Abstract

Preservice teachers are the future of education and at the pinnacle of contemporary pedagogical practices, which could potentially influence generations of children. Investigating the relationships among preservice teachers’ resilience, engagement, personality traits, and their practicum and coursework performance is critical as it provides rich data for how preservice teachers professionally develop and succeed at the onset of their careers. Resilience, the quality of bouncing back from adversity; engagement, linked to workplace success and burnout, as well as personality, a stable trait of human behavior, are informative and measurable constructs. Self-reported grades on campus and in practicum; as well as self-evaluation on teaching confidence and preparedness are performance metrics in relation to these three psychological constructs. This study administered a five-part 39-item questionnaire to two-cohorts of 139 preservice teachers, one cohort beginning, and the other finishing their teacher education program. Descriptive statistics, factor analysis, correlation and regression analysis were completed. The results of this study indicated that engagement and two personality traits of conscientiousness and extraversion were significantly correlated and predicted four measures of performance. Although resilience was extracted as a single factor according to the BRS (Smith et al., 2008), this variable maintained no correlation to any of the four performance measures, and negatively predicted self-evaluation of preparedness for teaching. Engagement was also extracted in a single factor, different from previous models using the ETS (Klassen, Yerdelen, & Durksen, 2013). Personality did not show any coherent factor structure in this study, and items were forced into respective personality factors according to previous work (Rammestedt & John, 2007). This study has important implications for teacher education and for teacher career onset and longevity.
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Chapter 1 Introduction

1.1 Context and Rationale

As preservice teachers graduate from their teacher education program and look for work, they enter an arduous labour market. The most recent data suggest that new teachers face an unemployment rate of nearly 20% (Ontario College of Teachers, 2017). If these novice teachers do find work teaching in their first year, as an English language teacher, only 15% find permanent positions, where 50% of these teachers rotate through daily supply jobs, and 25% are underemployed elsewhere (Ontario College of Teachers 2017). It is expected that the average novice teacher in Ontario will have to navigate up to five years in temporary and occasional teaching before a permanent full-time teaching position becomes available (Galt, 2017).

Teacher attrition is another significant risk in the career of new teachers. Among dismal job prospects, there are additional personal and professional challenges which these new teachers face. Mounting student loans and limited experience force many new teachers to seek work elsewhere. For the few who begin working in education, many are required to work temporary or occasional teaching jobs for several years, and many lack both the support network and stability of full-time employment. New teachers struggle to stay within the job market, and retention of these teachers has become a major concern. Across Canada, for example, it has been reported that in the first five years of teaching 30-40% of new teachers will have left the teaching profession (Ghafari, 2015), with no guarantee if they will return. Additionally, economists indicate this employment trend may reverse in the next two decades with a potential shortage on the horizon (Prism Economics and Analysis, 2016; Ontario College of Teachers, 2017) There must be efforts invested today to ensure that preservice and new teachers are retained for the future. The costs of teacher attrition are and will continue to be both harmful and expensive.
Within this context, school systems are likely to suffer as they dedicate costly resources into the recruiting and hiring of these educators. New teachers also suffer as they have invested numerous financial and personal resources into their career through teacher education programs. The students, as well as various school administration, and the community at large are affected by teachers who do not continue their careers as teachers.

Resiliency, engagement, and personality are important factors in considering the tremendous challenges for beginning teachers. Each has been shown to be associated with success, performance, overall achievement and teaching retention. Valuable metrics for preservice teachers, such as academic performance within on campus coursework and practicum, are also important considerations as they offer an important measure of performance within teacher education programs.

Resiliency has been defined as “a set of behaviours over time that reflect the interactions between individuals and their environments, in particular the opportunities for personal growth that are available and accessible” (Ungar, 2012, p. 14). Thus, resiliency is broadly recognized as the ability to bounce back and recover from stress. This quality is crucially required for new teachers, as they move through the first few years of teaching in order to attain full-time employment.

Engagement, specifically engagement in teaching within the classroom, is a motivational trait and state, and has been found to be a reflection of an individual’s feelings of energy that lead to desired behaviours (Klassen, Yurdelen, & Durkson, 2013). Additionally, engagement is thought to exist on a spectrum of burnout (Schaufeli, Salanova, González-romá, & Bakker, 2002), thus, higher engagement may lead to reduced teacher attrition, increased morale, and
creation of a positive, thriving community. Engagement in the teaching profession can be measured through an Engaged Teacher Scale (ETS) (Klassen et al., 2013).

Personality traits, described as an individual’s unique and stable behavioural characteristics, are classified within the Big Five trait theory of personality. These traits are measured within the Big Five personality index (BFI) with specific traits relating to academic, workplace and lifelong success (John, Naumann, & Soto, 2008). The Big Five personality traits can be measured by the 10-item Big Five Personality Index (BFI-10: Rammstedt & John, 2007).

Performance, as a metric for evaluation, is also critical to explore among the relationships among resilience, engagement and personality. Performance in preservice teachers can be measured in different ways. Preservice teachers operate both in a practical setting within practicum and on a campus, course-based setting. The pursuit of a comprehensive performance metric should be used to gain an adequate perspective on preservice teacher performance.

In sum, there has been a recent growing focus of resilience, engagement and personality in various educational conferences, symposia, and documents across the province of Ontario (Alexander, 2018; Education, 2016; National Research Council, 2012). Current direction and discussion within preparing the workforce for an evolving landscape of employment stresses the value of traits such as conscientiousness, a Big Five trait, and resilience. Curriculum and professional development in teacher education can benefit greatly from a deeper understanding of how resilience, personality, and engagement manifest in preservice teachers. Within the setting for which this thesis study is conducted, a university in eastern Ontario, the results may help to inform and strengthen their own teacher education programs as well as nation-wide teacher education programs. Examining these traits empirically will be useful to those who desire a deeper quantitative understanding of these traits in preservice teachers.
1.2 Purpose and Research Questions

This study investigated how preservice teachers responded to a questionnaire on resilience, engagement, and personality at a Faculty of Education at a university in eastern Ontario. The purpose of this quantitative survey based study was to examine how the performance of preservice teachers can be explained, and to what extent are resilience, engagement, and personality are associated with performance in class and on practicum. The following research questions are posed for this study.

1) How do pre-service teacher candidates self-report their resiliency, engagement, personality, and performance?

2) Is there a factor structure of resilience, engagement, and personality within this population? If so, what is the structure?

3) What are the relationships among resiliency, engagement, personality, and performance of preservice teachers on campus and in practicum as well as their teaching confidence and preparedness?
Chapter 2 Literature Review

2.1 Resilience

Resiliency is recognized and measured as the ability of an individual to bounce back and recover from stress (Mansfield, Beltman, Broadley, & Weatherby-Fell, 2015; Smith et al., 2008). Resilience has been understood in a number of ways within the medical and behavioral sciences, which have direct influence on educational research (Smith et al., 2008). Generally, resilience is viewed as the behaviours of individuals to manage adversity. In education, resiliency is recognized as a teacher adapting positively to adverse situations (Clará, 2017), while also “maintain their commitment to teaching” (Brunetti, 2006, pp. 813), which is where this present study is situated.

The history of resiliency dates back to the 1970’s beginning in work with children who experienced trauma. In these early psychiatric studies, resilience was described as a quality within children who, despite having undergone stress latent traumatic experience in early childhood, ended up developing in a positive way (Garmezy, 1974). These ‘at-risk’ resilient individuals who had overcome their adversity laid the foundation for future work within this field (Masten, Best & Garmezy, 1990). As the term evolved, it became clearer that a dynamic relationship between both “at risk” and “protective” factors existed. In this relationship, “at-risk” factors, such as traumatic events, had the potential to lead to maladjustment later in life, and “protective” factors, such as a strong identity stability and social support, could lead to positive adjustment (Werner, 1993, 1995). The interplay between these two factors is not simple. The relationship is highly contextualized and complex, which given the human condition, would support the nature of a complex conceptualization of resilience.
Focusing on the highly contextualised nature of resilience in education, a teacher resilience framework has been proposed by Mansfield et al., (2015). In their review of 50 studies, teacher resiliency was conceptualized and analyzed. Their findings indicated that resiliency was also incredibly complex and contextualized within teachers. The resilient teacher reacts to their environment and acts in a way that manages their situation to maximize their outcomes. This resiliency framework is conceptually organized into three resiliency categories - resilience as a capacity, a process and an outcome. Resilient preservice and novice teachers use their personal and professional contextual capacity to navigate through adversity. This is completed in a dynamic process with the qualities of the individual in both their personal and professional context interacting over time, thus achieving a desired outcome (Mansfield et al., 2015). These teachers engage in a constant process of ongoing reflection and adjustment both in personal and professional life to achieve goals. This framework can be highly personalized to individual teacher dispositions. As Mansfield et al. (2015) indicate “What might be a challenge for one individual in a particular context may not be so for another person.” (pp. 204) In this present study, the aim is to continue to add to the knowledge of resiliency and “disentangle” its complexity within this important population.

Howard and Johnson (2004) explored the dispositions of preservice teacher resilience in a qualitative study of teachers in the disadvantaged neighbourhoods of Adelaide, Southern Australia. In this low socioeconomic area, unemployment, poverty, and family violence were common. Three schools within this area were identified, and the principals consulted to find teachers at-risk of burnout within these conditions. The researchers selected ten teachers to be a part of this study and semi-structured interviews were conducted. The dispositions patterns of resilience were examined. Findings indicated that the support network provided from the school
was among the most critical areas to sustain resilience for teachers. However, a few dispositional patterns were also credited for their sustained resilience. When considering these attributes, these teachers believed that their high resilience in their stressful jobs was due to a strong sense of agency, a belief in personal competencies, a sense of accomplishment and belief in their learnt strategies of resilience. This work provides valuable results in an area of teacher resilience, however, the questions provided in the semi-structured interview do not address the teachers individualized psychological experiences, perspectives and motivations. It is recommended that further work into teacher’s perspectives, engagement in their career, and energies which sustain them to persist would be valuable for future study.

Hong (2008) used qualitative methods to investigate the dispositions and decision making of beginning teachers who stayed or left education. In this qualitative study, fourteen teachers engaged in semi-structured interviews. Seven of these participants were practicing teachers and seven were teachers who had already left the profession. All teachers had been teaching for up to five years and had been previous students of the Secondary Science Teacher Certificate Programme at a south-eastern university in the United States.

Between both the teachers who left the practice and the continued practice teachers, the perspectives on challenges was a significant attribute for their decision making. The group of teachers who left the profession attributed their own personality and emotional burnout to be a contributing factor towards their attrition and the teachers who stayed, however, were able to maintain resolve through these challenges. This result helps to broaden the resiliency-burnout discussion by providing deeper contexts on the individual personality characteristics and dispositions that play a role in attrition. Further work in this area could employ a quantitative
perspective in a similar research design with a larger sample size to pursue consistent themes and understanding of the relationship between resilience and teacher attrition.

The Brief Resiliency Scale (BRS; Smith et al., 2008) is a tool for measuring resilience and is used in a study by Stanley et al., (2015). Here, the BRS was used as researchers investigated preservice teacher resilience. Researchers set out to understand how storytelling may be involved in the promotion of resiliency cross culturally. A sample of 889 elementary and secondary preservice teachers in teacher education programs at urban universities were participants in this study. All participants were enrolled in teacher education programs within China, Germany, US and Vietnam (China, n = 302; Germany, n = 154; United States, n = 83; and Vietnam, n = 350). Participants in each country were recruited via email and a questionnaire was administered. Demographics were collected as well as BRS responses and responses regarding personal values as through a Personal Values Questionnaire (PVQ).

The findings by Stanley et al., (2015) indicated that preservice teachers in Eastern and Western cultures significantly differed in their perspectives of resilience and personal values in storytelling. Additionally, this study specifically drew light on the cross-cultural differences observed within the selected participating nations. Results in this study, as the first of its kind to investigate resiliency in the BRS and these nations, indicated that American’s self-report had the highest levels of resilience followed by German, Vietnamese, and Chinese preservice teachers. This work is also the first of its kind to use this methodology to examine the relationship between values resilience and storytelling, however it lacks further analysis to understand how this relationship may be explained. The methods of this study used correlational design, ANOVA, and path analysis analyze the data, however regression analysis was not discussed as an appropriate or available methodology to use. Future work should consider the use of outcome
variables such as performance to investigate teachers across different cultures and how they compare.

2.2 Teacher Engagement

Engagement is a psychological state characterized by passion and absorption in the work one does, where one works, with enthusiasm and self-presence (Macey & Schneider, 2008). This psychological state, conceptualised through the perspective of work engagement theory, provides multiple benefits for empirical studies. Within the context of this perspective, an individual who is engaged is one who is energized in their work and can stay positive with challenges which they encounter. They are also self-sufficient and directed, creating their own positive feedback (Bakker & Bal, 2010). These individuals are positive, fulfilled, and, in a work-related state of mind, filled with vigor, dedication and absorption (Schaufeli et al., 2002). This state is infectious for those whom they work with and having engaged peoples in a team is beneficial for team morale, and productivity. Thus, engaged individuals benefit their own well-being, while also contributing indirectly to their immediate community which then benefits their organization and community (Macey & Schneider, 2008).

Teacher engagement is similar to work engagement and worthwhile to study for several reasons. Engaged teachers are generally more effective teachers (Bakker & Bal, 2010) and are more likely to foster student engagement (Roth, Assor, Kanat-Maymon, & Kaplan, 2007). With teacher engagement thought to exist at a spectrum, with highly engaged teachers at one end and burned out teachers on the other (Klassen et al., 2013), studying teacher engagement would also add to knowledge in the areas of burnout and teacher attrition, which is addressed in Chapter One. Though there exist many studies investigating in teacher burnout (Ghafari, 2015), as well as
self-efficacy and other related motivational constructs, limited research exists solely investigating teacher engagement (Klassen et al., 2013).

The following section will highlight a few works in teacher engagement. Each work (Klassen et al., 2012; Taylor, 2017; Watt & Richardson, 2007) call for a need to investigate engagement in teachers. Given that all three of these studies use engagement measures which are either (a) not intentionally designed for teachers (Klassen et al., 2012; Taylor, 2017) or (b) not robustly tested (Watt & Richardson 2007), there is a need to use a specialized teacher engagement scale.

A doctoral thesis by Taylor (2017) highlighted the relationship between teacher engagement and teacher attrition (teacher turnover is used in this work to refer to the act of leaving the teaching profession, however, to keep terminology consistent, teacher attrition will be used hereon). Literature in work/employee engagement has been fundamental in predicting employee attrition, and this dissertation used binomial logistic regression to investigate if teacher engagement is a predictor of teacher attrition. The doctoral thesis investigated 143 certified science, technology, engineering, and mathematics (STEM) teachers who had completed a teacher education program at the University of Texas at Austin. A combination of two instruments were used in this study to gather teacher responses: (1) a School and Staffing Survey (SASS) measured teacher demographics and other contextual information and (2) an Employee Engagement Scale (Shuck, Adelson, & Reio, 2016) measured employee engagement in a 12-item scale.

Three constructs of employee engagement were examined in this study: cognitive engagement, emotional engagement, and behavioural engagement. Cognitive engagement focused on the “intensity of mental energy expressed towards positive outcomes and
attentiveness and concentration towards work-related tasks” (pp.44). Emotional engagement focused on “the personal meaning to a situation, person, or context with the full experience of work… …defined as the intensity and willingness to invest emotionally towards organizational outcomes” (pp 44). Lastly, behavioural engagement focused on “the psychological state or intention to behave in a manner that positively affects performance” (pp.44). The results of this study indicated that teachers who were higher in emotional engagement were more likely to stay in their jobs as teachers, however the opposite, is true for those who were high behavioural engagement, as the higher they were in behavioural engagement the more likely they were to leave their jobs. Cognitive engagement did not have any significant relationships with emotional and behavioural engagement.

Taylor (2017) discussed possible rationale for the differences in emotional and behavioural engagement. It is possible that teachers who were emotionally engaged in their work were more likely to be invested in their work, and the more invested they were in their work, the less likely it was that they would leave. However, the opposite is true for behavioural engagement and attrition, as teachers were more likely to leave as they were more behaviourally engaged. Taylor (2017) hypothesizes “that higher levels of behavioral engagement could lead teachers to burnout, resulting in a teachers’ desire to leave their current job. Research has shown that burnout is a significant predictor of teacher turnover, specifically, as level of burnout increases” (pp.100). With these mixed results from all three constructs of engagement proposed in this study, further work should investigate how engagement may relate to teachers’ desires and perspectives to leave the teaching profession.

Professional engagement, career development aspirations, perceptions, motivations, demographics and satisfaction were examined by a study in Australia study by Watt and
Richardson (2008). Three Australian Universities sampled a total of 510 preservice teachers in primary and secondary stream teacher education programs in a mixed methods study. This study used two separate time points for analysis. The first time point was at the beginning of their teacher education program and the second time point was at the end of their teacher education program, right before they completed their certification.

At time point one, researchers measured demographics, motivations for teaching and perceptions about the profession. Motivations for teaching was measured in a 57-items questionnaire, and perceptions about the profession in a 17-item scale, both measured in the Factors Influencing Teaching Choice Scale (FIT-Choice Scale; Watt & Richardson, 2007). At time point two, professional engagement, career development aspirations, and professional plans were measured. Professional engagement and career development aspirations were measured with a 17-item questionnaire, and professional plans was measured with a forced choice response and supplemental open-ended response. Career choice satisfaction was measured at time one and time two as a 2-item response.

Researchers used factor analysis to examine and empirically identify teacher types at the outset of their careers. Exploratory factor analysis was conducted, and four factors emerged from the data with factor loadings >.50 with robust reliability $\alpha>0.90$. Cluster analysis was then conducted among these four factors. These researchers were able to develop an engagement and career aspiration profile of these preservice teachers fitting into three clusters: (1) highly engaged teachers who planned and persisted through teaching, (2) highly engaged teaches with significantly lower persistence who would leave teaching, and (3) lowly engaged teachers who had no professional aspirations and persistence.
Attention should be drawn to the interesting relationship between cluster one and cluster two, “highly engaged persisters” and “highly engage switchers” respectively, as these groups share their enjoyment and engagement for teaching. The difference here is that, cluster two is actively planning or at-risk of teacher attrition. Watt and Richardson (2008) were able to share rich contextual information for selecting or leaving the teaching career, but this study lacks deeper questions. There were no questions designed to examine any psychological drivers, thus in this regard, the results are quite limited. As the questionnaires used were only sensitive to, and designed to, measure career aspirations and professional planning of these individuals. Further work should investigate and examine the possible relationship with other constructs and variables. New research may be able to explain the engagement of these highly engaged individuals from a psychological perspective in resiliency or personality. It is possible that other constructs that are not measured in the study played a significant role in their desires to stay or leave teaching, as both groups do share a common positive engaged outlook on the profession.

In an international study measuring teacher engagement, 853 teachers across multiple Western and non-Western countries were invited to complete a study using the Utrech Work Engagement Scale (UWES) to measure work engagement (Klassen et al. 2013). The UWES is a frequently used instrument to measure work engagement and has been used in multiple different contexts (UWES; Schaufeli, Bakker, & Salanova, 2006). This study explored how the UWES was internally consistent, valid, cross-culturally reliable, and contextually correlated to demographics. Teachers in Australia (Western Australia; n=206), Canada (Alberta; n=255), China (Hong Kong; n=100), Indonesia (Semarang; n=100) and Oman (Muscat and area; n=192) were invited to participate in this cross-cultural study. Each of the countries was purposely
selected via convenience sampling to represent diverse geographical regions, culture, social standards, economics, language, and cultural diversity.

Authors used multigroup confirmatory factor analysis to test the factor structure and measurement invariance across settings. Following this, authors used correlation analyses to determine the relationships between UWES results and engagement, workplace well-being, and contextual variables such as socio-economic status, experience and gender. Initial factor analysis yielded internal consistency among UWES results within both Western and non-Western countries, however, invariance measurements yielded different results. Though Western and non-Western settings individually demonstrated partial invariance in each category, together the UWES was deemed not invariant across Western and non-Western countries. This suggests that the UWES does not operate the same way across countries as it was responded to differentially.

For the construct validity of the UWES, the relationship between UWES test scores and other indications of work motivation was tested. Generally, there was a significant positive relationship between UWES scores and job satisfaction. This result demonstrated that UWES scores, and thus, engagement was related to the satisfaction teachers experience from teaching and negatively related their thoughts about attrition. Teachers who reported high levels of engagement in the UWES were less likely to report leaving the profession. Lastly, for relationships between engagement and other contextual variables, the results were inconsistent across these settings.

The results from using the UWES in this international study implied that the UWES is not a robust measure of measuring teacher engagement cross culturally. The measurement invariance observed between Western and non-Western countries demonstrated this. However, in regard to the general use of UWES in measuring teacher engagement, this tool lacks sensitivity
to the contextual environment for which teachers operate in. It is known that teachers operate in an interpersonal, dynamic environment: “further work is also need to contextualize teacher engagement measures and to recognize the unique environments in which teachers work” (pp. 337).

Currently, there exists only one engagement scale which has been robustly, and validity tested to measure engagement in teachers in their profession - the Engaged Teacher Scale (ETS) (Klassen et al. 2013). Klassen et al., (2013) set out to create and validate a measure of teacher engagement.

Five stages of development occurred within three separate samples of teachers (N=810) in this creation and validation study. In stage one researchers from education, educational psychology, and psychology reviewed the literature on teacher and employee engagement and collaborated to construct a 56-item pool of questionnaire items. Following creation of this pool, consultation and review from colleagues and students resulted in a 48-item item questionnaire

In stage two this 48-item questionnaire was administered to 224 practicing teachers and results were analyzed with principal component analysis (PCA) for item reduction. Component loadings were set at > 0.50, and the retained item loadings were between .61 to .98. Inspection of components and items reveled that three components loaded six items, and one component loaded five items. Following PCA, further analysis indicated that items theorized as physical and cognitive engagement were not represented equally and two additional items were introduced. The result was a 27-items questionnaire following this stage.

In stage 3 the 27-items were administered to a new set of 265 teachers and results were analyzed using exploratory factor analysis (EFA) with principal axis factoring and promax rotations. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.92, which indicated
that the data were appropriate for factor analysis and examination of scree-plot indicated four or five factors to be retained. Parallel analysis indicated retention of four factors. Due to the discrepancy between parallel analysis and EFA, of five and four factors between them respectively, EFA results were reviewed and one factor which loaded a single item was dropped. Further analysis of the factor pattern coefficients set the cutoff point to > .70. Ten items were analyzed as below this point and eight items were dropped. Two borderline-case items were retained having factor pattern coefficients of .50-.70. One redundant case was additionally dropped. As a result of EFA and revisions 16-items and four factors were retained following stage three. The scale was labelled the Engaged Teacher Scale (ETS) and these factors were labelled as cognitive engagement (CE), emotional engagement (EE), social engagement with students (SES), and social engagement with colleagues (SEC).

In stage four confirmatory factor analysis (CFA) was used to test the four-factor structure of the ETS. Multiple analysis for first order fit and second order fit were conducted, and results indicated a good fit for the data. Additionally, second-order factoring revealed that a four-factor model or superordinate single factor model was viable for investigating teacher engagement.

Stage five investigated the relationship with the ETS and two existing scales the Utrech Work Engagement Scale (UWES) and the Teacher Sense of Efficacy Scale (TSES). The relationship was examined through canonical correlation analyses. Results indicated that teachers with high engagement scores on the ETS tend to also score high on scales that measure similar relationships UWES and TSES.

Klassen et al. (2013) demonstrated that the ETS is a stable, reliable and valid measure of teacher engagement. Though there are some concerns, notably with a few arbitrary item droppings and exclusions, the scale remains robust, especially following a final factor analysis.
and canonical correlation analysis. Thus, the 16-item ETS with four factors of engagement were formed each with distinct and exclusive categorical meaning.

In sum, Taylor’s (2017) dissertation provided a valuable investigation into how teacher engagement, measured through an employee engagement scale, may be beneficial for predicting teacher attrition. Watt and Richardson (2007) examined professional engagement and demonstrated that although engagement may be high in the teaching profession, teachers still choose to leave education. In Klassen et al. (2013) it was established that the UWES was a robust tool for measuring engagement but lacked specificity and applicability for the teaching profession. With Klassen et al. (2013), the development of a valid and reliable scale for measuring teacher engagement was established with a 16-item questionnaire and four factors. This ETS is able to account for a wide range of teacher dispositions in the realm of engagement in their teaching. There exist limited research studies which use the ETS in pursuit of understanding teacher engagement and psychological constructs, and even fewer works which conduct this investigation within preservice teachers in the midst’s of their teacher education program.

The role of the teacher in a classroom is unique, and the teaching profession is unlike other professional careers. Teachers spend a significant amount of time daily with students in instruction, mentorship, and caregiving, to a greater degree than most other interpersonal professions. It is possible that these tools used to measure engagement were not sensitive to the complex and challenging role of a teacher.

2.3 Personality

Personality traits are defined as an individual’s consistent and stable patterns of behaviour observed over time (Barenbaum & Winter, 2008). These behaviours have been the
center of much research over the past century in attempts to provide a working taxonomy of personality traits. Such attempts were coined as the lexical approach, and first emerged in the 1920’s by the German researcher Klages (1926) in *Die Grundlagen der Charakterkunde*—The Science of Character—and later built upon by others in the field of psychology (Allport, 1937; Baumgarter 1933; Cattell 1943; Norman 1964; Goldberg 1982). The lexical approach was an effort to analyze the English language to extract all terms used to define personality. This approach helped to provide the foundation and rationale for which current personality research is based on (John, Naumann, & Soto, 2008). The lexical approach posits two central arguments: (1) the most salient and relevant individual differences in people are captured and encoded by language, and (2) the more pronounced the difference, the more probable it is expressed by a single term (John, Angleitner, & Ostendorf, 1988). In pursuit of a simple taxonomy of traits and using the lexical approach, the works of Allport (1937), Cattell (1943), Norman (1964), and Tupes and Christal (1961) assisted in establishing the Big Five Index (BFI) of personality traits. Though there are other categorizations of the five factors found, with many different researchers using different questionnaires to measure them, this study subscribes to the BFI and line of literature which supports this classification of the five factors.

The Big Five Index, as the product of the lexical approach, identifies five factors which make up personality: (1) Extraversion, (2) Agreeableness, (3) Conscientiousness, (4) Neuroticism, and (5) Openness (Goldberg, 1992). Each factor represents a host of qualities and behaviours which can be observed in individuals, these are measured in the index as items. Each factor represents a unique dimension of human personality: *extraversion*, a trait of sociability or reservation; *agreeableness*, a trait of problem resolution and cooperation; *conscientiousness*, a trait of diligence, organization, and thoroughness; *neuroticism*, a trait which captures an
individual’s ability to handle stress and nervousness; and openness, a trait to describe artistry and imagination.

Many instruments have been used over time to measure these traits; the 60-item NEO-PI-R (Costa & McCrae, 1992), the 44-item Big Five Index (BFI-44) (John & Srivastava, 1999), and the 10-item Big Five Index (BFI-10) (Rammstedt & John, 2007), to name just a few. Among them, the BFI-44 was shown to be stable and reliable, completed in under 5 minutes, allowing the measurement of Big Five both succinctly and effectively. However, with the passage of time, users of the questionnaire began to look for increasingly quicker versions with the same level of reliability and validity. The BFI-10, a ten-item Big Five questionnaire, was thus designed and developed to meet the needs of a faster, equally effective personality instrument (Rammstedt & John, 2007). Tools like the BFI-10 can be enormously effective in groups where time may be restricted both as the sole instrument in a questionnaire, or a supplement for measuring personality, among other constructs.

These above traits found with the BFI have garnered much research attention by policymakers, educational administration and psychologists in the last century. In education, there has also been an increase in attention towards these traits. This is recognized in recent educational conferences, symposia, and published ministry documents (Alexander, 2018; Education, 2016; National Research Council, 2012). This section will first outline three literature reviews as to outline personality’s link with academic performance, job performance and effective teaching.

In educational psychology, examining the factor structure of these traits has been shown to be most popular, demonstrated many meta-reviews on this subject. Poropat’s (2009) meta-review captured a culminating sample size of over 70,000 students to investigate the relationship
between personality traits and academic performance. Results demonstrated that individual personality traits were associated with measures of academic performance. Conscientiousness specifically had an overall strong association with academic performance. The remaining four personality traits did maintain partial relationships with academic performance, however, as educational level increased, the effect size with the other personality traits was diminished.

In an earlier meta-review by Barrick and Mount’s (1991), researchers examined the relationship between personality traits and three job performance criteria. In this meta-review, job performance was measured in: (1) job proficiency (2) training proficiency and (3) personnel data. A total of 231 studies criterion-related validity studies in personality were selected from the years 1952-1988. Results demonstrated that conscientiousness was found to have positive correlations with job performance across job performance measures, and once again, the remaining four personality traits were shown to demonstrate small, mostly positive, correlations across job performance measures.

In meta-review of 166 studies with teachers between the years 1985 and 2013, Klassen and Tze’s (2014) examined the relationship between teacher’s psychological characteristics (personality and self-efficacy) and teacher effectiveness (student achievement and evaluated teacher performance). Klassen and Tze (2014) used all studies to compute one aggregated effect size. Results indicated that there was a significant relationship between the personality traits of teachers and levels of student achievement, as well as evaluated teacher performance. Even though effective size was small ($r = .10$), it remains significant and warrants a more focused approach to disentangle and disaggregate the constructs presented here.
Each of these reviews demonstrated that personality traits maintain a significant relationship with performance. The next section of this paper will investigate a few studies to take a deeper look at some of these relationships.

In investigating the interaction of personality traits and academic performance Nofite and Robins (2007) used Standardized Aptitude Test’s (SAT), a standardized and novel measure of academic performance. This study investigated the relationship between SAT scores, Grade Point Average (GPA), and the Neuroticism-Extraversion-Openness Five Factor Inventory (NEO-FFI) personality trait measurement instrument (Costa & McCrae, 1992). The total sample size of this study was nearly 12,000 university students in the United States. Multiple correlational and regression modelling techniques were used here for data analysis.

The results of this study indicated both conscientiousness and openness had significant positive interactions with the performance data of high school students. Conscientiousness was found most strongly positively related to college and high school GPA, over any other variable including gender and SAT scores. Additionally, conscientiousness was also found to be incremental, as when students were tested later in their academic career, those who were found to have conscientiousness test scores increase significantly, also had GPA scores increase significantly. Openness did not have similar interactions with GPA and was only found to be weakly correlated. Noftle and Robins (2007) demonstrated that student personality, specifically conscientiousness and openness maintains significant relationships with performance.

Komarraju, Karau, and Schmeck (2009) incorporated additional dispositional variables in their study on college students’ academic performance and personality. In this study, researchers also used the Academic Motivational Scale (AMS, Vallerand et al., 1992). The AMS is known as a standardized and valid measure of motivation with three motivational constructs located on a
continuum of motivation: intrinsic, extrinsic and amotivation. In this study, the role of personality traits in explaining the relationship between academic performance and motivation was investigated with correlation and multiple regression analyses. In total, 308 undergraduate students at a college in the United States completed a three-item questionnaire including: (1) the 60-item NEO-FFI Big Five personality trait questionnaire, (2) the 28 item AMS, and (3) a self-reported measure of current GPA.

Several conclusions were drawn. Regression analysis showed the following results: the personality traits of conscientiousness and openness explained 17% of the variance in intrinsic motivation, conscientiousness and extraversion explained 13% of the variance in extrinsic motivation, conscientiousness and agreeableness explained 11% of the variance in amotivation and all traits but extraversion explained 14% of the variance in GPA.

Conscientiousness in this study was found to have significant interactions within the data, as conscientious individuals were found to have higher scores in extrinsic and intrinsic motivation as well as the lowest amotivation and highest GPA. In addition, though openness was found to interact with the data with a small effect size, the results remain consistent with the smaller and sometimes absent effect this trait was observed to have (Nofte & Robins, 2007; Poropat, 2009). Komarraju et al. (2008) attained novel data consistent with previous findings, and, notably, this study used self-reported GPA to attain reliable measures of performance. This will be discussed further in the performance chapter.

In contexts of broader dispositional characteristics, Furnham, Monsen and Ahmetoglu’s (2009) study employed multiple assessments to gather a wide range of academic performance data. Within 212 secondary school students in the United Kingdom, this work focused on which cognitive and non-cognitive tests could be used predict the success of the General Certificate in
Secondary Education (GSCE), a secondary school cumulative senior exam. Multiple additional tests were also administered. These tests assessed: personality through the NEO-FFI, engagement, cognitive ability, IQ, and learning approaches. Correlational and regression analysis were conducted, and the results were surprising.

Results here indicated that intelligence as measured through the Typical Intellectual Engagement scale (TIE, Goff & Ackerman, 1992) was the best predictor of academic performance measured in GSCE grades. The personality trait of openness had a small, consistent and significant contributor to the variance of exam grades. Conscientiousness, despite the literature review presented above, did not predict exam scores. A possible explanation for this, Furham et al. (2009) discusses, is that openness, despite the weaker relationship to academic performance in other literature, maintains a relationship with cognitive ability and the intelligence as measured in the TIE. It is suspected that conscientiousness may not have shown within this population due to age. Alternatively, another hypothesis to explain these inconsistent results is that Furham et al. (2009) used 5 separate items for instrument within this study. In total, the instrument combines 283 items. It is possible that a 283-item questionnaire is not suitable for this participant population in this context, secondary school students in the United Kingdom.

With this being said, Furham et al. (2009) adds to knowledge on the relationship between personality traits, intelligence and the outcome variable of performance. The methodology, employed an exhaustive an approach to gather data from multiple different constructs all at once, and uses this data to predict performance at a later time. Given the evidence of the relationship between personality traits and performance, usage of additional constructs is recommended for future work, with consider drawn to a suitable length of instrument.

In a study conducted by Caprara, Vecchione, Alessandri, Gerbino and Barbaranelli
(2011), researchers examined the process by which personality traits and self-efficacy beliefs are conducive to academic performance at the end of the junior and senior levels of secondary school in Rome, Italy. A mixed sample of 412 students made up two cohorts were participants in this study. Self-efficacy beliefs here were defined as the judgment held about the capability to change the course of action for goal attainment. Students were assessed within each cohort at four different time points throughout Grade 7, Grade 8, Grade 10, and Grade 13.

Students self-rated their personality traits and self-efficacy beliefs in this study in Grade 7 and Grade 10 using a Big Five personality trait instrument specially designed for this population (BFQ-C, Barbaranelli et al., 2003), and a 15 item self-efficacy belief scale. Academic performance was measured at Grade 8 by teachers and Grade 13 with self-report over the phone. Self-reported final grades were reported on a 0-100% scale, in line with the standards of the Italian national education system.

Though all five personality traits were measured in this study, results focused on openness and conscientiousness, as the other three personality traits did not attain notable results. Results indicated that openness and conscientiousness were stable across all time points and they did not directly predict academic performance at the end schooling, Grade 13. However, openness alone did predict academic performance at Grade 8.

These results are unstable across all time points. Only openness maintained any relationship with grades, and it occurred at the end of junior high school. Capara et al., (2011), hypothesized that openness may be only effective towards academic performance at this earlier stage as a “proxy of cognitive endowment to foster learning”(pp. 91). This result is consistent with Furnham et al. (2009) which also indicated a link between cognitive ability and openness.

Both Führman et al., (2009) and Capara et al., (2011) found results that indicated
personality traits and the predictors of academic performance vary within these younger age groups. These results are additionally consistent with the meta-review by Poropat (2009), who emphasized the stability of predicting academic performance in post-secondary education, not within younger students. Thus, there exists a benefit in targeting participants within post-secondary education.

In all previous studies, personality has been used to predict student performance. In a study by Perera, Granziela and McIlveen (2018), the relationship between personality, self-efficacy, work engagement and job satisfaction is examined. A total of 574 Australian teachers were participants in a research study investigating personality was measured with a short personality trait measuring instrument, the Mini-IPIP (Donnellan, Oswald, Baird & Lucas, 2006), teacher engagement was measured with the Engaged Teacher Scale (ETS: Klassen et al., 2013), Self-efficacy was measured with Teacher Self Efficacy Scale (TSES: Tschannen-Moran & Hoy, 2001), teacher work satisfaction was measured using the Brief Job Satisfaction Measure II (BJSM-II: Judge, Locke, Durham, & Kluger, 1998).

This multi-part questionnaire was administered, and analysis was conducted. After controlling for gender and years of experience, clear factor structures of both personality and engagement were found. A secondary analysis to generate a secondary model of aggregated personality scores was conducted. This analysis concluded with the emergence of four new personality profiles, each of these consisting of different levels of the five personality traits. These new profiles were identified as: rigid, ordinary, well-adjusted, and excitable (see Figure 1.)
Each of these four personality profiles were linked with significant outcomes. Well-adjusted teachers, high in conscientiousness, agreeableness, openness and extraversion and low in neuroticism showed the best outcomes, with significantly positive relationships with social engagement with students (SES), cognitive engagement (CE), and emotional engagement (EE).

Teachers in the excitable profile, high in extraversion, openness, and agreeableness were linked with the lowest job satisfaction. Perera et al., (2018) suggest that this may be due to the high levels of openness, agreeableness and above average neuroticism. This combination, of an agreeable, open and slightly less emotionally stable individual would increase their likeliness towards compliance and altruistic behaviour. This then translates to individuals who may over commit and without the conscientious personality traits of discipline and organization, may set themselves up for failure.
Teachers in the ordinary category, with null data in all measured personality showed lower satisfaction in their work and no relationship with any of the other variables. Surprising, Perera et al., (2018) report that 67% of the sample was captured in this “ordinary” teacher profile. Teachers in the rigid category closely mirror ordinary teachers for neuroticism and extraversion, however, individuals in the rigid category differ vastly in agreeableness, conscientiousness and openness with lower levels of all these traits. Job satisfaction for ordinary rigid teachers is significantly greater than that of ordinary teachers. Perera et al., (2018) recommend this relationship be explored in future work, but hypothesize that rigid teachers, are significantly less invested in their work, and do not care for high levels of performance. This acts as a protective factor, maintaining rigid teacher satisfaction, especially in setbacks.

The results found within Perera et al (2018) are notable as they demonstrated a novel usage of the ETS and the Big Five factor index together with teacher job satisfaction. This explored relationship is important because it captures the disposition of a teacher and the personality constructs and engagement teachers in their professional practice. This analysis, in addition to the previous discussed literature, helps to further knowledge on teacher personality, engagement, and job satisfaction and performance. The studies here are limited, as they do not investigate or discuss possible relationships that may exist outside individual personality profiles, correlated engagement, and deeper motivational constructs such as resilience. These relationships could benefit from usage specialized statistical analysis to explain some of the interactions observed and use these data to predict results on an outcome variable such as academic performance.
2.4 Teacher Performance

The quality of a teacher in the classroom is credited as being one of the most direct and promising strategies for improving public education outcomes (Darling-Hammond, 2010). However, a teacher’s role is vast within the classroom and the quality of a teacher is dependent on a multitude of different factors. It is the within the unique nature of the role of a teacher that is part of the difficulty within quantitative studies to assess the quality of a teacher and measure such a variable as teacher performance as compared with other stable and reliable performance measures such as self-reported GPA. Thus, this next section will examine performance through several different perspectives. A conceptual understanding of teacher performance through meta reviews is discussed followed by analysis of several reviews on academic performance.

The challenge to measure teacher performance was captured in a meta review by D’Agostino and Powers (2009), where multiple quantitative studies were examined to investigate the ability of teacher test scores, measured through GPA and teaching licensing tests, to predict measures of teaching performance. Teacher performance within this review was defined through their achievement and test scores. A total of 123 studies were selected for analysis, with 715 effect sizes. It was found that preservice teacher performance, especially during student (practicum) teaching, predicted performance better than other testing measures. Despite previous findings indicating otherwise in the mid 20th century (Quirk, Witten, & Weinberg, 1973).

Interestingly, these results, indicated that teacher licensing tests do little to provide evidence for teacher performance. Instead, it was found that assessment throughout preservice teacher education corresponded to a more robust GPA and was a better predictor of performance than other measures. Although GPA was determined to be a reliable predictor of performance and can be used in research when it is both clear and accessible, there are clear challenges that
exist in using it. GPA, though has predictive abilities, maintains difficulty in being both consistent and equal across studies. In some cases, GPA is not readily accessible or unavailable. In lieu of this, research looks to self-assessment as a performance indicator.

Self-assessment is the process and outcome when learners make judgements about aspects of their own performance (Falchikov & Boud, 1989), however, there remains much contention about the validity of this metric. It is argued that learners, if granted the opportunity to self-assess, can easily inflate or inaccurately portray their performance. In a review of quantitative studies regarding student self-assessment in higher education, Falchikov and Boud, (1989) examine if a difference exists between student generated self-reported grades and teacher generated grades.

In total, 57 quantitative studies were compared in Falchikov and Boud (1989), and the results indicated that when mature, experienced undergraduates or graduate students were asked to self-report grades, there existed no difference in their self-assessments versus that of a teacher’s assessment. However, students who were weaker, less mature, or less experienced, tended to overrate themselves. Falchikov and Boud, (1989) discussed that as higher education students gain awareness of their deficiencies progressing through the coursework, students who are able to see where they are weakest, tend to acknowledge such deficiencies. Whereas students who are overrating themselves tend to do so as they not aware of how weak they are.

Kuncel, Credé, and Thomas (2005) similarly investigated the validity of self-reported grades. Electronic databases were searched from 1861 to 2003, and reference lists were examined to obtain a total of 37 relevant independent samples and 60,936 subjects. Each article was coded based on the type of GPA, the educational setting the study took place in (e.g., high
school or university), the effect size, the sample size, demographics and other relevant metrics such as time lapse between official GPA and self-report.

To summarise, teacher performance, when measured by student achievement, was correlated with a comprehensive measure of GPA. Self-reported grades “were reasonably good reflections of actual grades for students with high ability and good grade point averages” (Kuncel et al., 2005, pp. 74). However, the caveat for self-reported grades was that as actual performance, GPA, and abilities of students decreased so did the reliability of the self-reported GPA. These results were consistent with earlier results found in Falchikov and Boud (1989) iterating that students who perform more highly, either due to GPA, life experience or other performance metrics, are more likely to report accurately.

Within this area, there is a literature gap. An examination into preservice teacher’s self-assessment of performance is not present within the literature. Additionally, no work is present which uses this variable in examining the relationship with other constructs such as resiliency, teacher engagement and personality. Given the relevance, significance and crucial role these constructs have, there should be further examination into these constructs within preservice teachers’ teacher education portion of their careers.
Chapter 3 Methods

3.1 Research Design

This study used a questionnaire to explore resilience, personality, engagement, and performance. Use of a survey design is fitting for this research as it is a non-intrusive method used frequently in educational research to attain rich data from a large group of participants over a short period of time. Convenience and purposeful sampling were utilized within the pre-service teacher population at a Canadian University in eastern Ontario. In doing so, it accomplished two aims. First, the study explored the data through descriptive statistics and factor analysis to investigate the factor structure of resiliency, personality, engagement, and performance of pre-service teacher candidates. Secondly, using correlation and multiple regression analyses, this study attempted to understand the relationship among these constructs within this population.

3.2 Context and Participants

In total, 139 preservice teachers participated in this study, all of whom were all enrolled in the consecutive teacher education program at one university in eastern Ontario. Pre-service teacher candidates participating in this study were from two Consecutive Education, Bachelor of Education (B. Ed.) cohorts, Cohort Class of 2018 and 2019. Unlike Concurrent Education, which combines undergraduate study with a final cap-year of strictly education related coursework for two degrees. The Consecutive Education program allows prospective teachers to return to study for a condensed 16-month, 4 term program. These participants are from a variety of disciplines, backgrounds and age groups. Each of the 2018 and 2019 cohorts were made up of preservice teachers in programs for the following divisions: Primary/Junior, Intermediate/Senior and Technological education.
3.3 Instruments

A five-part questionnaire (Appendix A) was used with the following components: (1) the six-item Brief Resilience Scale (BRS) (Smith et al., 2008), (2) the 16-item Engaged Teacher Scale (ETS) (Klassen et al. 2013), (3) the 10-item Big Five Personality Index (BFI-10) (Rammstedt & John, 2007), and (4) on campus and practicum performance and five demographical items. The questionnaire was piloted among a small group (n=5) of recent B.Ed. graduates to ensure it was understandable and comprehensive.

Part One: Brief Resilience Scale:

The BRS was originally designed as a six-item brief psychometric tool to reliably assess resilience, known as the ability for an individual to bounce back from stress (Smith et al., 2008). An equal number of positive and negative questions were used. A 5-point Likert scale was used for each of the questions.

Part Two: Engaged Teacher Scale

The ETS measured teacher engagement in their profession. In Klassen et al.’s (2013) work, 4 factors were recognized in using the ETS: cognitive engagement (CE), emotional engagement (EE), social engagement: students (SES), and social engagement: colleagues (SEC). Each of the 16 items used a 5-point Likert scale.

Within the ETS, factor EE is represented by items 2, 5, 10, and 13, and is related to the emotional engagement in teaching. Sample questions include “I love teaching” and “I feel happy while teaching”. Factor CE, related to the cognitive engagement in teaching, is represented by items 4, 8, 11, and 15, and contains items such as “While teaching, I pay a lot of attention to my work” and “While teaching, I really “throw” myself into my work. Factor SES, is represented by items 3, 6, 14, and 16, is related to the social engagement of students. This factor is represented
by items such as “In class, I care about the problems of my students” and “In class, I am aware of my students’ feelings”. Factor SEC is related to items 1, 7, 9, 12. This factor’s items have captured the social engagement of a teacher with colleagues. The questions within this factor are reflected with items such as “At, school I value the relationship I build with my colleagues” and “At school I am committed to helping my colleagues”.

**Part Three: Big Five Personality Index:**

The BFI-10, was developed to quickly and accurately measure the Big Five personality traits of Neuroticism (N), Extraversion (E), Openness (O), Agreeableness (A), and Conscientiousness (C). It has been designed from the much larger BFI-44 for the purpose of measuring personality effectively and efficiently. Each factor in the Big Five was represented twice by 2 items, each pair was selected to generalize the full scales they were originally designed to represent (Rammstedt & John, 2007). Once again, a 5-point Likert scale was used for each of the 10 items in this tool.

**Part Four: Performance**

This section collected four individual items. First, participants were asked to self-report their on-campus grades, provided with 6 options ranging from A+ to F, as well as practicum grades in a 4-point scale resembling the rubric preservice teachers were assessed on (Appendix D). For the following two questions a 5-point Likert scale was used. The third question asked participants to self-evaluate if they feel like they are good teachers, and the last question asked if participants felt prepared to begin their careers as teachers.

**Part Five: Demographics**

This section collected information on the pre-service teachers’ age range, years of teaching, teaching experience, teachable division (Intermediate Senior or Primary Junior),
teachable subject (for Intermediate Senior only), and scheduled completion date of the teacher education program.

3.4 Data Collection

Data was collected over a two-week period from July 16th until July 31st, 2018. Mid-July 2018 was selected as preservice teachers in the end of their program, the Class of 2018, had returned to campus for the last portion of their on-campus requirements of the teacher education program, as well as having completed all practicums. This time was also valuable for the Class of 2019, as they had begun their teacher education program, and completed a single practicum as well as a few courses.

Qualtrics was used for data collection, and participants were invited in several ways to ensure maximum participation. Eligible participants were invited via a list-serv on two separate occasions. In addition, a posting was created within a closed and private group within a social media platform to collect data. Word of mouth throughout the teacher education building was also used. Participants were incentivized to participate with a chance to enter a draw for one of four $25.00 gift cards.

3.5 Data Analysis

To answer the three research questions, questionnaire responses were entered into Statistical Package for Social Sciences (SPSS) 22 and all responses were reviewed for missing data. Research question one was addressed first: how do pre-service teacher candidates self-report their resiliency, engagement, personality, and performance. First, normality of data was checked with SPSS and outliers were examined. Next, descriptive statistics, including means, standard deviation, and skewedness for each component of the questionnaire were calculated and
analyzed. Performance and demographic data were also analyzed to provide contextual background of this population.

Research question two was examined next: is there a factor structure of resilience, engagement, and personality within this population? Exploratory factor analysis was conducted with principal axis factoring and rotational methods to identify the underlying factors of resilience, engagement, and personality. Kaiser-Meyer-Olkin (KMO) criterion for sampling adequacy, scree plot, and Barlett’s test for sphericity were analyzed to determine if results were factorizable and how many factors should be retained. Previous literature demonstrated a clear factor structure in resilience, engagement and personality. Therefore, exploratory factor analysis was used to examine if this sample would demonstrate similar results to previously reported findings (Klassen et al., 2013; Rammstedt & John, 2007; Smith et al., 2008).

During factor analysis, both outliers and sample size were concerns for this study. Laerd Statistics (2015), indicated that outliers may cause disproportionate influence in factor analysis, Due process was observed, and rationale provided for outliers which were present and needed removal.

Field (2017), recommended an adequate sample size of 300 was required in order to provide stable factor structure, others indicated ratios of participant to factor that range as low as 2:1, to as high as 1000:1(Field, 2017, pp. 798). In this study, given the limitations of convenience sampling, the aim was to obtain as many responses as possible from the two cohorts of preservice teachers.

The resultant factor loadings were analyzed, and rotations conducted. This study employed rotations in pursuit of the simplest factor structure for each category’s factors. The
results show the extent to which the preservice teachers exhibit a factor structure in resiliency, engagement and personality.

Lastly research question three was examined: what are the relationships among resiliency, engagement, personality, and performance of preservice teachers on campus and in practicum? For this question correlation and linear regression were used. Correlation analysis was conducted with the performance items used as dependent variables. This analysis attempted to show the relationship among the variables. Next, for each of the linear regressions, resiliency mean scores, engagement factor scores, and personality factor scores, were regressed onto each of the four performance variables. These results showed the extent to which resiliency, engagement, and personality trait factor scores were predictors of performance.
Chapter 4 Results

4.1 Descriptive Statistics

In total, 513 preservice teachers were invited to participate in this study, and 154 responses were collected, achieving a 33% returned rate. A total of 139 valid responses were retained (Table 1) with 15 participants from the 154 responses removed due to missing or incomplete data. Of 139 responses, 33 of these individuals were from the graduating cohort 2018, and 106 were from the graduating cohort of 2019. Within the three teaching divisions, a total of 81 participants (57.9%) were from the Primary/Junior teaching division, 52 participants (37.4%) from the Intermediate/Senior teaching division and 7 participants (4.3%) from the Technical Education teaching division.

Table 1

Frequencies for Division and Graduating Class

<table>
<thead>
<tr>
<th>Teaching Division</th>
<th>Graduating Cohort</th>
<th>Total</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2018 cohort</td>
<td>2019 cohort</td>
<td></td>
</tr>
<tr>
<td>Primary Junior</td>
<td>20</td>
<td>61</td>
<td>81</td>
</tr>
<tr>
<td>Intermediate Senior</td>
<td>12</td>
<td>40</td>
<td>52</td>
</tr>
<tr>
<td>Technical Education</td>
<td>1</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>106</td>
<td>139</td>
</tr>
</tbody>
</table>
**Missing Data**

In total, 15 individuals were removed from the analysis. Of the 15 removed participants, 13 were removed due to less than 5% of the survey complete. The remaining two participants were removed as one individual was not part of the studied population and the other with data which was more than 50% incomplete.

A number of demographic items were problematic and attained mixed results: “How many years of uncertified teaching experience do you have? This includes teaching experience that you completed prior to starting the teacher education program. e.g., Teaching abroad, early childhood centers”. The questionnaire allowed a written response, and, in four cases, responses were difficult to assign to a numeric value. An example of such responses includes: “a few years teaching in piano and swimming”, “a lot”, “depends if you count parenting”, and “a few months of volunteering in a classroom”. Mean replacement was used to treat the missing data in lieu converted responses to an assigned value. The second question which yielded a similar mixed response, was “How many years of non-teaching full-time-work experience do you have?”. Again, responses were converted to a numeric value via mean replacement. Examples of these responses include: “a little” and “I’ve been a grad student”. Implications for using mean replacement are discussed.

**Demographics**

Descriptive Statistics results for age and prior teaching experience are displayed in Table 2. The age ranged from 21 to 47 years old with a mean of 25.30 and standard deviation of 4.68. In the complete sample of 139 individuals who reported years of teaching experience, the mean years of uncertified teaching experience in the sample was 2.81 with standard deviation of 3.19. The mean years of continuous working experience in non-teaching areas was 3.67 with a
standard deviation of 4.66. These demographics suggest that the demographic which was
sampled was preservice teachers in their 20’s with limited teaching and non-teaching work
experience.

Table 2

Descriptive Statistics for Demographics

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Minimum</th>
<th>Maximum</th>
<th>M</th>
<th>SD</th>
<th>Skew</th>
<th>Kurt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
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<td>21</td>
<td>47</td>
<td>25.30</td>
<td>4.68</td>
<td>2.16</td>
<td>5.051</td>
</tr>
<tr>
<td>Years of Uncertified Teaching Experience</td>
<td>139</td>
<td>0</td>
<td>17</td>
<td>2.81</td>
<td>3.19</td>
<td>1.72</td>
<td>3.661</td>
</tr>
<tr>
<td>Years of Working Experience (Non-Teaching, Continuous Fulltime)</td>
<td>139</td>
<td>0</td>
<td>25</td>
<td>3.67</td>
<td>4.66</td>
<td>2.20</td>
<td>6.134</td>
</tr>
</tbody>
</table>

Resilience, Engagement, Personality, and Performance

The descriptive statistics below report the findings that help to answer research question
1: How do pre-service teacher candidates self-report their resiliency, engagement, personality,
and performance?

The Brief Resilience Scale contains 6 items and was completed by 139 participants (See
Table 3). Positively worded items 1, 3, and 6 retained means of 3.36, 3.19, and 3.20 respectively;
negatively worded items, 2, 4, and 6 retained means of 2.92, 2.86, and 2.63. Standard deviation
of all items ranged from .862 to 1.022. All positively worded items retained a negative skewness
of -.472, -.167, and -.191. All negatively worded items retained a positive skewness of 2.84,
2.40, and .394. Kurtosis in all 6 questions are reported below 0, which indicates a lightly tailed
sample (Field, 2017). Item 2, I have a hard time making it through stressful events retained the
highest SD of 1.022. Item 6, *I tend to take a long time to get over set-backs in my life*, retained the lowest SD of .862. The highest mean 3.36, attained from item 1, “*I tend to recover quickly after hard times*”. The lowest mean 2.63 attained from item 6, “*I tend to take a long time to get over set-backs in my life*”. After recoding, a mean of 3.22 was obtained for this population.

Table 3

**Descriptive Statistics for Brief Resilience Scale (Smith et al., 2008)**

<table>
<thead>
<tr>
<th>Questions</th>
<th>M*</th>
<th>M**</th>
<th>SD</th>
<th>Skew</th>
<th>Kurt</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I tend to recover quickly after hard times</td>
<td>3.36</td>
<td>3.36</td>
<td>1.01</td>
<td>-.472</td>
<td>-.528</td>
</tr>
<tr>
<td>2. I have a hard time making it through stressful events*</td>
<td>2.92</td>
<td>3.08</td>
<td>1.02</td>
<td>.284</td>
<td>-.925</td>
</tr>
<tr>
<td>3. It does not take me long to recover from a stressful event</td>
<td>3.19</td>
<td>3.19</td>
<td>1.00</td>
<td>-.167</td>
<td>-923</td>
</tr>
<tr>
<td>4. It is hard for me to recover when something bad happens*</td>
<td>2.86</td>
<td>3.14</td>
<td>.95</td>
<td>.240</td>
<td>-1.065</td>
</tr>
<tr>
<td>5. I usually come through difficult times with little trouble</td>
<td>3.20</td>
<td>3.20</td>
<td>.93</td>
<td>-.191</td>
<td>-930</td>
</tr>
<tr>
<td>6. I tend to take a long time to get over set-backs in my life*</td>
<td>2.63</td>
<td>3.37</td>
<td>.86</td>
<td>.394</td>
<td>-591</td>
</tr>
<tr>
<td>Total</td>
<td>3.02</td>
<td>3.22</td>
<td>.96</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: N=139 *Original before reverse correction **After correcting for reverse coding

The 16-item Engaged Teacher Scale was completed by 139 participants (See Table 4). All 16 items were positively worded and attained a total mean of 4.40. The highest means 4.68, 4.65, and 4.64 were from items 4, 14, and 16: “I try my hardest to perform well while teaching”, “In class I care about the problems of my students”, and “In class I am empathetic towards my students” respectively. The lowest mean of 3.99 was found in item 15, “While teaching, I work
with intensity”. SD for all questions ranged from .50 to .82. All items attained a negative skewedness, unsurprisingly, as all items were positively phrased. The most extreme skewness at was item 2 with -1.84, “I am excited about teaching” and item 10 with -1.72, “I love teaching”. These items also had the highest kurtosis values of 4.63, and 3.87.
The personality component of the questionnaire, the BFI-10, consists of 10 items (See Table 5). Item 1,3,5,7,9 all were negatively phrased items and in means in their respective order.
were: 3.01, 2.34, 2.79, 2.58, and 3.22. The highest mean in this negative item was 3.22 in item 9, “I see myself as someone who gets nervous easily”. This indicates that preservice teachers overall, agree with this statement. Additionally, item number 9 is the only negatively phrased item which had a negative skewness, indicating that the left “disagree” tail of the distribution is longer than the right “agree”.

Items 2,4,6,8, and 10 were all positively phrased, and means for these items attained values of 4.09, 3.30, 3.83, 4.37, and 3.92. Item 8 “I see myself as someone who does a thorough job”, with a highest mean of 4.37. This item was negatively skewed, indicating that the more responses for this item fell on the “agree” side of the distribution.

Table 5
Descriptive Statistics for the 10 Item Big Five Index (Rammstedt & John, 2007)

<table>
<thead>
<tr>
<th>Questions</th>
<th>M</th>
<th>M**</th>
<th>SD</th>
<th>Skew</th>
<th>Kurt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generally, I see myself as someone who….</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. …is reserved*</td>
<td>3.01</td>
<td>2.99</td>
<td>1.063</td>
<td>.008</td>
<td>-.935</td>
</tr>
<tr>
<td>2. …is generally trusting</td>
<td>4.09</td>
<td>4.09</td>
<td>.785</td>
<td>-.975</td>
<td>1.173</td>
</tr>
<tr>
<td>3. …tends to be lazy*</td>
<td>2.34</td>
<td>3.66</td>
<td>1.094</td>
<td>.540</td>
<td>-.550</td>
</tr>
<tr>
<td>4. …is relaxed, handles stress well</td>
<td>3.30</td>
<td>3.30</td>
<td>.983</td>
<td>-.315</td>
<td>-.431</td>
</tr>
<tr>
<td>5. …has few artistic interests*</td>
<td>2.79</td>
<td>3.21</td>
<td>1.189</td>
<td>.124</td>
<td>-.998</td>
</tr>
<tr>
<td>6. …is outgoing, sociable</td>
<td>3.83</td>
<td>3.83</td>
<td>1.035</td>
<td>-.681</td>
<td>-.175</td>
</tr>
<tr>
<td>7. …tends to find fault with others*</td>
<td>2.58</td>
<td>3.42</td>
<td>.947</td>
<td>.252</td>
<td>-.556</td>
</tr>
<tr>
<td>8. …does a thorough job</td>
<td>4.37</td>
<td>4.37</td>
<td>.616</td>
<td>-.612</td>
<td>.453</td>
</tr>
<tr>
<td>9. …gets nervous easily*</td>
<td>3.22</td>
<td>2.78</td>
<td>1.108</td>
<td>-.276</td>
<td>-.817</td>
</tr>
</tbody>
</table>
The performance section of the questionnaire contains 4 items (see Table 6). Performance sections item 1 and 2 asked respondents to address course performance on campus and in practicum. Course performance used a 6-point scale ranging from A to F, reflecting typical university assessment (Appendix E), and practicum performance used a 4-point scale reflecting typical practicum assessment (Appendix F). Performance items 3 and 4 both asked respondents to self-evaluation via 5-point Likert scale.

Table 6

*Descriptive Statistics for Performance Questions*

<table>
<thead>
<tr>
<th>Questions</th>
<th>Range</th>
<th>Potential</th>
<th>Actual</th>
<th>M</th>
<th>SD</th>
<th>Skew</th>
<th>Kurt</th>
</tr>
</thead>
<tbody>
<tr>
<td>During all of your on-campus time:</td>
<td></td>
<td>1-6</td>
<td>3-6</td>
<td>5.42</td>
<td>.741</td>
<td>-1.065</td>
<td>.422</td>
</tr>
<tr>
<td>What is the GPA of all your on-campus coursework?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>During all of your practicum time:</td>
<td></td>
<td>1-4</td>
<td>2-4</td>
<td>3.65</td>
<td>.507</td>
<td>-0.994</td>
<td>-0.264</td>
</tr>
<tr>
<td>How would you rate your own performance?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generally Speaking, I feel like a good teacher.</td>
<td></td>
<td>1-5</td>
<td>2-5</td>
<td>4.21</td>
<td>.583</td>
<td>-0.506</td>
<td>1.894</td>
</tr>
<tr>
<td>I feel prepared to begin my career as a teacher</td>
<td></td>
<td>1-5</td>
<td>1-5</td>
<td>3.61</td>
<td>.936</td>
<td>-0.383</td>
<td>-0.481</td>
</tr>
</tbody>
</table>

Item 1, “What is the GPA of all your on-campus coursework”, attained a mean of 5.42. This reflects an approximate average grade between an A and A+. Table 7 shows frequencies of
all responses for this item, with 88% of the responses at or above an A. SD for this first item was .742 with a negative skewedness of -1.065 and kurtosis of .422.

Performance item 2 “How would you rate your own performance in practicum?” had a range of 1 to 4, with the mean of 3.65. This result places the average response between 3 (meets expectations) and 4 (exceeds expectations). Table 8 shows frequencies for performance item 2, showing that 98.5% of participants self-evaluated themselves as at or above expectations for practicum, and less than 2% of participants moving towards expectations. No participant indicated that they did not meet expectations for practicum. With a sample of preservice teachers with limited education experience, and the majority of the sample having just completed their only one of the four requires practicums, this result is not surprising. Implications for this result will be discussed in the next chapter. SD was .507, with a negative skewedness of -0.994 and kurtosis of -0.264.

Table 7

*Frequency Table: During the on-campus time: What is the GPA of all your coursework?*

<table>
<thead>
<tr>
<th>Grade</th>
<th>Responses</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+ (90-100)</td>
<td>77</td>
<td>55.40</td>
</tr>
<tr>
<td>A (80-89)</td>
<td>45</td>
<td>32.40</td>
</tr>
<tr>
<td>B (70-79)</td>
<td>15</td>
<td>10.80</td>
</tr>
<tr>
<td>C (60-69)</td>
<td>2</td>
<td>1.40</td>
</tr>
<tr>
<td>D (50-59)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>F (Less than 50)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Item 3 “Generally speaking I feel like a good teacher”, retains a mean of 4.21, and SD of .583. The average response on this item is between Agree and Strongly Agree. The skewedness was of this item was -.506 and kurtosis 1.904. A frequency table shows 66.2% of participants responded Agree with this statement, and 28.1% strongly agree, however, approximately 5% of the population is neutral. The distribution of responses is much less skewed for this question, with the overall skewedness of this item reduced compared to the previous two items. Item 3 also maintains the highest level of kurtosis of all 4 items in this section of the questionnaire.

Table 9

Frequency Table: Generally Speaking, I feel like I am a good teacher.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Responses</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>39</td>
<td>28.1</td>
</tr>
<tr>
<td>Agree</td>
<td>92</td>
<td>66.2</td>
</tr>
<tr>
<td>Neutral</td>
<td>6</td>
<td>4.3</td>
</tr>
<tr>
<td>Disagree</td>
<td>2</td>
<td>1.4</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Item 4 “I feel prepared to begin my career as a teacher” retains a mean of 3.61, SD of .936, negative skewedness at -.383 and kurtosis of -.481. The average response in this item is
between Neutral and Agree, and the distribution for this item shows the lowest skewedness value, with 25.2% of participants responding Neutral, and 14% of them responding Disagree.

Table 10

*Frequency Table: I feel prepared to begin my career as a teacher*

<table>
<thead>
<tr>
<th>Grade</th>
<th>Responses</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>22</td>
<td>15.8</td>
</tr>
<tr>
<td>Agree</td>
<td>62</td>
<td>44.6</td>
</tr>
<tr>
<td>Neutral</td>
<td>35</td>
<td>25.2</td>
</tr>
<tr>
<td>Disagree</td>
<td>19</td>
<td>13.7</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>1</td>
<td>.7</td>
</tr>
</tbody>
</table>

It appears that when participants reflect on their recorded performance, the data shows a skewedness towards higher grades and increased levels of performance, however, when reflecting on how participants feel in their profession and preparedness of teaching, the results are not as heavily skewedness. Possible explanations will be discussed.

**Differences Between Groups**

In order to assess any cohort differences between the 2018 and 2019 years, independent samples t-test were conducted. No significant differences were found in reports of resilience, engagement, and personality. No significant differences were found in practicum performance as well as “I feel like a good teacher”. There were differences between 2018 and 2019 preservice teachers, but they were not significant for GPA and “I feel prepared to begin my career as a teacher”.
4.2 Factor Analysis

Factor analyses were conducted individually for each of the above three scales: resilience, engagement and personality in order to address the second research question: Is there a factor structure of resilience, engagement, and personality within this population? If so, what does each look like? The factor analysis was run in the same manner for each of the three scales, first a principal axis factor analysis was conducted with oblique rotations (ProMax). Next, scree plot, eigenvalues and Kaiser-Meyer-Olkin KMO values were analyzed.

**Resilience**

One factor solution emerged with an Eigenvalue of 3.280 to account for 54.70% of the variance. This factor will simply be referred to as “resilience”. Scree plot showed a clear single factor structure, and a clear break after the first factor (Figure 2). The KMO = 0.795. (middling according to Kaiser & Rice. 1974) (see Table 11), and all KMO values for individual items were over 0.7, above the acceptable limit of 0.5 (Field, 2017).
Figure 2. Scree plot for exploratory factor analysis of BRS with all 6 items extracting a single a factor solution, resilience.

Table 11

<table>
<thead>
<tr>
<th>Resilience KMO</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</td>
<td>.795</td>
</tr>
<tr>
<td>Bartlett’s Test of Sphericity</td>
<td></td>
</tr>
<tr>
<td>Approx. Chi-Square</td>
<td>315.907</td>
</tr>
<tr>
<td>df</td>
<td>15</td>
</tr>
<tr>
<td>Sig.</td>
<td>.000</td>
</tr>
</tbody>
</table>

All six items loaded onto this one factor of resilience, with all factor loadings ranging from .457 and .790. The strongest loading .790 attributed to item 3, *It does not take me long to recover from a stressful event*. The weakest loading .457, attributed to item 5, *I usually come through difficult times with little trouble*.

Table 12

<table>
<thead>
<tr>
<th>Item</th>
<th>Resilience Items</th>
<th>Factor Loadings</th>
<th>Communalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>It does not take me long to recover from a stressful event</td>
<td>.790</td>
<td>.625</td>
</tr>
<tr>
<td>1</td>
<td>I tend to recover quickly after hard times</td>
<td>.762</td>
<td>.581</td>
</tr>
<tr>
<td>6</td>
<td>I tend to take a long time to get over setbacks</td>
<td>.752</td>
<td>.566</td>
</tr>
<tr>
<td>4</td>
<td>It is hard for me to recover when something bad happens</td>
<td>.654</td>
<td>.427</td>
</tr>
<tr>
<td>2</td>
<td>I have a hard time making it through stressful events</td>
<td>.612</td>
<td>.374</td>
</tr>
<tr>
<td>5</td>
<td>I usually come through difficult times with little trouble</td>
<td>.457</td>
<td>.209</td>
</tr>
</tbody>
</table>

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 5 iterations required.

**Engagement**

After several manipulations of the items and factor solutions, 4 items were dropped and 12 items were analyzed for a clear single factor solution, which is further referred to simply as
“engagement”. The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO=0.868 (see Table 13), and all KMO individual values within the Anti-Image Correlation Matrix was over 0.799, again above the acceptable limit of 0.5, (Field, 2017). All items loaded strongly onto a single factor with a coefficient of above 0.4, with only item 6, “In class I am aware of my students’ feelings” partially loading onto this factor, with a coefficient of .348 (See Table 14). This single factor structure maintained an Eigenvalue of 5.490 and accounted for 45.75% of the variance. The scree plot also maintains a clear single factor structure with the cut-off after one factor.

Table 13

<table>
<thead>
<tr>
<th></th>
<th>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</th>
<th>.868</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartlett’s Test of Sphericity</td>
<td>Approx. Chi-Square</td>
<td>773.364</td>
</tr>
<tr>
<td></td>
<td>df</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>Sig.</td>
<td>.000</td>
</tr>
</tbody>
</table>

The single factor structure presented here is a result of repeated analysis of the factor loadings. The four items which were dropped, 1, 7, 9, and 12; and the resultant single factor structure for engagement is not consistent with the work by Klassen et al. (2007). In the original study, it was indicated that four factors have been found within this questionnaire when used in samples of in-service teachers (Klasssen et al. 2007). In fact, initially the loadings for a two-factor solution indicated that most of the items readily loaded onto a single factor, and only 3 items of the 16 were weakly and inversely loading onto a second factor. A comparison of these three items, item 7,9, and 12, and the original factor structure by Klassen et al. (2007) found that three items were within the factor social engagement with colleagues. Thus, in pursuit of the
simplest factor structure, it was decided to remove these three items plus the remaining item in this factor, item 1. This process resulted in the current single factor structure for Engagement.

![Scree plot for 12 item exploratory factor analysis to extract a single factor solution, engagement.](image)

**Figure 3.** Scree plot for 12 item exploratory factor analysis to extract a single factor solution, engagement.

**Table 14  
Factor Loadings of the Engaged Teacher Scale**

<table>
<thead>
<tr>
<th>Item</th>
<th>Engagement Items</th>
<th>Factor Loadings</th>
<th>Communalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>I feel happy while teaching</td>
<td>.798</td>
<td>.637</td>
</tr>
<tr>
<td>10</td>
<td>I love teaching</td>
<td>.733</td>
<td>.537</td>
</tr>
<tr>
<td>13</td>
<td>I find teaching fun</td>
<td>.730</td>
<td>.533</td>
</tr>
<tr>
<td>2</td>
<td>I am excited about teaching</td>
<td>.709</td>
<td>.502</td>
</tr>
<tr>
<td>8</td>
<td>While teaching, I really throw myself into my work</td>
<td>.690</td>
<td>.476</td>
</tr>
<tr>
<td>16</td>
<td>In class, I am empathetic towards my students</td>
<td>.655</td>
<td>.429</td>
</tr>
<tr>
<td>11</td>
<td>While teaching I pay a lot of attention to my work</td>
<td>.628</td>
<td>.395</td>
</tr>
<tr>
<td>14</td>
<td>In class, I care about the problems of my students</td>
<td>.619</td>
<td>.383</td>
</tr>
<tr>
<td>4</td>
<td>I try my hardest to perform well while teaching</td>
<td>.610</td>
<td>.372</td>
</tr>
<tr>
<td>3</td>
<td>In class, I show warmth to my students</td>
<td>.562</td>
<td>.315</td>
</tr>
</tbody>
</table>
Personality

The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO= 0.615, (see Table 15)(mediocre according to Kaiser & Rice, 1974), and 8 of 10 KMO values within Anti-Image Correlation Matrix for individual items were above acceptable limit of 0.5 (Field, 2017), with only item-5 and item-7 attaining values below 0.5.

Table 15

<table>
<thead>
<tr>
<th>Personality KMO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaiser-Meyer-Olkin Measure of Sampling Adequacy.</td>
</tr>
<tr>
<td>Bartlett's Test of Sphericity</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

No coherent factor structure emerged for the personality section of the questionnaire despite multiple approaches. Several different rotational methods were used as well as interpretation by eigenvalues and forcing factors. Investigation of the scree plot showed an unclear cut-off point for these 10 items (Figure 4). In reference to Rammstedt & John (2007), a clear five factor solution was to be expected, even in a similar demographic of undergraduates. However, in all attempts to extract factors the resultant loadings were unclear. The decision was made by the researcher in this study to then create composite scores for the 5 factors in the Big Five model based on pairing items as they were designed (Rammstedt & John, 2007). These five composite scores generated from the composite means retained for personality on future
analysis are: extraversion, conscientiousness, openness, agreeableness, and neuroticism.

Implications of this are discussed in the following chapter.

Figure 4. Scree plot for 10 item exploratory factor analysis with incoherent factor structure

Table 16

**Personality BFI-10 - Pattern Matrix**

<table>
<thead>
<tr>
<th>Generally, I see myself as someone</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>who….</td>
<td>1</td>
</tr>
<tr>
<td>…is reserved</td>
<td>0.751</td>
</tr>
<tr>
<td>…is generally trusting</td>
<td>-0.092</td>
</tr>
<tr>
<td>…tends to be lazy</td>
<td>-0.001</td>
</tr>
<tr>
<td>…is relaxed, handles stress well</td>
<td>-0.027</td>
</tr>
<tr>
<td>…has few artistic interests</td>
<td>0.071</td>
</tr>
<tr>
<td>…is outgoing, sociable</td>
<td>0.836</td>
</tr>
<tr>
<td>…tends to find fault with others</td>
<td>0.020</td>
</tr>
<tr>
<td>…does a thorough job</td>
<td>-0.006</td>
</tr>
<tr>
<td>…gets nervous easily</td>
<td>0.384</td>
</tr>
</tbody>
</table>
4.3 Correlation Analyses

In order to explore the relationship between resilience, engagement, personality and performance of preservice teachers – research question three, Pearson correlation coefficients were calculated based on the results of the questionnaire (see Table 17). Results used in the correlation analysis were composite means generated from items which loaded onto a variable’s factor or assigned to the variable. Independent variables included were resilience, engagement, and the five personality components: conscientiousness, extraversion, agreeableness, neuroticism and openness. For resilience, all six items in the questionnaire were used. Engagement used 12 of the 16 items from the ETS scale. Personality used the two items per factor for each of the five personality traits, consistent with Rammstedt and John (2007). The dependent variables in this analysis were the four items in performance section, GPA Campus Coursework, Practicum Performance, Self-Evaluation for “I am a Good Teacher”, and Self-Evaluation for “I am prepared for Teaching”.

The results of the correlation showed that preservice teachers who reported to be resilient do not show any significant correlation with any performance variables. However, resilience was significantly correlated with the personality trait of neuroticism ($r = .63, p<.01$), and weakly correlated with extraversion ($r = .21$) and agreeableness ($r = .21$). This result indicates that preservice teachers reporting more resilience tend to report higher levels of neuroticism. Additionally, individuals who are reported as resilient also show some positive correlations with other personality trait variables of extraversion and agreeableness. This finding suggests that the
most resilient of preservice teachers, those who exhibit the highest levels of resilience are also those who are most neurotic.

Engagement was significantly correlated to several performance variables. Engagement was positively correlated with GPA during practicum \( (r = .22) \), and the Self-Evaluations “I am a good teacher” \( (r = .35) \) and “I feel prepared to teach” \( (r = .32, p < .01) \), but not GPA during on campus time. Pre-service teachers who show high levels of engagement in teaching tend to believe themselves to be good, prepared teachers, but also are only engaged in the practicum aspects of teaching, and not within teacher education programming on campus. Engagement was also significantly correlated with the four personality traits of conscientiousness \( (r = .24, p < .01) \), extraversion \( (r = .27, p < .01) \) agreeableness \( (r = .30, p < .01) \) and openness \( (r = .25, p < .01) \). Suggesting that preservice teachers who are engaged in teaching, tend to also be conscientious, agreeable, open and extraverted.

Four of the personality trait variables: conscientiousness, extraversion, neuroticism, and agreeableness, are correlated with performance variables. Conscientiousness was significantly correlated with all performance metrics: GPA during on campus time \( (r = .34, p < .01) \), GPA during practicum \( (r = .29, p < .01) \), “I am a good teacher” self-evaluation \( (r = .25, p < .01) \), and “I feel prepared for teaching” self-evaluation \( (r = .27, p < .01) \). Due to the strong significant correlations with all four performance variables, it can be inferred that conscientiousness in preservice teachers was most strongly related to performance.

Extraversion was also significantly correlated with GPA during on campus time \( (r = .210) \), GPA during practicum \( (r = .22) \), “I am a good teacher” self-evaluation \( (r = .31, p < .01) \), and “I feel prepared for teaching” self-evaluation \( (r = .36, p < .01) \). Unlike conscientiousness which retained four significant correlations \( (p < .01) \), extraversion retained significant correlations.
with only the two self-evaluation performance variables. Preservice teachers high in extraversion tended to rate themselves higher when evaluating their own teacher preparedness and overall proficiency.

Neuroticism was significantly correlated with only two of the performance variables “I am a good teacher” self-evaluation ($r = .19$), and self-evaluation “I feel prepared for teaching” ($r = .29$, $p<.01$). This finding suggests that neurotic preservice teachers tend to rate themselves as being good teachers as well as being prepared.

Agreeableness and openness were not significantly correlated with any of the four performance variables, however as aforementioned, agreeableness was correlated with resilience ($r = .21$) and both agreeableness ($r = .30$) and openness ($r = .25$) were correlated with engagement.
### Table 17

*Pearson Product-Moment Correlation Coefficients among Variables*

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Independent Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Resilience</td>
<td></td>
<td>.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Engagement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Personality – Extraversion</td>
<td>.21*</td>
<td>.27**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Personality – Agreeableness</td>
<td>.21*</td>
<td>.30**</td>
<td>.20*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Personality – Conscientiousness</td>
<td>.16</td>
<td>.24**</td>
<td>.21*</td>
<td>.19*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Personality – Neuroticism</td>
<td>.63**</td>
<td>.13</td>
<td>.41**</td>
<td>.16</td>
<td>.21*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Personality – Openness</td>
<td>-.05</td>
<td>.25**</td>
<td>.08</td>
<td>.11</td>
<td>.10</td>
<td>-.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dependent Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. GPA Campus Coursework</td>
<td>.03</td>
<td>.07</td>
<td>.21*</td>
<td>.09</td>
<td>.34**</td>
<td>.06</td>
<td>0.13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Practicum Performance</td>
<td>-.04</td>
<td>.22*</td>
<td>.22*</td>
<td>.07</td>
<td>.29**</td>
<td>.12</td>
<td>.15</td>
<td>.33**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Self-Evaluation I am a Good Teacher</td>
<td>.09</td>
<td>.35**</td>
<td>.31**</td>
<td>.11</td>
<td>.25**</td>
<td>.09</td>
<td>.12</td>
<td>.12</td>
<td>.44**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Self-Evaluation Prepared Teacher</td>
<td>.05</td>
<td>.32**</td>
<td>.36**</td>
<td>.10</td>
<td>.27**</td>
<td>.29**</td>
<td>.13</td>
<td>.16</td>
<td>.28**</td>
<td>.51**</td>
<td></td>
</tr>
</tbody>
</table>

Note: * p < .05, ** p < .01
4.4 Regression Analyses

To continue to address the third research question, standard regression analyses were conducted. In Table 18, 19, 20 and 21 standard regression analyses were completed with resilience, engagement and personality as independent variables and GPA during on campus time and practicum experience as well as two variables of self-evaluations of teaching proficiency and preparedness as dependent variables.

As is shown in Table 18 the independent variables only explained 15.5% of variance in GPA during the on-campus portion of preservice teacher education, with the two significant predictors to be the personality trait variables of conscientiousness ($\beta = .33, p < .05$) and extraversion ($\beta = .18, p = .05$) among all seven independent variables. This finding suggests that the personality component of the questionnaire was the strongest predictor of GPA during the on-campus portion of preservice teacher education.

Table 18

*Standard Regression Analysis of GPA During Preservice Teacher Education On Campus Study*

<table>
<thead>
<tr>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>F (df$_1$, df$_2$)</th>
<th>Variable</th>
<th>Standardized Coefficients $\beta$</th>
<th>t</th>
<th>p</th>
<th>95% CI for B</th>
</tr>
</thead>
<tbody>
<tr>
<td>.155</td>
<td>.109</td>
<td>3.42**</td>
<td>Resilience</td>
<td>.00</td>
<td>-.00</td>
<td>1.00</td>
<td>[-.22, .22]</td>
</tr>
<tr>
<td></td>
<td>(7, 138)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Engagement</td>
<td>-.07</td>
<td>-.82</td>
<td>.41</td>
<td>[-.44, .18]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Extraversion</td>
<td>.18**</td>
<td>1.99</td>
<td>.05</td>
<td>[.00, .29]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Conscientiousness</td>
<td>.33**</td>
<td>3.82</td>
<td>.00</td>
<td>[.17, .52]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Agreeableness</td>
<td>.01</td>
<td>.16</td>
<td>.87</td>
<td>[-.18, .21]</td>
</tr>
</tbody>
</table>
In Table 19 the same seven independent variables were used with GPA during the practicum portion of teacher education as a dependent variable. Once again, in this model, the seven variables accounted for only 15.4% of the variance, with conscientiousness ($\beta = .16, p<.05$) again to be the only significant predictor of GPA. This result indicates that conscientiousness is the strongest predictor of both classroom and practicum GPA.

Table 19

<table>
<thead>
<tr>
<th>Variable</th>
<th>Standardized Coefficients</th>
<th>$t$</th>
<th>$p$</th>
<th>95% CI for B</th>
</tr>
</thead>
<tbody>
<tr>
<td>R²</td>
<td>Adjusted R²</td>
<td>$F$</td>
<td>Variable</td>
<td>$\beta$</td>
</tr>
<tr>
<td>.154</td>
<td>.109</td>
<td>3.41**</td>
<td>Resilience</td>
<td>-.20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Engagement</td>
<td>.11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Extraversion</td>
<td>.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Conscientiousness</td>
<td>.16**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Agreeableness</td>
<td>-.03</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Neuroticism</td>
<td>.14</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Openness</td>
<td>.06</td>
</tr>
</tbody>
</table>

Note: **$p<.05$
For the regression model with the dependent variable “I am a good teacher”, the seven independent variables explained 19.4% of the variance (See Table 20). Engagement ($\beta = .27$, $p < .05$) and extraversion ($\beta = .27$, $p < .05$) were found to be significant predictors of this self-evaluation. This result suggests that preservice teachers who were highly engaged in their teaching practice and/or were extraverted, were the strongest predictors of self-evaluation of being a good teacher.

Table 20

*Standard Regression Analysis of Self Evaluation “I am a good teacher”*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Standardized Coefficients $\beta$</th>
<th>t</th>
<th>p</th>
<th>95% CI for B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resilience</td>
<td>-0.018</td>
<td>-1.18</td>
<td>0.858</td>
<td>[-0.18, 0.15]</td>
</tr>
<tr>
<td>Engagement</td>
<td>0.27**</td>
<td>3.07</td>
<td>0.00**</td>
<td>[0.13, 0.61]</td>
</tr>
<tr>
<td>Extraversion</td>
<td>0.20**</td>
<td>2.17</td>
<td>0.03**</td>
<td>[0.01, 0.23]</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>0.14</td>
<td>1.72</td>
<td>0.09</td>
<td>[0.02, 0.26]</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>-0.04</td>
<td>-0.52</td>
<td>0.60</td>
<td>[-0.19, 0.11]</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>0.06</td>
<td>0.53</td>
<td>0.60</td>
<td>[-0.10, 0.18]</td>
</tr>
<tr>
<td>Openness</td>
<td>0.00</td>
<td>-0.01</td>
<td>1.0</td>
<td>[-0.12, 0.12]</td>
</tr>
</tbody>
</table>

Note: **$p < 0.05$
For the last standard regression model with the dependent variable “I feel prepared to teach”, the seven independent variables explain 25.6% of the results (See Table 21).

Neuroticism ($\beta = .29$, $p < .01$), engagement ($\beta = .21$, $p < .05$) and extraversion ($\beta = .19$, $p < .05$) were significant predictors of preparedness for teaching. Additionally, resilience was shown to be a negative predictive of preparedness for teaching ($\beta = -.20$, $p < .05$). The implications for this resilience regression result are discussed further in the next chapter. These results indicate generally that preservice teachers reporting more preparedness for teaching tend to score as more neurotic, engaged and extraverted than other teachers.

Table 21

*Standard Regression Analysis of Self Evaluation “I feel prepared to teach”*

<table>
<thead>
<tr>
<th></th>
<th>Adjusted R²</th>
<th>F (df₁, df₂)</th>
<th>Variable</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>p</th>
<th>95% CI for B</th>
</tr>
</thead>
<tbody>
<tr>
<td>R²</td>
<td>.256</td>
<td>.216</td>
<td>6.446** (7, 138)</td>
<td>Resilience</td>
<td>-.20**</td>
<td>-2.02</td>
<td>.05** [-.52, -.01]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Engagement</td>
<td>.21</td>
<td>2.50</td>
<td>.014 [.01, .84]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Extraversion</td>
<td>.19</td>
<td>2.23</td>
<td>.03 [.02, .37]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Conscientiousness</td>
<td>.15</td>
<td>1.92</td>
<td>.06 [-.01, .41]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Agreeableness</td>
<td>-.04</td>
<td>-.49</td>
<td>.63 [.29, .17]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Neuroticism</td>
<td>.29**</td>
<td>2.75</td>
<td>.01** [.09, .52]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Openness</td>
<td>.06</td>
<td>.73</td>
<td>.47 [-.12, .26]</td>
</tr>
</tbody>
</table>

Note: **$p < .05$
Chapter 5 Discussion and Conclusion

This study addressed three research questions which aimed to examine preservice teachers’ resilience, engagement, personality and performance; as well as the relationships among them. In the process, all four of these constructs were investigated using descriptive statistics, factor analysis, correlation and regression analyses. As a result, resilience and engagement were each found to be factorizable by a single factor. There was no factor coherent factor structure extracted for personality though. Instead, five factors were retained for this study. Performance variables measured through on-campus and practicum assessment, and two self-evaluation items, were found to be correlated in all cases with conscientiousness and extraversion; engagement was correlated with practicum performance as well as both self-evaluations of good and prepared teaching; neuroticism was found to be related to preparedness to teach. In standard regression, each of the four performance variables were found to be predicted mainly by personality: conscientiousness and extraversion predicted campus GPA; conscientiousness predicted practicum performance; self-evaluations of being a good teacher was predicted by engagement and extraversion; self-evaluations of being prepared to start teaching was predicted positively by neuroticism and negatively by resilience.

The most surprising findings in this present study surround resilience with low overall scores, absent correlations and a negative predictive relationship with preparedness to teach. Findings that were unsurprising from this current study are within engagement. Engagement had an overall high mean and was correlated with many of the positive variables conducive to teaching. Additionally, personality factors: conscientiousness and extraversion - two well-known positive personality factors demonstrate consistent results with strong relationships to many performance variables.
This chapter presents the results by themes addressing the three research questions. First research questions 1 and 2 are discussed, focusing on the descriptive statistics of resilience, engagement and personality separately. The results and meaning of the factor structure for each resilience engagement and personality are investigated as well. This chapter then addresses research question 3 in two parts, first strictly considering the correlations between resilience, engagement and personality, then addressing regression as well as correlation with performance in addition to resilience engagement and personality. This chapter discusses these results together in consideration of existing research, teacher education and teaching practice contexts. The limitations of this work, the tools used and the implications for future research are considered at the end followed by a brief conclusion.

5.1 Research Question 1 and 2: Descriptive Statistics and Factor Analysis

Resiliency

Descriptive statistics and resilience in preservice teachers. A total of 139 preservice teachers participated in this study. As mentioned previously, resilience is recognized as the ability for an individual to bounce back after stress and adversity (Smith et al., 2008). The descriptive analyses for the six items in BRS show some degree of resilience across preservice teachers in this population. The mean and standard deviation for this present study on preservice teachers showed consistent patterns with the results found in Smith et al. (2008) the study which originally conceived and tested the BRS used by this current study. After recoding for negatively phrased items, the mean in the present study was found to be lower, and the standard deviation was found to be higher ($M = 3.22, SD= .96$) than Smith et al. (2008). Interestingly, the mean in this study is lower to the Samples 1 and 2 in Smith et al. (2008) which was mostly composed of
undergraduate students, the closest sample population to the current study (see Table 22 below of a comparison).

Table 22

*Comparison of Mean and Standard Deviation to Smith et al. (2008)*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Size</td>
<td>139</td>
<td>128</td>
<td>64</td>
<td>112</td>
</tr>
<tr>
<td>Age</td>
<td>25.3</td>
<td>20.4</td>
<td>19.8</td>
<td>62.8</td>
</tr>
<tr>
<td>BRS mean</td>
<td>3.22 (.96)</td>
<td>3.53 (0.68)</td>
<td>3.57 (0.76)</td>
<td>3.98 (0.68)</td>
</tr>
</tbody>
</table>

*Note.* Standard deviations are listed in parentheses.

*Smith et al. (2008, p. 197)*

Within this current study, the highest means of 3.36 and 3.20 out of 5 were attained by item 1 and item 5: “*I tend to recover quickly after hard times*” and “*I usually come through difficult times with little trouble*”. It is surprising why item 6, “*I tend to take a long time to get over setbacks in life*”, attained the lowest mean of 2.63, even though it is simply the negatively phrased version of item 1.

There is no evidence to ascertain what exactly caused this outcome within the scope of the current study, thus previous work within resilience must be considered. A teacher resiliency framework had been conceptualized in previous literature reviews by Mansfield et al. (2015). It is proposed that a complex and contextualized relationship exists within in-service teachers and their resilience. In this framework, resilience is described as *a capacity, a process and an outcome*, where all three components rely on experience in order to successful achieve life goals. In this current study, experience is limited (*M*=2.81 *years of uncertified teaching experience*). It is possible that the preservice teachers in this current study are simply too limited in experience to demonstrate higher levels of resilience.
The question of whether or not these low scores are significant for the current population should also be addressed. Recently, a quantitative study from Croatia assessed the psychological well-being of teachers in practice \((n=941)\), and also investigated the relationship of resilience via the BRS, as well as teacher burnout, psychopathically symptoms and negative student-related emotions (Burić, Slišković, & Penezić 2019). It was found that when assessed at the same time point, teachers with higher levels of self-assessed resilience as determined by the BRS, were negatively correlated with all study variables, including teacher’s emotions of anger, hopelessness, burnout, exhaustion, disengagement, anxiety and depression. Albeit a sample size which is significantly larger, within a population of different culturally and contextual different challenges may not be directly applied to the current study. However, this current study population will mostly enter the teaching profession and encounter similar challenges, therefore, attention should be drawn to these low scores.

**Resilience, the BRS, and exploratory factor analysis in preservice teachers.** This section addresses the second research question as it pertains to resilience: “Is there a factor structure of resilience… within this population?” Findings revealed that resilience was a single factor. The single factor solution for resilience found here is consistent with Smith et al. (2008) where the BRS was originally tested for use (See Table 23).

Within the current study, the only item which did not load similarly to previous work is item 5 “I usually come through difficult times with little trouble”. A possible explanation is that this item may be too similar to the other items in this analysis. Item 2 and 3 for example, “I have a hard time making it through stressful events” and “It does not take me long to recover from a stressful event” both encompass the same idea as presented in item 5. It is possible that due to this question being the third iteration of this same theme, participants attempted respond to it
differentially. Overall, there is not enough contextual information to be analyzed here, and future work should attempt to further differentiate questions within this factor.

Table 23

*Comparison of Factor Loadings to Smith et al. (2008)*

<table>
<thead>
<tr>
<th>Items</th>
<th>Current Study</th>
<th>Sample 1</th>
<th>Sample 2</th>
<th>Sample 3</th>
<th>Sample 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 I tend to recover quickly after hard times</td>
<td>.76</td>
<td>.77</td>
<td>.79</td>
<td>.70</td>
<td>.89</td>
</tr>
<tr>
<td>2 I have a hard time making it through stressful events</td>
<td>.61</td>
<td>.73</td>
<td>.78</td>
<td>.68</td>
<td>.91</td>
</tr>
<tr>
<td>3 It does not take me long to recover from a stressful event</td>
<td>.79</td>
<td>.78</td>
<td>.78</td>
<td>.71</td>
<td>.71</td>
</tr>
<tr>
<td>4 It is hard for me to recover when something bad happens</td>
<td>.65</td>
<td>.85</td>
<td>.90</td>
<td>.70</td>
<td>.85</td>
</tr>
<tr>
<td>5 I usually come through difficult times with little trouble</td>
<td>.46</td>
<td>.69</td>
<td>.69</td>
<td>.71</td>
<td>.68</td>
</tr>
<tr>
<td>6 I tend to take a long time to get over setbacks</td>
<td>.75</td>
<td>.84</td>
<td>.81</td>
<td>.67</td>
<td>.68</td>
</tr>
</tbody>
</table>

*Note.* aSmith et al. (2008, p. 197)

**Engagement**

*Descriptive statistics and engagement in preservice teachers.* The Engaged Teacher Scale (ETS) was developed by Klassen et al. (2013) in attempts to validate a teacher engagement scale which reflects the demands of teaching. In the present study, all 139 preservice teachers responded to all 16 items of the ETS (*M*=4.40, *SD*= 0.63).

The total mean for this section of the questionnaire was high, at 4.40 out of 5. The range of all 16 items in this section was also high, from 3.99 to 4.68 out of 5, suggesting that nearly all participants are perceived to be highly engaged in teaching. In discussing the overall mean in this section of the questionnaire it is important to address a potential bias. Considering the context of the participant background, such a high range is to be expected. The decision to join a
professional teacher education university program, with a requirement of a previous Bachelor university degree, emphasizes the commitment that many applicants must have. This commitment ensures that many of the candidates in the preservice teacher education program, must be engaged at some level in the profession of teaching. In addition, there is potential participant bias to acknowledge considering that in the 500+ preservice teachers invited for this study, only 139 eventually responded voluntarily, less than 30% of the available population. This claim is evidenced in the kurtosis values of 4.634 and 3.869 for item 2 “I am excited about teaching” and item 10 “I love teaching” respectively.

**Factor analysis and engagement in preservice teachers.** The aim of the second research question was to investigate the factor structure within this group of preservice teachers. In the present analysis, however, four distinct factors were not found. Assuming that similar contextual demands exist for preservice and in-service teachers, a semblance of a similar factor structure would be expected. According to Klassen et al. (2013), that factor structure would have been made up of emotional engagement (EE), cognitive engagement (CE), social engagement with students (SES), and social engagement with colleagues (SEC). Instead, the resultant one factor solution found here resembles a combination of EE, CE, and SES, with the four items dropped belonging to SES.

Klassen et al. (2013) determined that the four ETS factors found in their research were based on extensive analysis which were reliable and valid within in-service teachers’ population. The goal of their research was to explore a similar four-factor teacher engagement model and measuring tool that was quick to administer, and reliable. Additionally, the ETS was designed to be used specifically in educational contexts, as much of the current engagement literature
generally captures employee engagement. In search of a brief scale to measure preservice teacher engagement, the selection in this current study led to ETS as a sensible choice.

The fact that in this factor extraction items related to social engagement with colleagues was dropped is somewhat unsurprising given existing research in the field of engagement. Social engagement is a recent investigated dimension of work engagement and calls to further explore this area; separate of a physical, emotional and cognitive engagement; have come up in previous research (Klassen et al., 2013).

It is crucial to recognize teacher engagement is not a static measure. This group of preservice teachers have only just begun their teacher education and have much of their professional teaching career ahead of them. It is possible that levels of engagement may change. The majority of teachers in the present study had one practicum experience and were under 3 years of relevant teaching experience. It is likely that their engagement in teaching will dynamically evolve over the course of their career, as previous work indicates a large variance in teacher engagement in the span of only a few weeks (Bakker & Bal, 2010).

**Personality**

*Descriptive statistics and preservice teachers’ personality.* The BFI-10 has five positively phrased items and five negatively phrased items. Each item was selected to generalize the full BFI-44 scale, with five personality factors. In the BFI-10 there are two items, one positive and one negative for each for the five personality factors. Table 24 provides grouped means for each of the five factors after recoding data for negatively phrased items.

Table 24

*Means for Five Factors in the BFI-10*

<table>
<thead>
<tr>
<th>Factors</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factor</td>
<td>Mean</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>-------------------</td>
<td>------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Extraversion</td>
<td>3.41</td>
<td>1.05</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>3.75</td>
<td>0.87</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>4.01</td>
<td>0.85</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>3.04</td>
<td>1.05</td>
</tr>
<tr>
<td>Openness</td>
<td>3.56</td>
<td>1.02</td>
</tr>
</tbody>
</table>

*Note.* Parentheses indicate the item pair for these factors.

Conscientiousness has the highest mean and lowest standard deviation \((M=4.01, SD=0.85)\) after recoding. Two components, positively phrased item 8 “Generally, I see myself as someone who does a thorough job” and negatively phrased item 3 “Generally, I see myself as someone who tends to be lazy” had the highest mean and lowest means respectively \((M=4.37, SD=0.616)\) \((M=2.34, SD=1.094)\) prior to recoding. Overall, all preservice teachers rated themselves most strongly with this factor. There are several possible explanations for this. Teaching is a profession which requires a high level of organization and attention to detail; such strong conscientiousness is crucial for teachers in their career in order to comprehensively and thoroughly evaluate, assess, mentor and support all students under their care. Additionally, these preservice teachers are already admitted to a professional program and, up to this point, would have had to demonstrate a semblance of this characteristic. An important consideration also needed for conscientiousness is in item selection from the BFI-44, the test-retest stability and self-peer validity correlations also demonstrated that conscientiousness was one of the items which best represented in a two-item version (Rammstedt & John, 2007).

The second highest individual item mean goes to item 2 “Generally I see myself as someone who is trusting” \((M=4.09, SD=0.785)\), under the factor of agreeableness. Once again,
there are many possible reasons for such a high value. Teachers generally are required to act *in loco parentis*, meaning that students are the legal responsibility of teachers during school time. Teaching requires professionals who are trusting, and once again a bias may exist within this population of preservice teachers. If admitted to a professional teacher education program, a level of trust and responsibility is required on part of the preservice teacher. Interestingly, the negatively phrased item for this pair is item 7, “Generally I see myself as someone who tends to find fault with others” which received the second lowest individual item rating. This is to say that item 7 was rated as the second highest item preservice teachers disagreed with. Together these items do depict a strong case for a high degree of this factor.

Given the contextual importance of agreeableness it is surprising that this factor was not rated as the highest mean. A possible explanation is found when looking at Rammstedt and John (2007). When the BFI-10 was tested against the BFI-44, the whole part correlations were among the lowest, as well as convergent validity, and generalizability. It is even recommended by the researchers that an additional item is added to the BFI-10 to compliment this factor: “Generally I see myself as someone who is considerate and kind to almost everyone”.

Neuroticism is the lowest scoring at the group level (\(M=3.04, SD=1.05\)), and also is the only negative item with a strongly positive mean with a negative skewedness, item 9: “Generally, I see myself as someone who gets nervous easily” (\(M=3.22, SD=1.11, \text{Skew}=-.276\)). Preservice teachers in this population overall agreed with the statement, causing both a high level mean also showing a light negative skew. Neuroticism showing stronger results is notable for this study, as this trait is associated with negative emotionality, and feelings of anxiety, nervousness, and even sadness (John & Srivastava, 1999).
Exploratory factor analysis of personality in preservice teachers. The results of this exploratory factor analysis demonstrated that there was no coherent factor structure in personality for this study. Even after additional rotations, item removals and combinations were attempted, no clear factor structure emerged. This is surprising as the existing work by Rammestedt & John (2007), used a similar sample of undergraduate students from an American University as well as undergraduate students from a German University. The reasons for an incoherent factor structure remain unclear and the data collected within this study do not directly lead to any particular evidence that may explain this.

Examining the existing literature does provide a few technical explanations. In the where the BFI-10 was first used, Rammestedt and John (2007) caution the use of this scale due to its brevity. Its succinct and timely two item per factor ratio, is encouraged for use where the BFI-44, a longer scale which the BFI-10 was created from, cannot be used. The BFI-10 can be problematic as it may provide too few items to construct clear factor structures. Crede, Harms, Neihorster and Gaye-Valentine (2012) caution directly against short measures which use one or two items per factor. They warn that short measures lead researchers to increase the likeliness of Type 1 and Type 2 errors rates, as well as underestimate the profound role of this traits in human behaviour. Recommendations for future work are discussed in the final subchapter.

Despite these warnings against using the BFI-10, there is good evidence to continue using the data it produces. Barrick and Mount (1991) recommend researchers should construct the composite scores in the same way they have been combined here. As combining of all the items measuring a dimension into a composite provides increased validity of personality dimensions. Additionally, in the meta-review by Porapat (2009) which investigated the relationship between personality and academic performance, their review of existing literature did not mention
selection criteria that included a clear five factor model, with adequate loadings in the participating studies. Only consideration was given to the magnitude and quality of the correlations between variables themselves.

**Performance**

**Descriptive statistics for GPA on campus and practicum assessments.** The first two performance items were negatively skewed, with right sided distributions into higher grades during on campus and practicum work. Herein lies a potential ceiling effect. For the first item, “What is the GPA of all of your on-campus coursework”, there was no individuals reporting marks below a 60%, the vast majority of the candidates reported their marks to be in the A or A+ range. A similar distribution is represented in the second performance item, with over 90% meeting and exceeding expectations for practicum.

There is an important consideration when assuming that the grades reported here are accurate representations of the grades that preservice teachers are receiving. The review by Falchikov and Boud (1989) demonstrated that in populations of students within higher education, self-assessments tended to be more accurate representations of their grades than students in earlier years of their education. If this the case, then there is an incredible bias being represented within these preservice teachers. There are students in every professional university program that struggle in both coursework and in practice. It is possible, that this sample hasn’t fully captured this population. Implications for this finding are discussed in the final subchapter, future research.

There are two additional considerations to be made when investigating the skew of high grades. There is a possibility that this particular teacher education program has a strong positive skew. This would mean that if the entire population was sampled, we would continually find the
results presented here, As and A+s. This possibility brings about larger considerations on the
performance, variance and potential validity of teacher education programming.

The last consideration to be made here is that it is possible preservice teachers are
inflating their own self-assessments and reducing the validity of this measure due to
inexperience. There is a critical piece of evidence to consider here. First, preservice teachers who
participated in this study were made up largely of a cohort who had just begun their teacher
education (N=106 of the 2019 cohort, N=33 of the 2018 cohort). These preservice teachers who
are part of the 2019 cohort have very limited experience in the classroom as a teacher, with
several practicums incomplete, and very little, if any, completed coursework. The 2018 cohort
may have more experience as a classroom teacher, but as the demographic data suggested, this
population has a low average for years of teaching related experience (M=2.81).

Descriptive statistics for teacher proficiency and preparedness. The latter two
performance items were self-evaluations: “I feel like I am a good teacher” and “I feel prepared
to teach”. These items attained skewedness which was lower than the previous two performance
items (Item 1 = -1.065, Item 2 = -.994, Item 3 = -.506, Item 4 = -.383). It is possible that these
items, being less dependent on actual grades, attained responses that more accurately reflect
actual performance. Whether the responses here are a true reflection of performance or not, it is a
point of interest for potential future work that may investigate the performance metric.

The fact that these teachers, being engaged and performing well during their teacher
education programming still do not feel entirely prepared to teach, or strongly agree that they are
good teachers represents an area for further research. There is no current evidence available here
to provide rationale for this response, as the current questionnaire used did not ask participants to
provide a reason or explanation for their self-assessment. Future work should explore different methodologies for attaining performance data, recommendations are made in the final chapter.

5.2 Research Question 3: Relationships Among Variables

The third research question this study set out to answer: “What are the relationships among resiliency, engagement, personality, and performance of preservice teachers on campus and in practicum as well as their teaching confidence and preparedness?” In sum, there was no relationship directly between the variables of resilience and engagement in this present study. However, each of these two variables were found to be correlated with multiple personality factors. The following section will explore both resilience and engagement as they relate to the various personality factors.

Resilience, Engagement and Personality - Correlation

Resilience, a complex interaction with personality. The correlation between resilience and personality variables is perhaps the most complex finding in this study. Resilience was found to be strongly correlated with neuroticism, and weakly correlated with extraversion and agreeableness. As individuals reported themselves to be more resilient, they also reported neuroticism, extraversion and agreeableness.

Referring back to the study by Perera et al., (2018), which employed a person-centered approach to investigating personality, a similar personality composite is found. This composite provides some insight to the results found here. In the four profiles proposed in this study, the “excitable profile” consisted of high neuroticism and extraversion as well as openness and agreeableness. As Perera et al., (2018) found, this “excitable” profile was high energy, outgoing, and impulse, leading this particular group of teachers to overcommit to many activities. In their study, this particular group was suspected to lack discipline, organization and conscientious
nature to follow through. It is possible that a similar composite personality structure was found here within this correlation. Though the scope of the current study was not to form a second tier of personality composites, the findings here were made substantially clearer when the framework discussed in Perera et al. (2018) is applied.

**Engagement correlations with personality.** Engagement was correlated with conscientiousness, extraversion, agreeableness, and openness but not with neuroticism. As individuals reported themselves to be increasingly engaged, they also reported to be increasingly conscientious, extraverted, agreeable and open. In the current study, the highly engaged preservice teacher was the one who is exhibited the qualities that John and Srivastava (1999) described as outgoing, dutiful, trusting, thorough, and artistic. Indeed, this group demonstrates some of the most crucial, qualities sought out in teachers.

Interestingly, Perera et al. (2018), investigated the results of a Big Five questionnaire and the ETS, among other variables. The results found in this present study for engagement and personality traits reflected a strong similarly to the composite group of “well adjusted” in the study by Perera et al. (2018). In their study, this “well adjusted” personality composite group also showed strong levels of student, cognitive and emotional engagement, consistent with this present work. What is surprising for the current study though, is why there was no correlation found with resilience and engagement. Perera et al., (2018) noted that in a group of teachers who demonstrated positive efficacy, engagement and satisfaction in teaching, they should also be persevering to reach their goals.

This single factor that stood out and was strongly correlated with the resilient teachers but not correlated with the engaged teachers was neuroticism. At this point, there is no explanation
for the potential causes of this interaction based on the survey results, but further work could explore how neuroticism may play a role in engagement and resilience of preservice teachers.

**Performance with Resilience, Engagement and Personality - Correlation and Regression**

In this last section, the relationships among all variables in the questionnaire are explored. Each performance variable is examined, with all correlations and regressions explained in order to fully address the third research question.

**On-campus GPA.** The first item of the performance section of the questionnaire asked participants to self-report their GPA in the teacher education program during the on-campus portion at their host university “During all of your on-campus time, what is the GPA of all your coursework?”. It was not possible in this current study to obtain marks from the registrar for research use in the statistical analyses, therefore this self-assessment was used. Using self-assessments is a less direct way of obtaining grades, however, previous research demonstrated that self-assessed grades can be appropriate and reliable reflections of actual grades in higher education (Kuncel et al., 2005), especially in a professional program.

In the correlation analyses this performance item was found to be correlated with conscientiousness and extraversion. Those who reported to perform well academically those were reported to be conscientious and extraverted.

Conscientiousness has been described as dependability and will to achieve (Poropat et al., 2009), as well as disciplined and thorough (John & Srivastava, 1999), traits that are conducive to success in an academic setting. The result of conscientiousness being correlated with high levels of academic performance is not a new finding as it has been found throughout the existing research that conscientiousness is strongly related with positive academic performance (Poropat
et al., 2009). This is a finding that is represented through all levels of education from primary education all the way up to post-secondary.

There may be a contextual importance as to why extraversion is found to be correlated here with academic performance. When considering academics, extraversion has typically been associated with higher levels of academic performance early on in primary education. It is thought that the increased visibility from students with higher activity levels increases student visibility, thus increasing perceived grades (Poropat et al., 2009). However, as addressed in their review, this effect diminishes as students move into higher education (Poropat et al., 2009). It is possible that this correlation is evident due to the nature of teacher education. Many teacher education programs strive to model teacher professionalism and pedagogical practice that emulates that which exists in a classroom. With 57.9% (N=81) of the current sample as primary junior education preservice teachers, the capacity of extraversion to be related to strong performance may be related in this sample as it does in primary education student populations.

The regression analyses for this item found conscientiousness and extraversion to predict academic performance. Resilience, engagement and other personality factors did not predict academic performance in this study. This finding is interesting as it demonstrates that resilience did not have any effect on academic performance. Resilience defined as the ability to bounce back after stress and adversity, in concept, is related to the ongoing, formative nature that education should have on preservice teachers. It is possible that the scale used here is not sensitive enough or lacks enough items to provide a reliable score to demonstrate this relationship. Further research in this relationship is recommended. The results for engagement also showed that in all the performance items, this was the only item that engagement was not related to, and one of the few items it did not predict. This will be discussed later in this chapter.
Practicum performance. The second performance item asked participants to assess themselves during their practicum placements “During the practicum portion of your teacher education please rate your own performance”. The responses for this item were designed to emulate the exact rubric to which candidates would be graded on, a four-point scale ranging from “Does not meet expectations” to “Exceeds expectations”. This question required candidates to reflect on their own experience in the classroom and consider the grades they received. As previously mentioned, this self-assessment is indeed a reliable form of attaining grades (Kuncel et al., 2005).

Correlation and standard regression analyses were conducted. Practicum performance was related to engagement, conscientiousness and extraversion. Engagement, described by Macey and Schneider (2008) as absorption and passion in one’s work, is fitting to see it correlated with performance in practicum. As preservice teachers in this sample are increasingly engaged in teaching their performance in practicum is also increased. As aforementioned in the factor analysis, four items were removed from all future analyses using engagement, all four of these items were related to the social engagement with colleagues. Therefore, the correlation seen here with performance in practicum is a representation of what authors Klassen et al. (2013) determined to be an engagement with students as well as an emotional, cognitive engagement in teaching.

The correlation that practicum performance maintained with personality, were within conscientiousness and extraversion. These two personality components were also found to be correlated and predicted the previous performance item on-campus GPA. Given the contextual importance of these two personality factors as discussed previously there is also merit in considering that these two items may be best represented in this personality scale, as practicum
performance would hopefully be also correlated with agreeableness and openness, two other personality factors are encompassed by qualities of trustworthiness, creativity, collaboration with others (John and Srivastava, 1999).

Standard regression for practicum performance was predicted by conscientiousness. There were no significant findings for any of the other variables in the regression analyses for this question. The finding that conscientiousness predicted both components of academic performance is consistent with findings in previous research (Poropat, 2009).

**Good Teacher.** The third performance item was a self-evaluation “*Generally speaking, I feel like I am a good teacher*”. Where performance items 1 and 2 asked participants to provide their grades as assessed by either the university faculty or associate teacher at practicum school, this question was designed to have preservice teachers assess themselves. The correlations were found to be with engagement, conscientiousness and extraversion, similar to practicum performance and partially similar to GPA on campus less the engagement. As preservice teachers evaluated their own proficiency as teachers to be higher, they also tended to respond with higher reports of engagement, conscientiousness and extraversion. Given the similarities with the previous question, there is some significance to be noted within these three measured variables and the performance of preservice teachers.

Furthermore, the standard regression analysis on this item found that both engagement and extraversion predicted higher levels of this self-evaluation. Higher levels of both engagement and extraversion in these preservice teachers predicted higher levels of evaluating themselves as proficient teachers.

**Prepared and non-resilient teacher.** The fourth performance item was also a self-evaluation, “*I feel prepared to begin my career as a teacher.*” This performance self-evaluation
was designed to gather data for participant outlook on their future performance. Correlation analyses demonstrated that preparedness to teach was correlated with engagement, conscientiousness, extraversion and neuroticism. As preservice teachers were increasingly self-evaluating themselves as prepared they were increasingly engaged, conscientious, extraverted and neurotic. The presence of engagement, conscientiousness and extraversion in this correlation is unsurprising given prior results, however, what is surprising is that neuroticism is also included in this correlation. As previously noted, Neuroticism, or emotional stability, is captured in an individual’s impulsivity and anxiety. As performance measure of preparedness to teach increases, as does neuroticism. Neuroticism is typically associated with anxiety and a lack of confidence (John & Srivastava, 1999). It is possible, as the preservice teacher is increasingly insecure with planning and neurotic, their preparation provides a sense of increased preparedness.

The regression analyses for this final item demonstrated two important findings. Firstly, neuroticism positively predicted preparedness to teach, in line with the previous theory. Secondly, more surprisingly, resilience was found to have no correlation with any of the performance variables in this study, yet it appeared here in item 4: resilience negatively predicts preparedness to teach. Preparedness to teach can be negatively predicted by resilience. As an individual is increasingly non-resilient according the BRS, the self-evaluation of preparedness to teach increases.

Three possibilities exist, (1) the BRS was misinterpreted by the current sample, (2) performance item 4 was misinterpreted by the sample and (3) the relationship that we see here uncovers a deeper and more complex interaction that the statistical methods employed were not able to detect.
In the first possibility, misinterpretation in the BRS, respondents may have been providing a contextualize resilience, in life either before or after they assumed the role as a preservice teacher. It is likely that this population simply does not have enough teaching or work-life experience to self-evaluate resilience outside of the academic environment.

In the second possibility, performance item 4 misinterpretation, this population may not have an adequate representation or conceptualization of what it means to be a teacher, yet alone the duties in preparing to teach. As discussed, there was a large majority of preservice teachers in this study who were just beginning their teacher education program, and many of these respondents also had limited experience in teaching. Thus, it is possible that item 4, may be out of reach for many of these teachers and the validity of this item is in question. In all three possibilities, further research is required to order to address this result.

Consideration of the results for resilience, engagement, personality and performance, as well as the implications for teacher education must be discussed. In regards to resilience, as Mansfield et al. (2015) discusses “At one level, resilience related skills and strategies can be viewed as an essential component of developing teacher competence….” (pp. 79). The nature of teacher education presents an increased level of psychological stress in the career of an educator. The existing challenges of university education coupled with new practicum experiences as preservice teachers begin to actualize and assume the role of everyday teaching mixes together to present especially challenging times. This blend of experiences only increases the need for resilience in teacher education. Mansfield et al. (2015) also notes that a conceptual framework for building resilience focuses on the themes of relationships, wellbeing, motivation, and emotions. Given the findings of this study, attention to teacher education curriculum planners can be made to stress the importance of resilience-based education in the programming of
teacher education. In consideration of engagement and personality, the results are mixed. Engagement data here present a profile of preservice teachers who are demonstrating high levels of this state. Given the correlation and regression findings, it is suggested that the role that teacher engagement plays in the success of preservice teachers is large. In personality, similar considerations can be made for conscientiousness and extraversion, however, the main difference is that there is less confidence in expressing these results as the factor analysis was not conclusive in determining clear factor scores for both conscientiousness and extraversion. Thus, university faculty and staff working with preservice teachers should continue to dedicate resources to seeking out those who maintain high levels of passion and absorption in the profession of education. Similar efforts should be done for fostering skills like organization, commitment, and discipline in efforts to benefit some of the traits seen as crucial here.

5.3 Future Research and Limitations

The present study presented a novel use of a questionnaire on preservice teachers to measure four variables. At the time of writing, there has not been a similar attempt to investigate resilience, engagement, personality and performance, all at once, within preservice teachers in Canada. This study set out to provide a deeper understanding of how resilience, engagement and personality present themselves in preservice teachers, how they are related, and what the results say about preservice teacher education. Despite the strength of the study, limitations arose which are discussed in the following section.

Being engaged, a balance is needed. The resilience and personality sections of the questionnaire used here both had a balance of positively worded and negatively worded items. Engagement, however, was entirely positively phrased. The mean for engagement was high, so future studies using the ETS should consider changing this tool to include some negatively worded items.
phrased items. In doing so, it is possible that the responses may have a wider distribution, lower kurtosis and reduced skew.

**Personality BFI-10 and a failed factor structure.** As discussed, the BFI-10 is a short, valid and effective measure for gathering psychometric data when time is limited (Rammstedt & John, 2007). However, there are multiple risks in using such a short scale. An item to factor ratio used here is low. It is recommended that “models with factors that have only two indicators [items] are more prone to estimation problems especially when sample size is small” (Kline, 2005) as was in this current study of 139 preservice teachers. Additionally, any factor with fewer than three items is generally recognized as weak and unstable (Crede et al. 2012). It is required that 5 items or more with loadings of .50 or higher is most desirable for strong factors (Osborne & Costello, 2009). Future work using the BFI-10 should proceed with caution especially in small sample sizes. Given the lack of a strong factor structure, future use of the BFI-10 is strongly cautioned and instead a more robust model could be considered, like the BFI-44 is recommended instead.

**Demographic response data, years of missed opportunities.** In this study, asking preservice teachers how many years of teaching experience and work experience they had prior to enrolling in a teacher education program was problematic. Without an option to select a numeric prompt, many teachers provided a text-based response. The insights gained from asking this question provided rich data. However, any responses with non-numerical values were substituted by mean replacement or assigned to the closest value. This process, though effective in an attempt to clean the data, degrades the validity of these responses.

It was within the task of cleaning the data that some of the richest most valuable data was lost. In examining the responses provided, many participants alluded to teaching experiences
such as parenting, swimming lessons, and piano lessons, all of which exist outside the realm of certified teaching. Other candidates mentioned teaching experience in kitchens, on-job sites and in kindergarten classrooms as an early childhood educator. It is because of the mixed responses provided in this question that a qualitative research design for future research is strongly encouraged.

**Timing and logistics, long term considerations.** There are limitations in the timing of this study. The questionnaire used in this study was conducted at a single time point, collected over a two-week period. This single time point provided data across two cohorts to provide information for the beginning and end of a teacher education program. Due to limitations in the short project window as a master’s thesis, it was not possible to track preservice teachers through their year in teacher education. The results here are limited to only provide information for this small slice of what is a long profession as an educator. Future work should consider multiple time points in a longitudinal design as to investigate the variables studied here, most notably resilience and engagement which are known to be dynamic and change over time (Klassen et al., 2007; Smith et al., 2008).

As mentioned in the challenges encountered for demographic data sampling, a call to researchers to employ a qualitative research design is once again appropriate. Investigating these variables over longer time spans in a mixed methods or qualitative research design may provide some evidence and richer intricate detail of how transitions through the career of a teacher may shape and influence the variables studied here, or vice versa.

**Qualitative models and a missed sample.** The performance items 1 and 2 demonstrate that this questionnaire captured data from a high performing preservice teacher population. Though it is possible that a response bias is in effect here. Engagement data also showed a
ceiling effect for those who responded. The participants were all highly engaged in the teaching profession. This participant bias is important to note, when considering that only 27% percent of the entire population was sampled. There was 73% percent of the teacher candidate population that did not respond to the invitation to participate. There are populations of teacher candidates who struggle throughout any university program, and this questionnaire does not capture this group.

It is possible that the use of a survey lacks the component of human interaction, which is, after all, at the core of the teaching profession. Again, future research should explore other data collection models including a qualitative or mixed method designs. Interview or focus groups are excellent first steps that may collect richer data for many of the investigated variables here.

5.4 Conclusion

Resilience, the ability to bounce back from adversity and stress is important (Smith et al., 2008). It is a quality that has an intricate link with teacher attrition, burnout, and the longevity of a teaching career; and is especially important as educators begin their careers with teacher education (Mansfield et al. 2015). The single factor model found here demonstrates consistent findings with those found in previous work (Smith et al. 2008) and the descriptive statistics shows resilience mean at 3.22 (out of 5) in this sample of preservice teachers. Further research is needed to understand the findings presented here, as there is no clear evidence to explain why resilience related so strongly to neuroticism and did not relate to engagement or any of the performance variables as demonstrated in this present study.

Engagement, known to be the state of passion and absorption in one’s work (Macey & Schneider, 2008), was extracted as a single factor while using the ETS in this study. This is inconsistent with Klassen et al. (2013) who conceived the ETS in a 4-factor model. Engagement
was found to be overall strong in this study with a very high mean. Examining some of the items on the ETS scale with the highest means provides deeper context to the sample of preservice teachers in this study, with the heaviest loading items to be: “I feel happy with teaching” and “I love teaching”.

Engagement correlated with several variables in this study. The four positive factors in personality were all strongly correlated with engagement, and reference to (Perera et al., 2018) helps to contextualize what this relationship means. Engagement was also significantly correlated to several performance metrics including the GPA during practicum, self-assessment “I am a good teacher”, and “I feel prepared to teach”. Engagement was not correlated to the GPA during on-campus time. Of the four performance items, the three items that are directly related to the practice of teaching are the three variables that engagement was correlated to.

The use of the BFI-10 was found to produce an incoherent personality factor structure inconsistent with previous research (Rammstedt & John, 2007), and the author of this present study cautions future researchers against using scales with item to factor ratios any lower than 3 to 1. However, future use of the Big Five factor model in investigating personality traits is encouraged, as measurable significant and consistent results were found in the present study. Conscientiousness and extraversion playing a key role in predicting performance; agreeableness and openness maintaining a limited and absent role; and neuroticism with a peculiar and intriguing role found here.

Given the results presented for this study, those involved in the planning, training, preparation and hiring of future teachers should be cautious to directly apply the results found in this study. The questionnaire provided to this small sample of preservice teachers acts as a small window in understanding the resilience, engagement, personality and performance of preservice
teachers. Though the results are limited, this study adds to the existing knowledge in the areas of resilience, engagement, personality and performance of preservice teachers.

It is clear that engagement, conscientiousness, and extraversion play an important role in interacting with the measures of performance in preservice teachers. Engaged teachers are known to be generally more effective (Bakker & Bal, 2010), and seeing such strong engagement results in this population is a positive finding to those in training and hiring. The same goes for those high in conscientiousness and extraversion, as these have been found, study after study, as positive traits linked with positive life outcomes (Komarraju et al. 2008; Noftle & Robins, 2007; Poropat, 2009).

The larger implications and concerns for the findings of this study are within resilience, and those who did not respond to the survey. It is troubling to consider that resilience was moderate in this population as it has been found to play a critical role in preservice teachers and attrition in other studies (Howard and Johnson, 2004). Additionally, it is visible within the responses of this sample, notable the performance responses, that the highest performing group of preservice teachers had participated. As previously mentioned, due to the nature of survey study with voluntary participation, it is suspected that there are teachers who require much more support and are not represented here. More work needs to be done to capture the responses of the groups who are most difficult to reach in order to better understand these variables and their relationships.

Preservice teaching is a formative time in the lives of future educators. At the current time of writing, the landscape of teacher employment in Ontario is uncertain, and teachers need to maintain strength in their dispositions if they are to see through to their education related career goals. The importance of teachers being engaged in their work, staying disciplined and
working well with others is crucial as preservice teachers will eventually become the individuals who are directly involved in shaping and educating future generations.
References


and resilience. *Educational Psychology*, 1-20.


http://doi.org/10.17226/13398


Appendix A: Questionnaire

Exploring Relationships Among Resilience, Engagement, Personality, and Performance in Teacher Education

The purpose of this survey study examines resiliency in pre-service teachers, and to what extent are engagement, personality, and performance in class and practicum associated with resiliency in preservice teachers. This survey has 5 parts and will take you about 10 minutes of your time. Please answer as truthfully as possible. There is no right or wrong answers.

Part One:
Use the following scale and circle one number for each statement to indicate how much you disagree or agree with each of the statements:

1 = Strongly Disagree  2 = Disagree  3 = Neutral  4 = Agree  5 = Strongly Agree

1. I tend to bounce back quickly after hard times
2. I have a hard time making it through stressful events
3. It does not take me long to recover from a stressful event
4. It is hard for me to snap back when something bad happens
5. I usually come through difficult times with little trouble
6. I tend to take a long time to get over set-backs in my life

Part Two:
Use the following scale and circle one number for each statement to indicate how much you disagree or agree with each of the statements:

1 = Strongly Disagree  2 = Disagree  3 = Neutral  4 = Agree  5 = Strongly Agree

1. At school, I connect well with my colleagues
2. I am excited about teaching
3. In class, I show warmth to my students
4. I try my hardest to perform well while teaching
5. I feel happy while teaching
6. In class, I am aware of my students’ feelings
7. At school, I am committed to helping my colleagues
8. While teaching, I really throw myself into my work
9. At school, I value the relationships I build with my colleagues
10. I love teaching
11. While teaching I pay a lot of attention to my work
12. At school, I care about the problems of my colleagues
13. I find teaching fun
14. In class, I care about the problems of my students
15. While teaching, I work with intensity
16. In class, I am empathetic towards my students

Part Three:
Use the following scale and circle one number for each statement to indicate how much you disagree or agree with each of the statements:

1 = Strongly Disagree  2 = Disagree  3 = Neutral  4 = Agree  5 = Strongly Agree

I see myself as someone who...

1. …is reserved
2. …is generally trusting
3. …tends to be lazy
4. …is relaxed, handles stress well
5. …has few artistic interests 1 2 3 4 5
6. …is outgoing, sociable 1 2 3 4 5
7. …tends to find fault with others 1 2 3 4 5
8. … does a thorough job 1 2 3 4 5
9. …gets nervous easily 1 2 3 4 5
10. …has an active imagination 1 2 3 4 5

Part Four:
Please complete the following sections:

1. During all of your on-campus time, what is the GPA of all your coursework.

<table>
<thead>
<tr>
<th>F (0-49)</th>
<th>D (50-59)</th>
<th>C (60-69)</th>
<th>B (70-79)</th>
<th>A (80-89)</th>
<th>A+ (90-100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
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</table>

2. During the practicum portion of your teacher education please rate your own performance

<table>
<thead>
<tr>
<th>I = Does Not Meet Expectations</th>
<th>2 = Progressing Towards Expectations</th>
<th>3 = Meets Expectations</th>
<th>4 = Exceeds Expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
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<td>[ ]</td>
</tr>
</tbody>
</table>

3. Generally Speaking, I feel like I am a good teacher

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
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</tbody>
</table>

4. I feel prepared to begin my career as a teacher.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
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Part Five:
Please circle one number for each statement.


2. How many years of teaching experience do you have? 

3. Are you in P/J or I/S? (circle one) P/J I/S

4. I/S ONLY Write your teachable: 

5. When are you scheduled to finish this program? (circle one) July/Aug 2018 July/Aug 2019 Other
Appendix B: Ethics Clearance Letter

July 06, 2018

Mr. Christopher Suppa
Master's Student
Facility of Education
Queen's University
Duncan McArthur Hall
511 Union Street West
Kingston, ON, K7M 5R7

GREB Ref #: GEDUC-904-18; TRAQ # 6024143
Title: "GEDUC-904-18 Exploring Relationships Among Resilience, Engagement, Personality, and Performance in Teacher Education"

Dear Mr. Suppa,

The General Research Ethics Board (GREB), by means of a delegated board review, has cleared your proposal entitled "GEDUC-904-18 Exploring Relationships Among Resilience, Engagement, Personality, and Performance in Teacher Education" for ethical compliance with the Tri-Council Guidelines (TCPS 2 (2014)) and Queen's ethics policies. In accordance with the Tri-Council Guidelines (Article 6.14) and Standard Operating Procedures (405.001), your project has been cleared for one year. You are reminded of your obligation to submit an annual renewal form prior to the annual renewal due date (access this form at [http://www.queensu.ca/traq/signon.html](http://www.queensu.ca/traq/signon.html) click on "Events," under "Create New Event" click on "General Research Ethics Board Annual Renewal/Closure Form for Cleared Studies"). Please note that when your research project is completed, you need to submit an Annual Renewal/Closure Form in Remeo/traq indicating that the project is 'completed' so that the file can be closed. This should be submitted at the time of completion; there is no need to wait until the annual renewal due date.

You are reminded of your obligation to advise the GREB of any adverse event(s) that occur during this one-year period (access this form at [http://www.queensu.ca/traq/signon.html](http://www.queensu.ca/traq/signon.html) click on "Events;" under "Create New Event" click on "General Research Ethics Board Adverse Event Form"). An adverse event includes, but is not limited to, a complaint, a change or unexpected event that alters the level of risk for the researcher or participants or situation that requires a substantial change in approach to a participant(s). You are also advised that all adverse events must be reported to the GREB within 48 hours.

You are also reminded that all changes that might affect human participants must be cleared by the GREB. For example, you must report changes to the level of risk, participant characteristics, and implementation of new procedures. To submit an amendment form, access the application by at [http://www.queensu.ca/traq/signon.html](http://www.queensu.ca/traq/signon.html) click on "Events;" under "Create New Event" click on "General Research Ethics Board Request for the Amendment of Approved Studies." Once submitted, these changes will automatically be sent to the Ethics Coordinator, Ms. Gail Irving, at University Research Services for further review and clearance by the GREB or Chair, GREB.

On behalf of the General Research Ethics Board, I wish you continued success in your research.

Sincerely,

Dean Tripp, Ph.D.
Chair
General Research Ethics Board

cc: Dr. Liying Cheng, Supervisor
Dr. Richard Reeve, Chair, Unit REB
Mrs. Erin Rennie, Dept. Admin.
Appendix C: Letter of Information and Consent Form

Exploring Relationships Among Resilience, Engagement, Personality, and Performance in Teacher Education

You are invited to participate in a research study being conducted by Christopher Suppa (Master of Education, Candidate) under the supervision of Dr. Liying Cheng, in the Faculty of Education at Queen’s University in Kingston, Ontario. This study has been granted clearance by the General Research Ethics Board according to Canadian research ethics principles (http://www.ethics.gc.ca/default.aspx) and Queen’s University policies (http://www.queensu.ca/urs/research-ethics).

What is this study about? This study aims to investigate the resilience of preservice teachers at a Faculty of Education in a university in eastern Ontario. The purpose of this quantitative study aims to examine resiliency in preservice teachers, and to what extent are engagement, personality, and performance in class and practicum associated with resiliency in preservice teachers.

What is involved to participate in this study? You will be required to complete a questionnaire that collects responses on (a) a resilience scale, (b) a teacher engagement scale, (c) a personality trait scale, (d) self-reported performance in class and practicum, and (e) your demographic information.

The entire data collection procedure will be carried out during your class time with a paper questionnaire. In total, you will require approximately 10-15 minutes maximum to complete this questionnaire. There are no known physical, psychological, economic, or social risks associated with this study. However, minimal psychological risk might exist in this study. It is possible that you might feel upset while reporting your resilience, engagement, personality or performance. In that case, a list of your local counselling resources would be provided so that you could receive help if applicable.

Although you may not directly benefit from taking part in this research study, information from this study will contribute to our understanding of resilience in preservice teachers to what extent are engagement, personality, and performance in class and practicum associated with resiliency in preservice teachers.

Is participation voluntary? Yes. You should not feel obliged to answer any questions that you find objectionable or that make you feel uncomfortable. You may choose to withdraw from the study by returning the questionnaire completely blank. If you withdraw, you may request removal of all or part of your data from the study, indicating this on the bottom of the second page.

What will happen to your responses? Your responses will be kept confidential. Only Christopher Suppa will have access to this information. Your confidentiality will be maintained to the highest extent possible. None of the data will contain your name. To protect your identity, an arbitrary identity code will be assigned to your data on all data files. Results from this study may be published in professional journals or presented at scientific conferences, but any such presentations will maintain individual confidentiality. In accordance with the General Research Ethics Board Standard Operating Procedures, all electronic data will be securely/password protected for a minimum of five years or beyond. Data will be archived or destroyed after five years depending on if data will be used for secondary analysis. In which case they will contain no identifying information. You are entitled to a copy of the findings, if you are interested. If you would like a copy of the findings, please fill out the available form or contact Christopher Suppa at 15cs39@queensu.ca

Will you be compensated for your participation? No, there is no compensation for your participation. Rest assured that your participation will assist in the completion of this study, and results will support future teacher education.

What if you have concerns? Any questions about study participation may be directed to Christopher Suppa at 15cs39@queensu.ca. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or 613-533-6081.

Thank you for your interest in participating in this research study.
Exploring Relationships Among Resilience, Engagement, Personality, and Performance in Teacher Education

Name (please print clearly): ________________________________

1. I have read the Letter of Information and have had any questions answered to my satisfaction.

2. I understand that I will be participating in the study called <Exploring Relationships Among Resilience, Engagement, Personality, and Performance in Teacher Education>. I understand that this means that I will be asked to complete a questionnaire on my demographic information, responses on resilience, engagement and personality surveys, and my academic and practicum grades and performance.

3. I understand that my participation in this study is voluntary and I may withdraw at any time. I understand that every effort will be made to maintain the confidentiality of the data now and in the future. Only researchers affiliated with this study will have access to my data. The data may also be published in professional journals or presented at scientific conferences, but any such presentations will be of general findings and will never breach individual confidentiality. I understand that I am entitled to a copy of the findings, if I am interested.

4. I am aware that if I have any questions, concerns, or complaints, I may contact Christopher Suppa at 15cs39@queensu.ca. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or 613-533-6081.

I have read the above statements and freely consent to participate in this research:

Signature: _____________________________________

Date: ________________________________
Appendix D: Supplementary Performance Documents

On campus performance was based on the following outline:

**Course Evaluation/Grading Policy**

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Grade Point</th>
<th>Descriptor</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>4.3</td>
<td>Outstanding</td>
<td>90-100</td>
</tr>
<tr>
<td>A</td>
<td>4.0</td>
<td>Excellent</td>
<td>80-89</td>
</tr>
<tr>
<td>B</td>
<td>3.0</td>
<td>Very Good</td>
<td>70-79</td>
</tr>
<tr>
<td>C</td>
<td>2.0</td>
<td>Adequate</td>
<td>60-69</td>
</tr>
<tr>
<td>D</td>
<td>1.0</td>
<td>Marginal</td>
<td>50-59</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
<td>Unsatisfactory/Failure</td>
<td>0-49</td>
</tr>
<tr>
<td>P</td>
<td></td>
<td>Pass; no grade assigned. Reserved for Practica courses only or as approved by the Dean</td>
<td></td>
</tr>
</tbody>
</table>

Practicum performance was determined by the following assessment document (p. 31-34)