased TSE levels for class-management. The other way around this characteristic of substitutes also prohibits teachers to establish sustained relationships with students which may have resulted in the lower scores on TSE for student engagement. The same may apply to TSE for instructional strategies; because these teachers have to adapt to different classes very often they may not get the chance to become familiar with class-specific instruction

strategies (Jenkins et al. 2009) and thus having fewer mastery experiences, resulting in lower feelings of self-efficacy for instruction. This assumption is confirmed by results from the current study since mastery experiences appeared to be mediating the relation between substitutes and the three dimensions of TSE indicating that substitutes, compared to non-starters have fewer mastery experiences leading to lower scores on TSE.

Furthermore, given the current economic situation and the derivative governmental policy in the Netherlands many starting teachers are forced to accept a job as substitutes. However since all teachers with less than three years experience in the current study were assigned to the novices group, teachers in the substitutes group all have at least three years of working experience. This raises the question therefore, whether the fact that these teachers have no permanent contract is either the cause of their lower TSE scores or whether this might be caused by lower TSE scores that lead to poorer performances. Nevertheless, a lack of support probably does not help to break this vicious circle.

Experienced teachers in unstable positions

The final group, experienced teachers, whose professional careers are in a state of flux, also score lower on TSE than their colleagues who are in a stable position. This result provides some evidence for Bandura's (1997) assumption that TSE, although stable once set, can decrease because of jarring experiences like starting in a new work-environment. This result is also in line with Chester and Beaudin (1996) who found a slightly but significant difference between experienced teachers in a changed work-environment and teachers who did not. It is important to take into account that this conclusion was based on the assumption that the TSE levels of these experienced teachers were higher before they started in a new work-environment. The current study does not provide data to confirm this premise.

It is noteworthy however that the difference in TSE between unstable teachers and non-starters was only significant for TSE for student engagement. A changed work-environment does influence the extent to which experienced teachers feel efficacious for the relations with their students but has less influence on their efficacy for instruction and class-management. Apparently these feelings are less affected by a changed work-environment.

Moreover, since the group became insignificant in the SEM model, the results reveal no significant mediating effect for the sources of TSE for this group. This may indicate that for experienced teachers other TSE increasing variables become more important. The support and involvement of parents and community support for instance were variables that were found to be related to the efficacy beliefs of experienced teachers (Tschannen-Moran & Woolfolk-Hoy, 2007). The leadership of the principal is another contextual variable that appeared to influence TSE beliefs of experienced teachers in a study by Walker and Slear (2011) which was not accounted for in the current study.

Implications concerning gender, school-board and age

In this study, gender related to TSE for instruction and class-management in favor of men. This is in contrast with a study examining TSE and its antecedents among novice and experienced teachers in the US (Tschannen-Moran & Woolfolk-Hoy, 2007) which found no significant relations between gender and TSE. However, the results are partly in line with Klassen and Chiu (2010) who found the same lower results for women on TSE for class-management in a Canadian study among practicing teachers in primary and secondary education. A reason for the lower TSE scores for women on class-management and instruction may be found in the finding that female teachers experience less job satisfaction (Liu and Ramsey, 2008), more job related stress and greater classroom stress regarding student behavior (Klassen & Chiu, 2010). Specifically since both constructs: job satisfaction and work related stress, are related to TSE (Skaalvik & Skaalvik 2010).

Furthermore, it is of interest that age appeared to be unrelated to the TSE levels of teachers in the final model. Apparently, this variable did not influence the TSE levels of the participating teachers. This seems to be in accordance then with Bandura's assumption that TSE is quite stable once established unless a shocking experience provokes a reassessment (1997).

Finally the relation between school-board and TSE revealed insignificant. Apparently, the influence of the school-boards policies did not affect teachers' feelings of self-efficacy. However, given Bandura's assumption that the TSE is context specific, it is possible that measuring the influence on a schoollevel would have revealed different results, this suggestion is supported by Goddard & Goddard (2001) who proved that teachers who work in two schools at the same time, experience two different sensations of self-efficacy.

Limitations and practical implications

Several limitations to the present study should be acknowledged. One is that the results may suffer from the effects of common-source bias, because all variables were from a single survey and one set of respondents. Another limitation of the present study is that it is designed as a cross-sectional study. Although a theoretical model was tested in which type of starter variables predict TSE on three levels through the sources, no rigid causal interpretations should be made. Longitudinal studies are needed to further explore these causal relations. In addition, because of the voluntary nature of the data gathering method, it may be that the teachers who responded differed in some systematic way related to the variables under study than teachers who did not. Related to this, is to be questioned if all participants interpreted all items in a consistent way. Critical reviewers therefore stress the importance of extending quantitative designs into mixed method designs. In depth qualitative research designs can provide more insights into how TSE is formed and hence support the investigation of interventions that enhance TSE (Wyatt, 2014; Labone, 2004).

In addition, since the sources of self-efficacy scale was newly composed it was not validated previously. Although Cronbach's alpha's of three subscales were sufficient the

vicarious experiences scale proved to be less reliable. This may have affected the poor results for this particular source. Adaptation of the vicarious experiences scale or reconsidering the factor structure of the sources of efficacy scale seems worth the effort. For example, Anderson and Betz (2001) suggest, based on their research on measuring the sources of social self-efficacy in relation to career development, to cluster mastery experiences, social persuasions and physiological arousal since these are all direct learning experiences. Vicarious experiences, on the other hand are examples of indirect learning experiences. Exploring the best fitting factor structure for the sources of teachers self efficacy scale was beyond the scope of this study but it is recommended for future research to take this possibility into account. Another issue regarding the sources of efficacy concerns item wording, which can lead to different results that may reflect artifacts rather than conceptual differences in underlying constructs (Usher & Pajares, 2009; Marsh, 1996). Some researchers have contended that the response patterns participants use when answering certain positively and negatively worded items may reflect a substantial and meaningful personal bias (Horan, DiStefano, & Motl, 2003). With the exception of the items designed to assess physiological arousal, the items used in the final scale were positively worded. Since it is possible that negatively worded items would have elicited different responses, it is recommended for future investigators interested in quantifying the sources of TSE to take this wording-issue into account.

A final limitation can be found in the fact that this study did not account for nested data structures. Although school-board appeared to be an insignificant covariate, a multilevel analysis could have accounted for variance in the dependent variables (TSE) that was measured at the lowest level of analysis (teachers) by considering information from other levels of analysis (Steenbergen & Jones, 2002), in this study the school-boards. Secondly multilevel analysis would have made it possible to determine whether the causal effects of starting teachers are conditioned or moderated by the higher level predictor: school-boards. Finally, multilevel analysis could have provided a test of the generalizability of the finding. That is, do findings obtained in one school-board also apply to other contexts? Given the fact that TSE is supposed to be context specific, it is advisable for future researchers to seriously consider this possibility. Additionally, for future investigators it is worth taking into account the influence of the schoollevel since it was, in order to ensure the anonymity of the participants, not possible to measure these effects in the current study.

Results from this study may also inform school-boards, schoolleaders and others involved in the support of starting teachers. As the findings provide evidence for the assumption that not only novice teachers have lower TSE scores compared to non-starters but also substitutes and teachers whose careers are in a state of flux. However the three starter-groups do differ which may indicate that support aimed at increasing the TSE levels of the various starters should differ accordingly. For novices, whose TSE scores were the lowest, results implicate that programs aimed at increasing their TSE for instruction, class-management and student engagement should enable novice teachers to gain mastery

experiences and positive physiological arousal. Subsequently, substitutes scored significantly lower on TSE for instruction and student engagement. Since all of the participating school-boards admitted that no formal policy is available for the guidance of substitutes, the results of this study justify the recommendation to provide these teachers with support aimed at gaining more mastery experiences. The experienced teachers in unstable positions finally had, compared to the other starters, the highest TSE scores; compared to non-starters however they scored considerably lower. This implicates that suitable support can help teachers who started in a new school or on a new schoollevel, to raise their TSE. However, since the sources, as measured in the current study appeared to be no significant mediators for this group of starters future studies should focus at investigating the specific needs of this group of starting teachers.

Final conclusion

Since most TSE-related studies up to now, mainly focused on novice teachers with few years of teaching experience, this research added to the body of literature by investigating the differences between three types of starting teachers namely novices, substitutes and experienced teachers in an unstable position. Overall it may be concluded that this study provides initial evidence for the relevance of distinguishing between these groups of starting teachers, since all starter-groups appeared to score lower on TSE compared to non-starters. Additionally it was found that the groups differed between each other as well, implicating that the extent to which they are in need for support to increase their TSE levels also varies. Furthermore, this study provides some primary indications on how this support may be shaped for each of the groups, based on the hypothesized sources of TSE. This may help all who are involved in the support and professional development of starting teachers to provide TSE increasing guidance tailored to the needs of each group. Finally, the current study emphasizes the importance of further investigations into the underlying sources of TSE for various groups of starters. This is especially worthwhile given the importance of higher TSE scores for starting teachers' well-being, the quality of their teaching, and most important within the scope of this study, for preventing them from leaving the profession.

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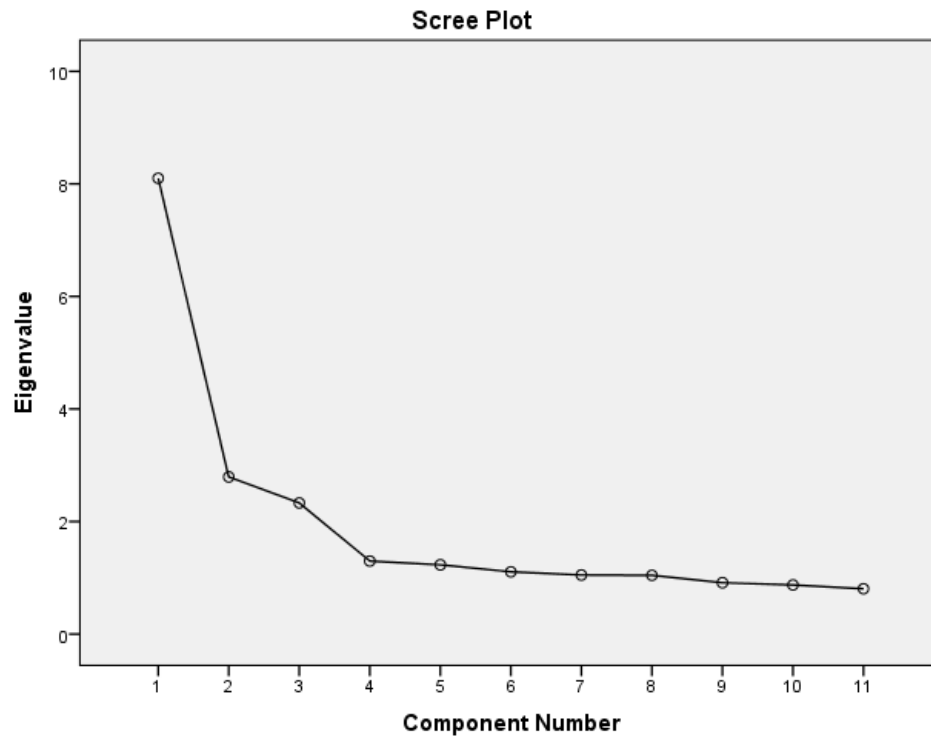
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Appendices

Scree plot sources of TSE

Sources of TSE, Scree Plot of Eigenvalues from initial EFA (PCA with oblimin rotation and Kaiser Normalization)



Original Survey items (Dutch)

Vragenlijst voor Leerkrachten in het Basisonderwijs

Wat fijn dat u wat tijd (± 10 tot 15 minuten) wilt besteden aan het invullen van deze vragenlijst!

Uw bestuur werkt, samen met de andere besturen in Twente, mee aan een regiobreed onderzoek bedoeld om de begeleiding van leerkrachten te verbeteren. Uw mening over hoe u aankijkt tegen het beroep van leerkracht en uw eigen rol hierin levert waardevolle informatie op. De resultaten zullen gebruikt worden bij de ontwikkeling van diverse begeleidingstrajecten voor zowel beginnende leerkrachten maar bijvoorbeeld ook voor ervaren leerkrachten die starten in een nieuwe bouw of school.

De vragenlijst bestaat uit vijf onderdelen (A tot en met E)

Probeer niet te lang na te denken over de vragen en stellingen, de eerste ingeving is vaak het best!

Er zijn geen goede of foute antwoorden, klik het antwoord aan dat het beste past bij u of uw situatie.

Ik vraag u deze vragenlijst individueel in te vullen op een rustig moment

Mocht u vragen hebben over dit onderzoek dan beantwoord ik deze graag. U kunt me bereiken via m.m.krakers@student.utwente.nl.

Alvast heel hartelijk bedankt voor uw deelname!

Marieke Krakers

1. Uiteraard wordt alle informatie strikt vertrouwelijk behandeld en uitsluitend voor dit onderzoek gebruikt. Deelname is anoniem, om die reden is het niet mogelijk om individuele resultaten terug te koppelen. Uw bestuur krijgt een rapport met de resultaten op stichtingsniveau.
 - ja, ik heb dit gelezen en ga hiermee akkoord
 - nee, ik doe niet mee aan dit onderzoek
2. Wat is uw leeftijd?
3. Wat is uw geslacht?
 - Vrouw
 - Man
4. Hoeveel jaar bent u werkzaam als leerkracht in het onderwijs?
5. Hoeveel jaar bent u werkzaam als leerkracht op uw huidige school?
6. Hoeveel jaar bent u werkzaam als leerkracht in uw huidige groep(en)?

7. Aan welke groep(en) geeft u les?

- groep 1
- groep 2
- groep 3
- groep 4
- groep 5
- groep 6
- groep 7
- groep 8

8. Bent u in het afgelopen jaar gestart in een andere/nieuwe bouw?

(werkte u bijvoorbeeld jaren in de onderbouw en dit schooljaar voor het eerst (weer) in de boven- of middenbouw)

- ja
- nee

9. Bent u in het afgelopen jaar langer dan zes maanden afwezig geweest door bijvoorbeeld ziekte?

- ja, ik ben re-integrerend
- nee

10. Bent u langdurig invaller?

(U bent langdurig invaller wanneer u langer dan 3 maanden op dezelfde school werkt maar geen vast contract heeft.)

- ja
- nee, ik heb een vast contract
- nee, ik werk korter op deze school

11. Voor welk bestuur werkt u?

- MarCanT
- ROOS
- Keender
- Quo Vadis
- Consent
- Dr. Schaepmanstichting
- St. Komt
- KONOT
- St. Koe
- OPOA
- VCO

12. Als u uw huidige functioneren zou vergelijken met dat van collega's, hoe schat u zichzelf dan in?

1= onervaren 3= weinig ervaren 5= gemiddeld 7=ervaren 9= zeer ervaren

Deel B

- Is1: Hoe goed kunt u vragen voor leerlingen formuleren?
- Se1: Hoe goed kunt u bij leerlingen een positieve houding ten opzichte van leren ontwikkelen?
- Is2: Hoe goed kunt u variëren in vormen van toetsing?
- Cm1: Hoe goed kunt u een einde maken aan storend gedrag in de klas?
- Se2: Hoe goed kunt u ouders stimuleren hun kinderen goed te laten presteren op school?
- Cm2: Hoe goed kunt u leerlingen de regels na laten leven?
- Cm3: Hoe goed kunt u in verschillende klassen effectief lesgeven?
- Is3: Hoe goed kunt u alternatieve uitleg of voorbeelden geven als leerlingen iets niet snappen?
- Se3: Hoe goed kunt u leerlingen ervan overtuigen dat zij goed kunnen zijn op school?
- Cm4: Hoe goed kunt u een leerling kalmeren die de les verstoort of onrustig is?
- Se4: Hoe goed kunt u leerlingen motiveren die weinig interesse in school hebben?
- Is4: Hoe goed kunt u verschillende werkvormen in uw lessen toepassen?

Deel C

- Me1: Lesgeven zit me als het ware in het bloed
- Ve1: Ik leer beter les te geven door te kijken naar excellente leerkrachten in mijn omgeving
- Sp1: Er is mij verteld dat ik een uitstekende leerkracht ben
- Me2: Ik ben altijd al goed geweest in lesgeven
- Pa1: Als ik lesgeef voel ik me relaxed
- Me3: Het kost me altijd veel moeite om leerlingen nieuwe stof aan te leren
- Sp2: De meeste ouders van mijn leerlingen vinden dat ik een goede leerkracht ben
- Pa2: Lesgeven is stimulerend voor mij
- Ve2: Door de hulp van collega's lijken lastige situaties tijdens het lesgeven beter beheersbaar
- Me4: Ik heb het gevoel dat ik voldoende strategieën heb ontwikkeld om goed les te kunnen geven
- Ve3: Ik denk veel na over hoe ik om zal gaan met de moeilijkste lessituaties
- Me5: Het lukt me niet goed om effectief les te geven, ook al besteed ik veel tijd aan mijn voorbereiding.
- Sp3: Leerlingen hebben mij gezegd dat ik een goede leraar ben
- Pa3: Het werken met moeilijke leerlingen brengt me in een negatieve stemming
- Ve4: Ik vergelijk mijn eigen capaciteiten vaak met die van andere leerkrachten
- Pa4: Ik voel me somber en teneergeslagen wanneer ik denk aan lesgeven
- Me6: Ik slaag erin om zelfs tot de lastigste leerlingen door te dringen
- Ve5: Ik overdenk of bespreek de lastige lessituaties die ik mogelijk tegen zou kunnen komen vaak zeer uitgebreid
- Sp4: De directeur heeft gezegd dat ik een goede leerkracht ben
- Sp5: Onderwijskundige boeken en artikelen bevatten, voor mij, bruikbare informatie over lesgeven

- Ve6: Ik zal nooit zo goed worden in lesgeven als de leerkrachten die ik het meest bewonder
- Pa5: Lesgeven is uitputtend voor me
- Ve7: Ik denk dat ik, vergeleken met andere leerkrachten, beter ben in lesgeven
- Sp6: Anderen vragen mij vaak om advies over lesgeven
- Pa6: Van lesgeven krijg ik een goed humeur
- Me7: Het lukt me goed om ordeverstoringen tijdens de les tot een minimum te beperken
- Sp7: Feedback van anderen helpt mij om beter les te gaan geven
- Pa7: Alleen al de school binnengaan geeft me een gestresst en nerveus gevoel
- Me8: Ik slaag er meestal goed in om een klimaat te scheppen waarin leerlingen taakgericht aan het werk zijn
- Ve8: Ik ben meer effectief gaan lesgeven door de fouten die ik anderen heb zien maken
- Sp8: De lichaamstaal van mijn leerlingen tijdens de les ervaar ik als een waardevolle vorm van feedback
- Me9: Ik heb aan het einde van een les meestal het gevoel dat mijn instructiestrategieën succesvol waren
- Sp9: Collega's zeggen dat ik een goede leerkracht ben
- Pa8: Ik kijk er iedere dag naar uit om weer aan het werk te gaan

Deel D

- Ik ben trots dat ik een leerkracht ben
- Ik voel me goed over het feit dat ik een leerkracht ben
- Ik heb weinig affiniteit met mijn beroep als leerkracht
- Ik vertel liever niet aan anderen dat ik leerkracht ben
- Ik ben blij om leerkracht te zijn
- Ik ben tevreden met mijn beroep als leerkracht
- Ik heb veel gemeen met de gemiddelde leerkracht
- Ik lijk erg op de gemiddelde leerkracht
- Leerkracht zijn vormt een goede afspiegeling van mijn persoonlijkheid
- Leerkracht zijn is een belangrijk onderdeel van hoe ik mezelf zie
- Ik denk vaak aan het feit dat ik een leerkracht ben
- Ik zou erg tevreden zijn wanneer ik de rest van mijn loopbaan leerkracht zou zijn
- Ik vind het leuk om met anderen over mijn beroep als leerkracht te praten
- Ik denk dat ik me makkelijk zou kunnen toeleggen op een ander beroep dan leerkracht
- Leerkracht zijn is van grote persoonlijke betekenis voor mij
- Ik ben niet bang voor wat er zou gebeuren als ik mijn baan als leerkracht op zou geven
- Het zou heel moeilijk voor mij zijn om mijn baan als leerkracht nu op te zeggen ook al zou ik dat willen
- Teveel in mijn leven zou verstoord raken als ik nu mijn baan als leerkracht zou verlaten
- Op dit moment is aanblijven als leerkracht meer een kwestie van moeten dan willen
- Ik denk dat ik te weinig opties heb om te kunnen overwegen mijn baan als leerkracht op te zeggen

Deel E

- Ik wil graag gezien worden als een 'normale' leerkracht door mijn collega's
- Ik wil graag verbonden zijn met mijn collega leerkrachten

- Ik wil graag geaccepteerd worden door mijn collega leerkrachten
- Ik wil graag passen bij de andere leerkrachten op mijn school
- Ik wil graag een gewaardeerde leerkracht zijn op mijn school
- Ik wil graag anders zijn dan andere leerkrachten
- Het is belangrijk om anders te zijn dan andere leerkrachten
- Ik zou me ongemakkelijk voelen als ik gezien zou worden als precies hetzelfde als andere leerkrachten
- Ik wil graag uniek zijn als leerkracht
- Ik zou graag willen dat ik gezien word als een leerkracht met speciale eigenschappen of kwaliteiten