Working Paper:

Examining the role of personal factors in the development of self-efficacy beliefs among pre-service teachers

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Although high teacher self-efficacy beliefs have been linked to improved teaching skills resulting in favorable outcomes for students, not much is known about the development of self-efficacy beliefs during the preparation phase. The focus of this paper is to examine whether and how self-efficacy beliefs vary among individual teacher candidates enrolled in a university-based teacher preparation program (n=352 teacher candidates) based on personal factors that teacher candidates bring with them to the program. I use hierarchical linear growth models to explore trajectories of self-efficacy beliefs across the duration of the preparation program and assess variation in these beliefs among individual teacher candidates based on teaching specialty, personality traits and attitudes towards teaching. Results suggest that although self-efficacy beliefs do not change significantly during the teacher preparation program on average, there is substantial variation in self-efficacy beliefs among individual teacher candidates based on personal factors. Findings from this study provide evidence that personal dispositions, beliefs and characteristics that individual teacher candidates bring to the preparation phase significantly predict their confidence in their ability to teach effectively in a classroom. Implications for teacher education and policy are discussed.

Introduction

Teacher self-efficacy, or teachers' beliefs in their ability to promote student learning has been consistently linked to a variety of teacher and student outcomes. Teachers who report higher self-efficacy beliefs feel more confident in their ability to teach their students, adjust to the classroom environment and deliver effective instruction (Yost, 2006). In the classroom, efficacious teachers exhibit greater levels of planning, better classroom organization and improved teaching practices (Tschannen-Moran & Hoy, 2001). Students in classrooms with teachers who have high self-efficacy beliefs report improved student self-efficacy (Anderson, Greene & Loewen, 1998), higher student motivation (Midgley, Feldlaufer & Eccles, 1989), higher levels of classroom engagement (Good & Brophy, 2003) and increased academic achievement (Caprara, Barbaranelli, Steca & Malone, 2006).

Although the literature establishes a clear link between different teacher and student outcomes that are of policy interest, less is known about how and when self-efficacy beliefs are developed among pre-service teachers. Pre-service teacher candidates enter preparation programs with some self-efficacy beliefs, based largely on the prior experiences with and observations of teaching (Richards & Lockhart, 1996). They also bring with them a set of personal characteristics, including their attitudes towards and beliefs about teaching, personality traits and demographic characteristics including age, gender, race/ethnicity, etc. During the preparation program, program components such as coursework, teaching experiences and mentor support as well as candidates' personal characteristics interact to change their existing self-efficacy beliefs. At this time, self-efficacy beliefs are also influenced by candidates' behaviors in response to their physical and social environment in the preparation program. Since we know that teacher self-efficacy beliefs are particularly malleable during the first few years of teaching (Tschannen-Moran & Hoy, 2007), the interaction of personal factors, environmental factors and behavioral factors become critical to study during the preparation phase.

Examining how personal characteristics influence the development of self-efficacy beliefs during the preparation phase is also critical to understanding the trajectory of these beliefs among pre-service teachers. Research suggests that self-efficacy beliefs form early on a teacher's career and once formed, these beliefs become resistant to change (Bandura, 1977; Tschannen-Moran & Hoy, 2007). Although many studies examine differences in self-efficacy beliefs among pre-service teachers at the beginning and/or end of the preparation phase, the focus is often to evaluate the role of student teaching experiences (mastery experiences) or coursework in changing these beliefs (see Cantrell, Young and Moore, 2003; Wagler, 2011). In addition, these studies compare different cross-

sectional samples of teacher candidates rather than longitudinally tracking the same cohort of teacher candidates over time. Thus, even though we know self-efficacy beliefs are critical to the success of a teacher and her students, it is difficult to ascertain when these beliefs are formed, how they change in the first few years of a teacher's tenure and whether they are influenced by personal characteristics of teacher candidates.

This study bridges gaps in the existing literature by identifying the role that specific personal characteristics including teaching specialty (i.e., elementary, secondary, special education), personality traits and attitudes towards teaching play in the development of self-efficacy beliefs during the preparation phase. The goals of this study are twofold: first, I aim to understand how pre-service teacher candidates' self-efficacy beliefs change during the preparation phase by examining their growth trajectories over time. I then use growth trajectories to explore variation in self-efficacy beliefs based on personal factors such as teaching specialty, personality domains and attitudes towards teaching. Thus, the second goal of this study is to explore the role that these personal factors play in explaining variation in self-efficacy beliefs both at the beginning and across the duration of the preparation program.

In meeting these two goals, this paper makes important contributions to existing research on self-efficacy beliefs among pre-service teachers. First, this study leverages multiple years of longitudinal data on 7 cohorts of pre-service teachers. Large-scale data collection, particularly longitudinal data tracking is rare in teacher preparation, therefore this study is unique in that it leverages data for multiple years for the *same* teacher candidates. These data allow for a comprehensive investigation of the role of personal characteristics in the development of pre-service teachers' self-efficacy beliefs across the duration of the preparation phase. The findings from this paper suggest that pre-service teacher candidates enter the preparation program with different self-efficacy beliefs based on their prior attitudes, personality traits and beliefs about teaching and that these factors significantly predict trajectories of self-efficacy development across the duration of the program. Overall, my findings suggest that based on these different personal factors, individual teacher candidates likely derive different experiences from the same teacher preparation program. The findings from this study have important implications for teacher preparation programs looking to provide targeted supports that enhance the preparation experience and improve candidates' beliefs in their ability to teach effectively in the classroom from day one.

Review of the literature

Self-efficacy Beliefs in Classroom Contexts

Developed as part of his work on social cognitive theory, Bandura describes self-efficacy as an individual's beliefs about their capacity to produce designated levels of performance and influence outcomes and events affecting their lives (Bandura, 1977, 1986). Self-efficacy in the context of teaching and teachers was first studied by Armor et al. (1976, pg. 31) who define teacher self-efficacy as "the extent to which the teacher believes he or she has the capacity to produce an effect on the learning of students". In its simplest form, teacher self-efficacy can be thought of as a teacher's belief in their own ability to effectively teach their students in a manner that leads to improved student outcomes, broadly defined.

Teacher self-efficacy has always been of interest to researchers, primarily because these beliefs are associated with improved teacher and student outcomes. The association between strong self-efficacy beliefs and improved teacher outcomes is particularly pronounced for novice teachers, who report greater satisfaction in teaching, less stress, and more favorable perceptions of their preparation program (Hoy, 2000). Teachers with high self-efficacy also demonstrate higher levels of effort and persistence in their teaching (Skaalvik & Skaalvik, 2017), resulting in improved student outcomes including higher academic achievement (Anderson et al., 1988; Chang, 2009), higher student motivation (Roeser, Arbreton & Anderman, 1993) and better attitudes towards school (Miskel, McDonald & Bloom, 1983). In essence, high teacher self-efficacy beliefs have the potential to improve teacher practices in the classrooms and ultimately improve a number of student outcomes that are of policy interest.

Self-efficacy Beliefs in Teacher Preparation Contexts

In this study, I focus on self-efficacy beliefs among pre-service teachers enrolled in a teacher preparation program. Self-efficacy beliefs among pre-service teachers has gained more research interest following evidence that novice teachers enter the profession with high hopes regarding the impact they will be able to have, but often end up facing painful reality shocks (Tschannen-Moran & Hoy, 2007). Teacher preparation programs across the nation are criticized for inadequately preparing new teachers, particularly in developing beliefs in their own ability to implement effective teaching and learning strategies (Zeichner, 2014; Riddle, 2018). In a study on the relationship between teachers' views of their preparedness and efficacy in classrooms, Darling-Hammond (2000) found that most teachers reported feeling underprepared and were prone to believing that students' learning was more influenced by peers and home environments than classrooms and teachers. Critics have long argued that traditional teacher programs provide candidates with content

knowledge courses and pedagogical experiences, but short-change prospective teachers on raising self-perceptions of teaching competence (Tschannen-Moran, Woolfolk-Hoy & Hoy, 1998).

Although preparation programs are held responsible for inculcating self-efficacy beliefs among teacher candidates, it is important to note that pre-service teachers enter preparation programs with pre-formed self-efficacy beliefs. These beliefs are based their previous learning experiences as students (Busch, 2010), perceptions of teacher education (Da Silva, 2005), experience of teaching, personality traits and broader educational principles (Richards & Lockhart, 1996). During the preparation program, self-efficacy beliefs are likely to be influenced by other factors, including formal training and the context of their teaching experiences (Humphrey & Wechsler, 2006). Bandura suggests that teacher efficacy may be most malleable early in the learning phase, hence the role of preparation program and its components is central to the development of self-efficacy beliefs during the early years of a teacher's career.

Development of self-efficacy beliefs during teacher preparation

Bandura conceptualizes self-efficacy within the larger framework of his social cognitive theory (SCT) (Bandura, 1997). In this framing, self-efficacy beliefs are formed through the interaction between an individual's personal characteristics, their behavior and their environment (see Figure 1). When teacher candidates enter preparation programs, they bring with them a set of personal characteristics including demographic characteristics (such as age, gender, race/ethnicity, etc.), attitudes towards and beliefs about teaching (based on prior experiences) and personality traits. At entry, teacher candidates likely already have some self-efficacy beliefs based on their previous experiences as a student or teacher, or through observing others teach and forming beliefs (termed apprenticeship of observation by Lortie, 1975). Once candidates begin coursework and accumulate teaching experiences during the preparation phase, their self-efficacy beliefs are likely to evolve and change depending on how they cognitively process their development as well as their reactions to their social and physical environments in the preparation phase (Bandura, 1997, Tschannen-Moran & Hoy, 2007).

<Insert Figure 1 Here>

A substantive body of literature has examined the role of coursework and student teaching placements in the development of self-efficacy beliefs, particularly in specific content areas. Overall, there appears to be consensus that although the precise nature of the impact that teacher preparation programs have on self-efficacy beliefs varies across studies and even amongst different pre-service teachers in the same study, teacher education does seem to empower teachers and

improve their confidence in their ability to teach (Berg, 2003; Cantrell, Young and Moore, 2003; Wagler, 2011; Woolfolk-Hoy, 2000).

However, limiting our understanding of how self-efficacy beliefs develop during teacher preparation by examining specific components of the program ignores other personal and behavioral factors that are integral to the development of these beliefs. Teacher candidates' preparation and ability to teach effectively are shaped by the interaction of their personal background, their formal training (such as coursework) and the context of their student placements (Humphrey & Weschler, 2006). Therefore, personality traits and other individual factors are crucial to the development of self-efficacy beliefs, even as components of teacher preparation influence self-efficacy beliefs.

Personal factors in the development of self-efficacy beliefs

Research on pre-service teacher candidates' characteristics on entering preparation programs has focused mostly on admission criteria including undergraduate GPA, SAT/ACT score and selectivity of undergraduate institution attended (Mitchell & King, 2016). It is surprising, therefore, that few of these mandated criteria are relevant to teaching quality (Steele et al., 2015). Researchers believe that focusing on these discrete variables obscures the likelihood that it is a combination of variables including candidates' dispositions and traits in addition to the quality of the preparation program that makes an effective teacher (Mitchell & King, 2016). Uncovering whether teacher candidates' demographic characteristics, personality traits or attitudes towards teaching predict both teaching success and teaching efficacy is important since it would provide preparation programs with another tool to identify, accept and train candidates who go on to become effective teachers.

Teacher preparation programs play a two-fold role in the development of self-efficacy beliefs (Wiens & Ruday, 2014). First, teacher preparation programs serve as gatekeepers into teaching in that they screen individuals who may or may not show potential to be effective teachers. To this end, examining differences in self-efficacy beliefs at the start of the preparation program based on personal factors can inform programs whether teacher candidates begin the preparation phase with different needs and thus require different supports. In addition, it is important to note that personal factors may also interact with preparation program components to predict change in self-efficacy beliefs. Based on different characteristics and perspectives, individual teacher candidates may develop self-efficacy beliefs in different ways as they progress through program components including coursework and student teaching experiences.

Teaching specialty and self-efficacy beliefs. The choice to teach elementary, secondary or students with disabilities is largely based on prior perceptions of teaching that pre-service teacher candidates bring with them to the program. Commonly referred to as teaching specialty, literature on teacher preparation has documented that pre-service elementary teachers differ from pre-service secondary teachers in their attitudes, perceptions of classroom problems (Ponnock, Torsney & Lombardi, 2018; Veenman, 1984) and commitment to teaching (Evans and Tribble, 1986). Importantly, elementary teacher candidates report an interest in teaching because of a desire to work with children, while secondary teacher candidates report an interest in teaching because of expertise or substantive interest in a specific content area (Fox, 1961). Given the implications these differences might have on teacher candidates' performance and beliefs, it is likely that these underlying differences among candidates in different teaching specialty result in different self-efficacy beliefs.

Although the current literature comparing self-efficacy beliefs between elementary, secondary and special education teachers is limited, it provides preliminary evidence that teaching specialty and self-efficacy beliefs are associated. An early study by Evans and Tribble (1986) descriptively examined differences in perceived problems and self-efficacy beliefs among 179 elementary and secondary pre-service teachers in the first year of their preparation programs. The authors find that prospective elementary teachers reported significantly higher self-efficacy beliefs than prospective secondary teachers (p<0.01). This finding is in direct contrast to another study by Savran and Cakiroglu (2003). Here, the authors examined differences in science efficacy beliefs among 646 elementary and secondary pre-service teachers in Turkey and found that secondary teachers reported significantly higher science self-efficacy beliefs than their elementary counterparts at the end of the preparation phase. The differences in findings may be explained by differences in motivation for why elementary and secondary teacher candidates enter preparation programs: elementary teacher enter preparation programs to work closely with children (Fox, 1961) and are therefore more likely to report higher general self-efficacy beliefs. In contrast, secondary teacher candidates enter teaching due to a substantive interest in a content area and therefore report higher self-efficacy beliefs in these specific content areas (such as science self-efficacy beliefs) (Savran and Cakiroglu, 2003). Additionally, it is likely that beliefs about teaching as a profession differ based on different cultures- the Savran and Cakiroglu (2003) paper examines self-efficacy beliefs among Turkish pre-service teachers while the Evans and Tribble (1986) study examined a sample of pre-service teachers in the US.

Another study by Freytag (2001) examined differences in self-efficacy beliefs among 48 (36 elementary/secondary and 12 special education) beginning teachers who had just completed their teacher preparation programs. Freytag found that special education teachers reported significantly higher self-efficacy beliefs than their general education elementary/secondary peers. Although Freytag (2001) did not discuss why special education teacher candidates reported higher self-efficacy beliefs compared to their general education (elementary or secondary) peers, she notes that it is possible that they respond differently to the preparation program than elementary or secondary candidates. For example, the curricula that special education candidates complete may include training or coursework that would benefit general education candidates as well as increase their self-efficacy beliefs (Soodak, Podell & Lehman, 1998). It is important to note here that although differences in how special education teacher candidates respond to program components may explain some of the variation in self-efficacy beliefs, Freytag (2001) examined differences across beginning teachers who enrolled in different preparation programs, so the programs themselves (and not just specific components) may also explain variation in self-efficacy beliefs.

A significant limitation with the papers referenced above is that they examined differences in self-efficacy beliefs either at the beginning (Evans and Tribble, 1986) or end (Savran and Cakiroglu, 2003) of the preparation phase. If, as the authors suggest, teacher preparation programs reinforce differences among elementary, secondary and special education teacher candidates, it would be valuable to examine differences in self-efficacy beliefs at multiple time points during the preparation phase. In addition to differences in average self-efficacy beliefs at different times, we might also expect to see differences in the trajectories of individual teacher candidates' self-efficacy beliefs based on teaching specialty.

Personality traits and self-efficacy beliefs. In the past several decades, teacher education has consistently attempted to measure and identify personality traits that teacher preparation programs might view as necessary for their candidates to possess to become effective teachers (Bolding, 2017; Damon, 2007; Sockett, 2009). A popular framework used by a large number of research studies to identify personality traits is the "Big Five" conceptualization of personality developed by Costa and McCrae (1992). The five factors include neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. Ripski, LoCasale-Crouch and Decker (2011) characterize neuroticism as negative emotions such anxiety and low self-esteem, extraversion as being sociable and assertive, openness as being curious and imaginative, agreeableness as sympathetic and easily moved and conscientiousness as being responsible and determined.

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Understanding which of the five personality traits predict teaching success gives teacher education programs an addition tool to identify and support candidates who are likely to be successful teachers (Wiens & Ruday, 2007).

Existing research on personality traits among pre-service teachers indicate high levels of all five personality traits compared to the general population- high neuroticism, high extraversion, high openness, high agreeableness and high conscientiousness. Although we might expect personality traits to remain stable across the pre-service and in-service phases, Diez (2007) believes that teacher preparation programs play an important role in supporting candidates to adapt their personalities in ways that set them up for success in the classroom. As they learn to teach, it is likely that pre-service teachers mediate their personal orientations in relation to professional contexts and practices, thereby displaying lower levels of neuroticism by the time they are actually in the classroom. Importantly, teacher preparation programs are key in enabling teacher candidates to transcend personal preferences and achieve dispositions that allow them to teach effectively in classrooms (Carroll, 2012).

Thus far, only a handful of studies have examined whether different personality domains predict teachers' their self-efficacy beliefs. Using the five-factor model, a study by Navidnia (2009) found that extraversion and conscientiousness were associated with self-efficacy beliefs among a sample of 168 English language teachers. Specifically, teacher candidates who expressed higher levels of extraversion reported lower levels of self-efficacy beliefs, and candidates who expressed higher levels of conscientiousness reported higher self-efficacy beliefs. Another paper by Djigic et al. (2014) examined whether 168 in-service teachers' self-efficacy beliefs were connected to basic personality dimensions. The authors found that while all five personality domains significantly predicted self-efficacy beliefs among participants, conscientiousness and openness were the most significant predictors. Both domains were positively related to self-efficacy beliefs, with participants who were more open and more conscientious reported higher self-efficacy beliefs. Findings from both papers are consistent with a more recent study by Jamil, Downer and Pianta (2012). In their paper, the authors examined a sample of 509 pre-service teacher candidates across 4 cohorts of a teacher preparation program and found that pre-service teachers' levels of extraversion and neuroticism were predictors of their self-efficacy levels at the end of the program. Teacher candidates who were more extraverted reported higher levels of self-efficacy, while teacher candidates who were more neurotic reported lower levels of self-efficacy.

Although all three studies are informative on the link between personality domains and self-efficacy beliefs, both the Navidnia (2009) and Djigic et al. (2014) studies use samples of in-service teachers rather than pre-service teachers. If, as pointed out by Carroll (2012), teacher preparation programs are uniquely situated to providing pre-service teacher candidates with different supports to enable them to teach effectively, understanding the link between personality traits and self-efficacy beliefs during the pre-service phase is crucial. Another limitation with the studies highlighted above is that they use cross-sectional samples of teachers/ teacher candidates to understand the relationship between personality traits and self-efficacy beliefs at a specific time point. As highlighted by the Jamil et al. (2012) paper, more longitudinal research that verifies the relationship between personality factors and the self-efficacy is critical to our understanding of the development of such beliefs.

Attitudes towards teaching and self-efficacy. A third set of variables that likely influence the development of self-efficacy beliefs among pre-service teachers are their attitudes towards teaching and students. Early research on teacher education suggests that candidates enter teacher preparation programs with pre-conceived attitudes about teaching, children and classrooms based on their own experiences as (Kagan, 1992; Pajares, 1992; Decker & Rimm-Kaufman, 2008). These attitudes shape their teaching practices, at least for the first few years they spend in a classroom (Pianta, 2005). Thus, examining the relationship between attitudes towards teaching and self-efficacy beliefs is another important, yet undiscovered, area of research in the pre-service context.

There is a large body of literature that classifies teacher attitudes into teacher-centered and student-centered approaches. Teacher-centered approaches are found where judgements about appropriate teaching practices, legitimacy of information and the way knowledge is operationalized rest primarily with the teacher (Kain, 2003; Rubin & Herbert, 1998; Villaume, 2000). In contrast, student-centered approaches are when the construction of knowledge is a shared process and is largely achieved through student engagement in classroom activities. Most studies in the in-service context link higher self-efficacy beliefs to a more student-centered approach to teaching (Driscoll & Pianta, 2010; Woolfolk, Rosoff & Hoy, 1990).

Very few studies have examined the link between pre-service teacher attitudes and their self-efficacy beliefs. In their paper, Jamil et al. (2012) examine this relationship in addition to their study on whether personality factors predict self-efficacy beliefs. Their findings corroborate what the literature on in-service teachers suggests- pre-service teachers who had more child or student-centered approaches reported higher self-efficacy beliefs than pre-service teachers who had teacher-

centered approaches. One major limitation with the paper by Jamil and colleagues is that the authors use data on predictors and self-efficacy beliefs collected at the end of the teacher preparation. Thus, although the findings suggest that attitudes towards teaching and children do play a role in determining self-efficacy beliefs, we do not have evidence on whether this relationship holds at other time points during the teacher preparation phase. Examining this relationship is particularly important if we expect that attitudes about teaching are likely to influence the development of self-efficacy beliefs during the preparation phase.

Method

In this study, I use archived longitudinal data collected by a southern School of Education in a large public university on prospective teacher candidates enrolled in an undergraduate/graduate combined teacher preparation program. Between 2009 and 2016, seven cohorts of teacher candidates completed self-report surveys about their education experiences, their attitudes towards teaching and working with children as well as a series of inventories including a Big Five personality measure. Candidates also completed self-report surveys on their self-efficacy beliefs at multiple time points during their enrollment: once each at the beginning of the program, approximately midway through the program, and at the end of the program. In my analyses, I only include teacher candidates who have all three time points of data, resulting in approximately 1000 observations and around 350 individual teacher candidates (67% of total sample).

Setting

All participants in this sample were enrolled in a five-years Bachelors/Masters in Teaching (B/MT) teacher preparation program. In the first two years of the program, candidates completed general coursework that is required of all undergraduate students at the institution. Beginning in their third year, teacher candidates were officially enrolled in the teacher preparation program. Teacher candidates began their first year in the preparation program by participating in a year-long tutoring experience with a student from the local school district classified as struggling in addition to coursework on general and content-specific teaching, assessment techniques and classroom management among others. The tutoring experience is designed to allow candidates to begin working with students in a structured and focused manner where teacher candidates receive detailed feedback from faculty in the teacher education program. In their second year, teacher candidates have two additional experiences teaching approximately 30 hours in each semester, prior to when they engage in a formal student teaching opportunity in their third and final year. The structure of the specific program in this study is different from many preparation programs that encourage

students to engage in teaching experiences, both informal and formal, only after they have completed foundational coursework.

Measures

This study uses a number of measures collected by the teacher preparation program through self-report surveys on teacher candidates' demographic information, their personality traits and ideas about teaching in addition to administrative data on candidates' teaching specialty.

<Insert Table 1 Here>

Demographic and administrative data. The teacher preparation program collected survey data on teacher candidates' demographic information, including their age, gender, race/ethnicity, parental education, characteristics of their high school (average SES status, average achievement levels and majority student race). These data were used as control variables in my analyses. The program also provided administrative data including teacher candidates' teaching specialty - i.e., whether they were preparing to teach elementary students, secondary students or students with disabilities. A summary of participant characteristics is provided in Table 1.

<Insert Table 2 Here>

Personality factors. Personality factors were assessed using the Neo Five-Factor Inventory (Costa & McCrae, 1992). The NEO inventory is a 60-item version designed to provide a reliable and valid measure of participants' neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. Responses range from 1 to 5 on a Likert scale: 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree. As designed by the instrument's authors, the 60 items can be divided into five subscales representing neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. Alphas on the NEO dimensions ranged from 0.77 to 0.87. Means and standard deviations are reported in Table 2.

Ideas about children. Developed by Shaefer & Edgerton (1985), the Ideas About Children scale differentiates between adult-centered views and child-centered views of teaching using a 16-item scale. Each item is on a 5-point Likert scale rating from 1-strongly disagree to 5- strongly agree and the 16 items are averaged to create a single composite score. Lower scores indicate a more child-centered view and higher scores reflect a more adult-centered view. Items include statements such as "Children should always obey the teacher" and "In order to be fair, a teacher must treat all children alike". Alphas ranged from 0.72 to 0.75. Means and standard deviations are reported in Table 2.

Teacher self-efficacy beliefs. Teacher candidates completed the Teacher Sense of Efficacy Scale (TSES) developed by Tschannen-Moran and Hoy in 2001. The long-form version of the

instrument consists of 24 items that are classified into three composite subscales: *1) efficacy for instructional strategies, 2) efficacy for student engagement and 3) efficacy for classroom management*. While the TSES scale was originally developed for use with in-service teachers, it has been used extensively with the pre-service teacher population as well. As recommended by the authors when using the instrument with pre-service teachers, I use scores on the overall scale rather than the subscales (Tschannen-Moran & Hoy, 2001). Responses range from 1-9 on a Likert scale with anchors at 1=Nothing, 3=Very little, 5=Some influence, 7=Quite a bit and 9=A great deal. Cronbach's alpha for the three subscales ranged from 0.88 to 0.90. Table 3 presents average self-efficacy levels and standard deviation for the overall self-efficacy scale at three time points for the sample of teacher candidates in this study.

<Insert Table 3 Here>

Analysis Models

I begin my analysis by examining whether teacher candidates' self-efficacy beliefs change significantly over the duration of the teacher preparation program. I then explore the variation in teacher candidates' self-efficacy beliefs at the beginning of the preparation program as well as in their growth trajectories over time. To do so, I fit a linear growth model to describe the shape of teacher candidates' trajectories using hierarchical linear modeling (Raudenbush, Bryk, Cheong & Congdon, 2000) in STATA. For each teacher candidate, a linear regression model was fit with time as the sole predictor (referred to as an unconditional model). The first part (Level 1) of the two-level hierarchical model examines variation in self-efficacy beliefs across time within each teacher candidate and is presented in Equation 1 below:

$$Y_{ti} = \pi_{oi} + \pi_{1i}(Time)_{ti} + e_{ti} \qquad (1)$$

In Equation 1, each teacher candidate i's self-efficacy beliefs (Y) at time t is a function of an intercept parameter π_{oi} (which is their self-efficacy beliefs at the start of the teacher preparation program), growth parameter π_{1i} which represents the average change in self-efficacy beliefs over the duration of the teacher preparation program and the residual error term e_{ti} which represents the portion of teacher candidate i's self-efficacy belief at time t that is not predicted by the duration of the preparation program. Here, I assume that the error term e_{ti} is independent and is normally distributed with a variance of σ^2.

At level 2, both the intercept and growth parameters are allowed to vary as a function of teacher candidate characteristics (i.e., each teacher candidate is allowed to have an individual

intercept and trajectory). Thus, the level 2 model allows me to examine variation in self-efficacy beliefs between individual teacher candidates. In the level 2 model presented in Equation 2 below, there are two level-2 random effects u_{0i} and u_{1i} with variances T_{00} and T_{11} respectively, and with covariance T_{01}.

$$\pi_{oi} = \beta_{00} + u_{0i}$$
$$\pi_{1i} = \beta_{10} + u_{1i} \tag{2}$$

Both the level 1 and level 2 models can be combined into the model presented below in Equation 3:

$$Y_{ti} = [\beta_{00} + \beta_{10}Time_{ti}] + [u_{0i} + u_{1i}Time_{ti} + e_{ti}] \tag{3}$$

Change in self-efficacy beliefs. In equation (3), the mean intercept β_{00} represents the average self-efficacy beliefs that teacher candidates reported at the beginning of the program, and the mean growth rate β_{10} represents the average change in self-efficacy beliefs between each time point (beginning to middle, middle to end of program). A positive, significant coefficient for β_{10} suggests that teacher candidates' self-efficacy beliefs are growing over time, and that the difference in self-efficacy beliefs between any two points is statistically significant.

Individual differences among teacher candidates. Equation (3) also includes estimates of variance for both the mean intercept and the mean growth rate. u_{0i} represents the variance in the mean intercept and provides a sense of the variability in self-efficacy beliefs at the beginning of the program. A large, statistically significant estimate for u_{0i} suggests that teacher candidates' self-efficacy beliefs vary greatly at the beginning of the program, and that this variation is significant. Similarly, $u_{1i}Time_{ti}$ represents individual differences in how self-efficacy beliefs develop over time. A large, statistically significant estimate for $u_{1i}Time_{ti}$ suggests that teacher candidates' self-efficacy beliefs develop differently over time and highlights the need to examine *why* different teacher candidates' self-efficacy beliefs follow different trajectories.

The role of personal factors in the development self-efficacy beliefs. After characterizing individual differences in self-efficacy beliefs, I assess whether these beliefs are predicted by teacher candidates' teaching specialty, their personality domains (neuroticism, extraversion, openness, agreeableness and conscientiousness) and their attitudes about children and teaching. I also assess whether these factors predict changes in self-efficacy beliefs- that is, whether teacher candidates' teaching specialty, their personality domains and their attitudes predict changes in teacher candidates' self-efficacy beliefs. To do so, I use a hierarchical linear growth model that

includes level 2 predictors. The level 1 and level 2 models are outlined in Equations 4 and 5 respectively:

$$Y_{ti} = \pi_{oi} + \pi_{1i}(Time)_{ti} + e_{ti} \tag{4}$$

$$\pi_{oi} = \beta_{00} + \beta_{01}TeachingSpecialty_i + \beta_{02}PersonalityDomain_i + \beta_{03}Attitudes_i + u_{0i}$$
$$\pi_{1i} = \beta_{10} + \beta_{11}TeachingSpecialty_i + \beta_{12}PersonalityDomain_i + \beta_{13}Attitudes_i + u_{1i} \tag{5}$$

In the level 1 and level 2 models outlined above, the interpretations for the intercept and growth parameters remains the same from the unconditional growth model presented in Equations 1 and 2. These models can be combined as presented in Equation 6 below:

$$Y_{ti} = [\beta_{00} + \beta_{10}Time_{ti} + \beta_{01}TeachingSpecialty_{ti} + \beta_{11}(TeachingSpecialty)(Time)_{ti}$$
$$+ \beta_{02}PersonalityDomain_{ti} + \beta_{12}(PersonalityDomain)(Time)_{ti}$$
$$+ \beta_{03}Attitudes_i + \beta_{13}(Attitudes)(Time)_{ti}]$$
$$+ [u_{0i} + u_{1i}Time_{ti} + e_{ti}] \tag{6}$$

In the model above, β_{01} represents the magnitude of the relationship between teaching specialty and self-efficacy beliefs for each teacher candidate i at time t after controlling for other predictors. Similarly, β_{02} and β_{03} represent the magnitude of the relationship between personality domains and self-efficacy beliefs and attitudes towards children and self-efficacy beliefs respectively. β_{11} represents the magnitude of the relationship between teaching and self-efficacy beliefs over the duration of the teacher preparation program after controlling for other predictors. Similarly, β_{12} and β_{13} measure the relationship between personality domains and self-efficacy and teaching specialty and self-efficacy over the duration of the program respectively. All the other terms are interpreted as in Equation 3.

Results

Descriptive Statistics

Table 1 describes the sample of pre-service teacher candidates included in my final analytic sample. Across the seven cohorts of candidates, 89% of participants were female and a majority of participants were below the age of 24 (71%). In terms of racial/ethnic background, 81% of the sample reported being Caucasian, followed by Asian (10%) and African American (4%). A slight majority were preparing to teach secondary students (43%) and 42% were preparing to be elementary teachers. The remaining teachers were preparing to teach elementary students with

special education needs (15%). Overall, the demographics of the samples used in this study are similar to those of individuals entering the teaching profession (American Association of Colleges for Teacher Education, 2013).

Change in self-efficacy beliefs

Next, I examine whether pre-service teacher candidates' self-efficacy beliefs changed significantly over the duration of the preparation program. Column 2 in table 4 reports the results from the combined model presented in Equation (3). The estimated mean intercept, β_{00} , and mean growth rate, β_{10}, for the self-efficacy data were 7.22 and 0.004 respectively. These coefficients suggest that teacher candidates started the teacher preparation program with average self-efficacy beliefs around 7.22 points (on a 9-point scale) and that candidates' beliefs changed by an average of 0.004 points between each time point during the study. Starting the preparation program with average self-efficacy beliefs of around 7.22 points suggest that pre-service teacher candidate entered with relatively high confidence in their ability to teach students. This aligns with other studies that have measured self-efficacy beliefs at the beginning of the teacher preparation program using the TSES measure (see Fives, Hamman & Olivarez, 2007; Pendergast, Garvis & Keogh, 2011). The growth rate suggests that on average, teacher candidates' beliefs did not change significantly over the course of the teacher preparation program (p>0.10). Although surprising, this lack of overall change in self-efficacy beliefs has been documented by other studies including Lin and Gorrell (2001) who suggest that there is a need to examine variation among individual pre-service teachers rather than assess average self-efficacy beliefs across all pre-service teachers.

Individual differences among teacher candidates

Consistent with the theory that aggregate patterns of self-efficacy beliefs may obscure variation in individual self-efficacy beliefs, the HLM analyses show that there is substantial variation in self-efficacy beliefs among teacher candidates at this university. Results from the model presented in Equation (3) include estimates of variance of change that represents individual differences in how self-efficacy beliefs develop over time. Standard deviations (square roots of these variances) are presented in the random effects section of table 4. The estimates for the variances of initial self-efficacy beliefs and change rate are 0.79 and 0.22 respectively. Both estimates are statistically significant, suggesting that teacher candidates vary significantly in terms of self-efficacy beliefs when they enter the program, and that there are also individual differences among the rate of change in teacher candidates' self-efficacy belief.

<div align="center"><Insert Table 4 Here></div>

The role of personal factors in the development self-efficacy beliefs

I then examine whether teacher candidates' teaching specialty, personality traits or beliefs about teaching explain the variation in self-efficacy beliefs both at the beginning of the program and in the trajectory of beliefs over the duration of the preparation program. Models 3-5 in table 4 report estimates from the model presented in Equation 6 for each of the predictors. Model 2 in Table 4 controls for demographic factors, including teacher candidates' age, gender and race as well as fixed-effects for cohort (γ_j) and year of TSES measure completion. Each successive model adds teaching specialty, each personality domain and ideas about children respectively.

Teaching Specialty. Model 3 in Table 4 estimates the relationship between teaching specialty and teacher candidates' self-efficacy beliefs after controlling for demographic variables, year and cohort fixed-effects. Estimates from this model suggest that elementary teacher candidates begin the preparation program with an average self-efficacy belief of 6.99 points and that their beliefs decrease by 0.04 points (on a 10-point scale) on average between each time point. The difference between elementary and secondary candidates is statistically significant (β_{01}=-0.37, p<0.01) suggesting that secondary teacher candidates report significantly lower self-efficacy beliefs on entering the program than elementary teacher candidates. Teacher candidates preparing to teach students with special education needs also report slightly lower self-efficacy beliefs than elementary and teacher candidates at the start of the preparation program, but this difference is not statistically significant (β_{01}=-0.10, p>0.10).

Random effects estimates for model 3 suggests that there are significant differences in both the average self-efficacy beliefs at the beginning of the preparation program (β_{11}=0.72, p<0.01) and in the trajectory of self-efficacy beliefs based on teaching specialty β_{11}=0.22, p<0.01). Figure 2 plots the trajectories of self-efficacy beliefs by teaching specialty. As highlighted above, secondary teacher candidates begin the preparation program with significantly lower self-efficacy beliefs than their elementary and special education peers. Across the duration of the preparation program, Figure 2 shows that secondary teacher candidates continue to report lower self-efficacy beliefs than their peers throughout the program. In addition, Figure 2 shows that elementary teacher candidates' self-efficacy beliefs decrease slightly between the beginning and end of the preparation program, while special education candidates' self-efficacy beliefs appear to increase slightly by the end of the preparation program. It is important to note here that the change in self-efficacy beliefs is not

significantly different for special education teacher candidates compared to elementary teacher candidates ($\beta_{11}=0.09, p>0.10$).

<center><Insert Figure 2 Here></center>

Personality traits. Model 4 of Table 4 presents HLM estimates of different personality domains on teacher candidates' self-efficacy beliefs after controlling for teaching specialty, demographic variables and fixed-effects for cohort and year of completion. Estimates from model 4 suggest that after accounting for the other personality domains, only neuroticism and conscientiousness appear to significantly predict teacher candidates' self-efficacy beliefs at the beginning of the teacher preparation program. Specifically, teacher candidates who report higher levels of neuroticism at the start of the program report significantly lower self-efficacy beliefs than their peers who report lower levels of neuroticism at the start of the program ($\beta_{01}=-0.36, p<0.05$). Despite reporting lower self-efficacy beliefs at the beginning , estimates of β_{11} suggest that teacher candidates who report higher levels of neuroticism at the start of the program increase their self-efficacy beliefs by the end of the program. The left panel of Figure 3 plots the relationship between different levels of neuroticism and self-efficacy beliefs at the three time points during the teacher preparation program. These lines suggest that of the five neuroticism levels, teacher candidates who report the highest level of neuroticism experience the largest growth in self-efficacy beliefs.

Apart from neuroticism, conscientiousness also appears to be significantly associated with pre-service teacher candidates' self-efficacy beliefs. Estimates from model 4 suggest that teacher candidates who report higher levels of conscientiousness at the start of the program report significantly higher self-efficacy beliefs than their peers who report lower levels of conscientiousness at the start of the program ($\beta_{01}=0.86, p<0.01$). Despite reporting higher self-efficacy , highly conscientious teacher candidates experience significant decreases in self-efficacy beliefs across the duration of the teacher preparation program ($\beta_{11}=-0.28, p<0.05$). This relationship is plotted in the right panel of Figure 3- of the five levels, teacher candidates who report very high conscientiousness report the highest self-efficacy beliefs at the start of the teacher preparation program but also experience the steepest decline.

<center><Insert Figure 3 Here></center>

Attitudes towards teaching. Finally, model 5 of table 4 presents the effect of attitudes towards teaching (measured by the Ideas about Children scale) on teacher candidates' self-efficacy beliefs after controlling for demographic factors, teaching specialty, personality domains and fixed effects for cohort and year of completion. HLM estimates suggest that teacher candidates who

report more child-centered views of teaching at the beginning of the teacher preparation program report higher self-efficacy beliefs (β_{01}=0.30, p>0.10) than their peers who report more adult-centered views towards teaching but that these differences are not statistically significant. In addition, estimates of β_{11} suggest that attitudes towards children and teaching do not predict change in self-efficacy beliefs over the duration of the preparation program (β_{11}=0.05, p>0.10).

Discussion

Although personal characteristics are critical to the development of self-efficacy beliefs under social cognitive theory, the teacher preparation literature has not paid much attention to the role of these factors in self-efficacy beliefs among pre-service teachers enrolled in teacher preparation programs. Recognizing the importance of individual paths underscores the importance of assessing what teacher candidate bring with them early on during the preparation phase and is critical to tailoring a package of coursework, clinical practice, mentoring, and appropriate placement to fit the needs of different individuals. As they learn to teach, pre-service teachers need help mediating their personal beliefs, attitudes and ideas in relation to professional contexts and practices. Teacher preparation programs can provide key support to teacher candidates that help them transcend personal preferences to achieve dispositions that allow them to teach effectively in classrooms (Carroll, 2012). Essentially, candidates need assistance in building on the foundation of values, personal beliefs and personality domains they bring to teacher education to construct a responsible professional identity and set of practices.

This study presents important evidence on the role of personal factors including teaching specialty, personality traits and attitudes towards teaching in the development of self-efficacy beliefs among pre-service teacher candidates. First, using rich survey data for multiple cohorts of pre-service teacher candidates, I find that when candidates enter their teacher preparation program, their personality traits, teaching specialty significantly predict their self-efficacy beliefs. Teacher candidates who are preparing to teach secondary students report significantly lower self-efficacy beliefs at the beginning of the preparation program as compared to teacher candidates who are preparing to teach elementary students or students who require special education. This difference is in line with earlier findings by Evans and Tribble (1986). This paper improves on earlier literature by highlighting that differences between secondary candidates' self-efficacy beliefs and those of their peers continue to persist across the duration of the preparation program. These persistent differences suggest that secondary teacher candidates likely respond differently to the preparation program than elementary or special education candidates. For example, elementary and/or special education teacher

candidates may benefit more from coursework and practice opportunities that help them meet children's needs for structure, discipline and routine, while secondary teacher candidates may benefit more from addressing the developmental needs of adolescents (Decker & Rimm-Kaufman (2008).

Second, I find that candidates' neuroticism, extraversion, agreeableness and conscientiousness affect their self-efficacy beliefs at the beginning of the program, while neuroticism and extraversion continue to affect self-efficacy beliefs throughout the program. These findings are consistent with those from Jamil et al. (2012) in that teacher candidates who were more extraverted reported higher levels of self-efficacy, while teacher candidates who were more neurotic reported lower levels of self-efficacy. Teacher education programs educate individuals from a wide range of backgrounds, experiences and education levels, all of which affect their teaching practice. Although personality characteristics are generally thought of as being "traits" and therefore hard to change, teacher education programs can help candidates identify the relationship between their own personalities and their teaching strategies as well as provide them with appropriate coping mechanisms to channel their personalities into effective teaching (Rimm-Kaufman & Hamre, 2010; Jamil et al., 2012). To provide an example, Rimm-Kaufman and Hamre (2010) highlight that an extroverted teacher candidate may need support from mentor teachers or coaches when presented with a challenging group of students and may fail if such support were not provided to them. In contrast, an introverted teacher may have developed strategies for their own teaching that is less dependent on external sources of support. Recognizing and addressing these different needs early on in the preparation phase might help teacher candidates realize their own strengths and limitations accordingly, as well as enable preparation programs to provide differential supports that maximize pre-service teachers' efficiencies.

Finally, I find that attitudes towards teaching do not explain a significant amount of variation in pre-service teachers' self-efficacy beliefs either at the beginning of the program or the trajectory of self-efficacy beliefs across the duration of the program. Although I find that teacher candidates who express more child-centered views of teaching report higher self-efficacy beliefs than those with more adult-centered views of teaching, differences between the two groups are not statistically significant. There are two possible explanations for the lack of relationship between attitudes towards teaching and pre-service teachers' self-efficacy beliefs- first, I control for various demographic factors, teacher candidates' teaching specialty and personality traits when examining the role of attitudes towards teaching in forming self-efficacy beliefs. The literature suggests that pre-service elementary teachers report more child-centered views of teaching as compared to pre-

service secondary teachers (Hur, Jeon & Buettner, 2016) so it is possible that the control variables explain most of the variation in self-efficacy beliefs that could otherwise be explained by attitudes towards teaching. Another possible reason might be that pre-service teachers' attitudes towards children may change over the course of the preparation program, and therefore their attitudes at the beginning of the program do not accurately predict their self-efficacy beliefs at other time points during the program. More research on the stability of attitudes towards teaching during the teacher preparation phase would help uncover if we might expect to see a strong relationship with self-efficacy beliefs over time.

Limitations and future research

Although this study builds on previous work examining self-efficacy beliefs among pre-service teachers in important ways, it is limited by the fact that the data comes from a single teacher preparation program and thus these results might not generalize to other pre-service teaching populations. This study is also inherently descriptive in nature and makes no causal claims about the relationships between any personal factors studied and teacher candidates' self-efficacy beliefs. Findings from this study provide numerous directions for future research on the role of personal factors or candidate' beliefs, characteristics and perspectives in the shaping of self-efficacy beliefs during the preparation phase. For example, although this study highlights that secondary teacher candidates might derive different experiences than their elementary or special education peers, it is beyond the scope of the study to explore the exact mechanisms that explain these differences. Future research might use mixed-methods to understand how teacher candidates in different teaching specialties perceive their teacher preparation experiences. Another direction for future research is to examine whether targeted supports can influence the relationship between personality traits and self-efficacy beliefs. For example, it appears from my findings that pre-service teachers who reported high levels of neuroticism at the beginning of the preparation program also reported the most increase in self-efficacy beliefs by the end of the program. It is possible that providing pre-service teachers who report higher-than-average neuroticism levels at the beginning of the program with additional student teaching experiences (or other forms of mastery experiences) may help reduce their anxiety and self-consciousness and develop their confidence in teaching.

Conclusion

Teacher self-efficacy in general, and novice teacher self-efficacy in particular, is important for a variety of teacher practices and student outcomes (Tschannen-Moran & Hoy, 2001). Given that novice teachers' self-efficacy beliefs are largely formed during their training, it is important to pay

attention to the role of personal factors in the development of self-efficacy beliefs in this stage. Learning more about the processes which underline self-efficacy might provide evidence on how to better support teacher candidates, increase their motivation and ultimately enable them to effectively teach in classrooms (Jamil et al., 2012). Teacher education programs enroll a wide variety of applicants who bring with them different characteristics, personalities and ideologies with the goal of training them to teach in stressful and demanding classroom environments. This study contributes to the literature on self-efficacy beliefs among pre-service teachers and highlights the importance of understanding differences in candidates based on what they bring with them to the preparation program and the role these differences play in affecting their self-efficacy beliefs. Ultimately, helping teachers learn more about themselves and their beliefs may contribute to them developing more skills and confidence in their own ability as educators.
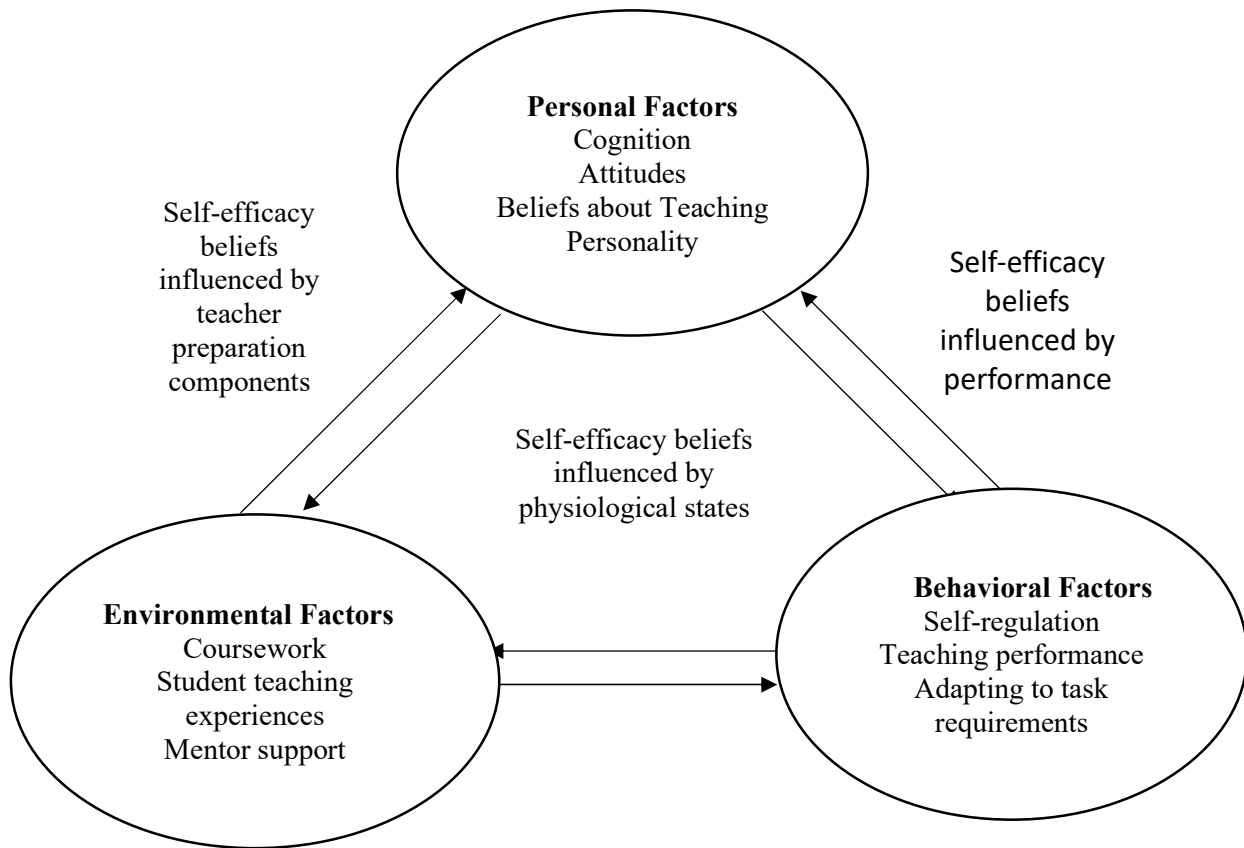
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Figure 1. Social cognitive theory in the context of teacher preparation

Personal Factors
Cognition
Attitudes
Beliefs about Teaching
Personality

Self-efficacy beliefs influenced by teacher preparation components

Self-efficacy beliefs influenced by performance

Self-efficacy beliefs influenced by physiological states

Environmental Factors
Coursework
Student teaching experiences
Mentor support

Behavioral Factors
Self-regulation
Teaching performance
Adapting to task requirements

Note: Adapted from Bandura's Social Cognitive Theory

Figure 2. Plots of effects of Teaching Specialty on Self-Efficacy Beliefs

Effect of Teaching Specialty on Self-Efficacy Beliefs
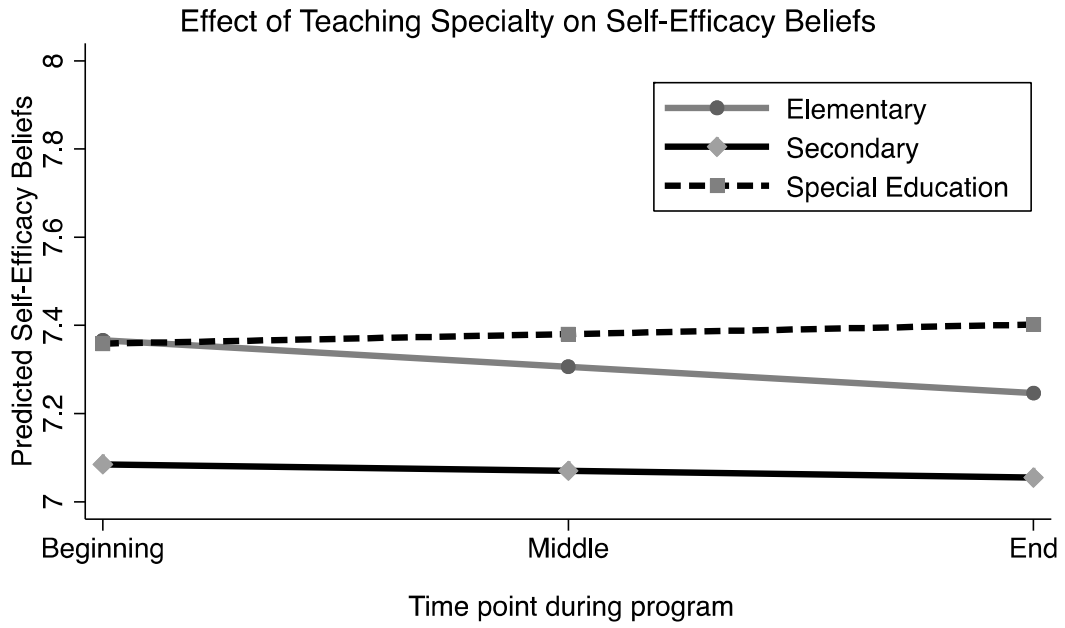
Note: Model includes controls for demographic variables, personality domains, attitudes towards children, cohort and year fixed effects

Figure 3. Plots of effects of Personality Domains on Self-Efficacy Beliefs

Effect of Personality Domains on Self- Efficacy Beliefs
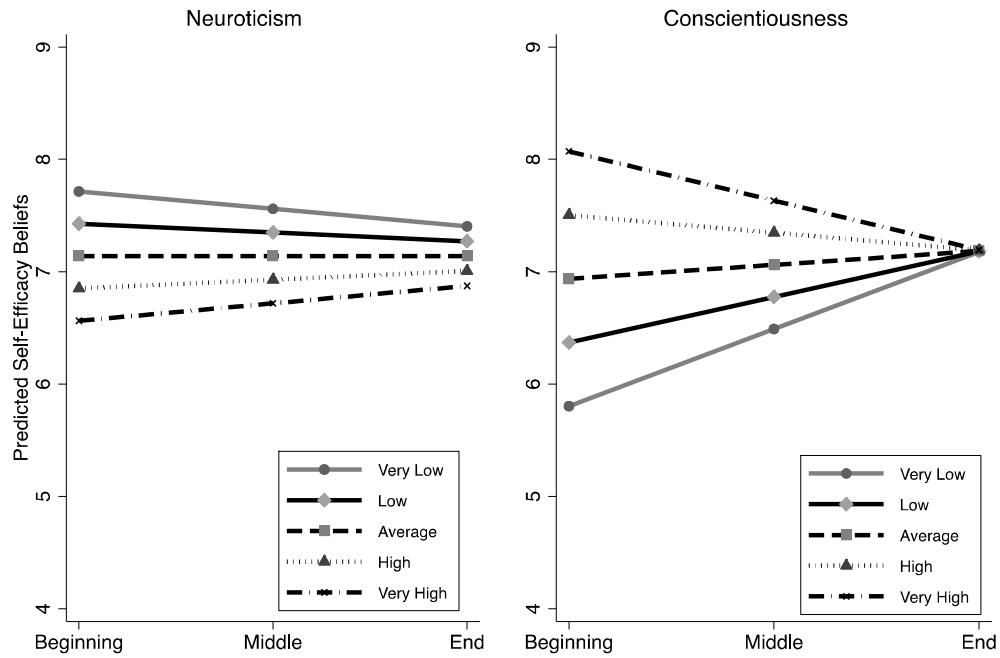
Note: Model includes controls for demographic variables, teaching specialty, other personality domains, attitudes towards children, cohort and year fixed effects

Table 1. Descriptive statistics for demographic variables at beginning of program

	% Non-missing	%
Program specialization	100%	
Elementary		42%
Secondary		43%
Special Education		15%
Gender	43%	
Female		46%
Male		11%
Race/Ethnicity	100%	
Caucasian/White		81%
Asian		10%
African American		4%
Hispanic		2%
Other		4%
Age	18%	
20 or under		34%
21-23		47%
24-26		0%
27-29		0%
30 or over		1%
High School Location	100%	
Rural		20%
Suburban		70%
Urban		10%
High School Majority SES	100%	
Low SES		10%
Middle SES		65%
High SES		26%
High School Majority Race	100%	
Primarily students of color		6%
Mixed		44%
Primarily white students		50%

Table 2. Means and standard deviations for measures at beginning of preparation program

Measure	Mean (SD)	Range
1. Overall Self-efficacy	7.23	1-9
	(0.94)	
2. Neuroticism	2.64	1-5
	(0.39)	
3. Extraversion	3.35	1-5
	(0.29)	
4. Openness	3.00	1-5
	(0.26)	
5. Agreeableness	2.89	1-5
	(0.33)	
6. Conscientiousness	3.56	1-5
	(0.24)	
7. Ideas about Children	2.65	1-5
	(0.31)	

Table 3. Mean self-efficacy levels at time 1, time 2 and time 3 of program

	(1)	(2)	(3)
	Beginning of program (Time 1)	Middle of program (Time 2)	End of program (Time 3)
Overall Self-Efficacy	7.30	7.28	7.31
	(0.11)	(0.11)	(0.11)

Notes: Standard deviations are reported in parentheses

Table 4. Estimates of Fixed effects, Random effects and Goodness of Fit for Linear Growth Models

	Unconditional Model	Demographic variables Model 1	Adding Teaching Specialty Model 2	Adding Personality Domains Model 3	Adding Child-centered views of teaching Model 4
Fixed effects					
Intercept	7.22** (0.06)	6.61** (0.20)	6.99** (0.22)	5.91** (1.26)	5.07** (1.39)
Linear change	0.00 (0.03)	0.00 (0.03)	-0.04 (0.04)	-0.07 (0.61)	-0.23 (0.66)
Elementary			-	-	-
Elementary × Time			-	-	-
Secondary			-0.37** (0.14)	-0.29* (0.13)	-0.33* (0.13)
Secondary × Time			0.06 (0.06)	0.04 (0.06)	0.04 (0.06)
Special Education			-0.10 (0.19)	-0.08 (0.18)	-0.09 (0.18)
Special Education × Time			0.09 (0.08)	0.09 (0.08)	0.08 (0.08)
Personality Domains					
Neuroticism				-0.36* (0.16)	-0.37* (0.16)
Neuroticism × Time				0.06 (0.08)	0.08 (0.08)
Extraversion				0.19 (0.21)	0.17 (0.21)
Extraversion × Time				0.07 (0.10)	0.07 (0.10)
Openness				-0.31 (0.23)	-0.25 (0.23)
Openness × Time				0.19+ (0.11)	0.20+ (0.11)
Agreeableness				-0.30 (0.20)	-0.24 (0.20)
Agreeableness × Time				0.03 (0.09)	0.01 (0.09)
Conscientiousness				0.86** (0.25)	0.85** (0.25)
Conscientiousness × Time				-0.28* (0.12)	-0.28* (0.12)
Child-centered views of teaching					0.30 (0.19)
Child-centered views × Time					0.05 (0.09)
Random effects					
Level 2					
Intercept	0.79** (0.08)	0.72** (0.08)	0.74** (0.08)	0.61** (0.10)	0.60** (0.10)
Linear change	0.22** (0.05)	0.22** (0.05)	0.23** (0.05)	0.21** (0.05)	0.20**(0.06)
Rate of change	-0.40 (0.16)	-0.34+ (0.19)	-0.41* (0.16)	-0.29 (0.26)	-0.29 (0.27)
Goodness of fit	300.24** (3)	271.75** (3)	261.95** (3)	200.29** (3)	189.48** (3)

** p<0.01 *p<0.05 +p<0.10