MIND YOUR BEDSIDE MANNERS:
THE EFFECT OF TEAM-BASED LEARNING
ON THE EMOTIONAL INTELLIGENCE
OF PHYSICIAN ASSISTANT STUDIES STUDENTS

A doctoral thesis presented
by

Emile R. “Mike” Boutin, Jr.

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Abstract

Emotional Intelligence (EI) has been recognized as a critical skill to success in healthcare and its focus on patient-centered care. The ability to listen attentively to a patient, to empathize with a patient’s pain, and to be aware of one’s own feelings and biases makes the difference between a competent healthcare provider and a truly good one. To train future healthcare providers more effectively in these various soft skills, healthcare education has increasingly moved towards a team-based learning model (TBL) because of its approach to promoting teamwork, interpersonal communication, and critical thinking. This quantitative, pretest-posttest, non-equivalent group design studied the effects of TBL on the trait emotional intelligence, emotional regulation, stress management, and empathy of first-year physician assistant studies students in two graduate schools in the Northeast, one of which was taught exclusively using TBL, and the other of which used a traditional lecture format. Participants took the Trait Emotional Intelligence Questionnaire (TEIQue) online, followed by eight weeks of either TBL or lecture-based classes, then participants took the assessment again. Mixed model ANOVA was conducted to analyze pretest to posttest scores, along with the possible effects of age, ethnicity/race, and gender. Analysis revealed a statistically significant decrease in global trait emotional intelligence scores of lecture-based students as compared to TBL-based students, but no significant differences were found in emotional regulation, stress management, or empathy. Covariates of age, ethnicity/race, and gender had no significant effect on the results. These findings suggest that TBL may be useful in developing emotionally intelligent healthcare providers. Future research should consider a longer study that would examine the effects of TBL over the course of a student’s PA education and into their first year of practice.

Keywords: trait emotional intelligence, emotional regulation, stress management, empathy, TEIQue, team-based learning, healthcare education, physician assistant studies
Dedication

“When they shall die,
Take them and cut them out in little stars,
And they will make the face of heaven so fine
That all the world will be in love with night,
And pay no worship to the garish sun.”

-Adapted from William Shakespeare,

*Romeo and Juliet, III.2*

To Papi, Pépère, Mémère, Dad, and Dave:

thank you for being the stars in my life and for sharing your light with me.

Á la prochaine…
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In The Return of the Prodigal Son: A Story of Homecoming (Nouwen, 1994), Henri Nouwen—Catholic priest, teacher, and philosopher—wrote: “The discipline of gratitude is the explicit effort to acknowledge that all I am and have is given to me as a gift of love, a gift to be celebrated with joy.” Joyfully, today, I acknowledge all the gifts of knowledge, support, and love which have gotten me to this moment:

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libations to encourage creative thinking and perseverance: thank you for getting me here and to whatever comes next for all of us…together….

- My family, especially my Mom, who is my stalwart support, my favorite cook, my greatest champion, and my best friend: I can’t thank you enough for all you are and have given me

- Rich-my partner in life and in so many journeys along the way: thanks for being my friend and support on another wild ride and my companion on the journey

To all of you: thank you for so many gifts of life and love, faith and hope, friendship and support, and wisdom and strength. Thanks for helping me to get here!
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<tr>
<td>ANOVA</td>
<td>Analysis of variance: a statistical method of analyzing means among groups</td>
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<td>CATME</td>
<td>Comprehensive Assessment of Team Member Effectiveness: in TBL, a web-based anonymous team assessment instrument that promotes teamwork and accountability</td>
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<td>EI</td>
<td>Emotional intelligence</td>
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<td>IFAT</td>
<td>Immediate Feedback Assessment Technique: in TBL, a scratch off quiz card marketed by Epstein Educational Enterprises used in TRAT’s</td>
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<td>IRAT</td>
<td>Individual Readiness Assurance Test: in TBL, a brief quiz to show that the student has done the required prework and mastered the material</td>
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<td>IRB</td>
<td>Institutional Review Board, responsible for ensuring ethical research involving human subjects</td>
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<td>$M$</td>
<td>mean: in statistics, used to calculate the central tendency by adding all the data points and dividing by the number of data points</td>
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<tr>
<td>$N$</td>
<td>number: when capitalized, represents the entire counted population group</td>
</tr>
<tr>
<td>$n$</td>
<td>number: when lower cased, represents a single group in a larger population set</td>
</tr>
<tr>
<td>PA</td>
<td>physician-assistant: a licensed medical professional, under the license of a medical doctor, to provide patient-centered care as part of a healthcare team</td>
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<tr>
<td>$SD$</td>
<td>standard deviation: in statistics, a measure of the spread of data, calculated as the square root of variance</td>
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<tr>
<td>Abbreviation</td>
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<tr>
<td>SPSS</td>
<td>Statistical Package for the Social Sciences, a statistical software package, licensed by IBM, and used for data analysis</td>
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<td>TBL</td>
<td>Team-based learning</td>
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<td>TEIQue</td>
<td>Trait Emotional Intelligence Questionnaire, a 153 item self-assessment of trait emotional intelligence developed by Petrides (2001)</td>
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<td>TRAT</td>
<td>Team Readiness Assurance Test: in TBL, the team version of the IRAT, coded to special scratch off cards.</td>
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Chapter One

The purpose of this quantitative, pretest-posttest, non-equivalent group study was to examine the effects of team-based learning on the trait emotional intelligence of physician assistant studies students at a graduate school of healthcare in New England. A quantitative study which could show that team-based learning does in fact contribute to the development of trait emotional intelligence, and especially to the development of empathy, emotional regulation, and stress management would be a much-needed addition to the corpus of literature about team-based learning.

This chapter begins with a statement of the problem of practice, followed by the significance of the research questions and concomitant hypotheses, and finally, a discussion of the theoretical framework of trait emotional intelligence and how that framework defines the questions and possible answers, along with the methodology and possible conclusions.

Statement of the Problem

In 1995, Daniel Goleman published his seminal work, *Emotional Intelligence*, in which Goleman made the claim that the ability to understand and manage one’s own emotions and those of others is arguably more important to success in life than hard skills or intellect. Although Goleman focused his early work on education, he broadened his perspective to include other emotion-laden fields, like healthcare, claiming that when healthcare leaders are not emotionally intelligent, their patients and their hospitals are adversely affected (Goleman, 2017).

Emotional Intelligence (EI) has been recognized as a critical skill to success in healthcare and its focus on patient-centered care (Wagner, Moseley, Grant, Gore, & Owens, 2002; Weng, 2008). The ability to listen attentively to a patient, to empathize with a patient’s pain or concerns, and to be aware of one’s own feelings and biases makes the difference between a competent healthcare provider and a truly good one (Hammerly, Harmon, & Schweitzberg,
Goleman (1995) made the claim that treating patients without a regard for their feelings no longer can be considered competent or compassionate care.

In 2001, the Institute of Medicine urged healthcare educators to form future healthcare providers who can work effectively in teams, communicate well with others, think critically, and provide safe and compassionate patient care (Michaelsen & Sweet, 2008). To train future healthcare leaders more effectively in these various soft skills, healthcare education is increasingly moving towards a team-based learning model (TBL) because of its approach to promoting teamwork, interpersonal communication, and critical thinking (Parmeelee, 2008).

Team-based learning is a pedagogical approach developed by Larry Michaelsen which focuses on learning in intentional teams utilizing a flipped classroom approach that encourages higher level thinking through application exercises and peer and team evaluations (Michaelsen & Sweet, 2008). The ability for students to interact in small groups, to deal with feedback and difficult conversations, and to learn from and with individuals who are radically different than themselves are central tenets of the team-based learning pedagogy. Through TBL, students not only need to be able to take a person’s blood pressure or patient history, but also to manage group dynamics and divergent personalities in preparation for the challenges of interprofessional care.

But what if a future healthcare provider does not evidence strong emotional intelligence skills as they begin their healthcare education? What if a student seems incapable of being empathetic towards a patient who reveals that she is dying? What if a healthcare student would prefer to work alone instead of alongside his team? Is such a student doomed to failure, or can a well-designed and implemented team-based learning pedagogy develop those requisite emotional intelligence skills? Is TBL an effective pedagogy that not only teaches hard skills in healthcare,
but also promotes the development of emotional intelligence and its coexistent soft skills like empathy, compassion, and active listening? Therefore, the purpose of this quantitative study was to examine the effect of team-based learning on the emotional intelligence of graduate students in a physician assistant (PA) studies program in the northeast U.S.

**Significance of the Research Question**

Scholars debate the science of emotional intelligence and especially, whether it can be assessed (Birks & Watt, 2007; Doherty, Cronin, & Offiah, 2013), while many other researchers argue for the importance of emotional intelligence in healthcare education (Cook, Cook, & Hilton, 2016; Grewal & Davidson, 2008; Lin, Kannappan, & Lau, 2013).

Team-based pedagogical approaches to healthcare education are a relatively new development; the need for rigorous research and assessment to ensure that intended learning outcomes are indeed achieved is necessary (Burgess & Mellis, 2015). Team-based learning emphasizes not just traditional healthcare skills, but also soft skills, a term that is used to refer to interpersonal skills, decision making, leadership, and communication styles (Ashbaugh, 2003). It is widely accepted that TBL promotes the development of soft skills, but there is a real dearth of research that examines traditional lecture-based programs vs. TBL program outcomes with a specific focus on emotional intelligence.

Master’s programs in Physician Assistant Studies at two different schools for healthcare in the northeast United States were utilized for this research study: one uses a traditional didactic lecture-based curriculum, while the other program is taught entirely using TBL. This research provides an opportunity for course and program assessment at the local level and at both the national and international levels. Healthcare education is moving to a TBL and inter-professional approach and this research provides data to other newer programs and to institutions
that are considering changing their healthcare education programs to a TBL model or who are looking to intentionally develop soft skills in their healthcare students.

There are several reasons why research regarding the effect of team-based learning on the development of emotional intelligence is significant. It has been shown that emotional intelligence is a key skill in the future success of healthcare providers (Vandewaa, Turnipseed, & Cain, 2016). Developing a team-based learning curriculum that takes that fact seriously is crucial to individual students’ success, both in the classroom and in future practice (Kim, Song, Lindquist, & Kang, 2016; Koles, Stolfi, Borges, Nelson, & Parmelee, 2010). A global economy means a growing emphasis on transnational healthcare, which requires an ability to work within very diverse cultural teams (Hamer, 2002). In a report published by the U.S. Census Bureau (2015), by 2020, more than half of the nation’s children will be part of a minority group, defined as any group other than non-Hispanic White alone; by 2044, the US will be minority-majority. Those demographic shifts demand a healthcare force that resembles the general population, and which possesses cultural humility and empathy for differences in patients and communities which they serve. Nationally, studies continue to explore the impact of emotional intelligence on physicians and nurses, but there is a real lack of research that explores the impact of emotional intelligence on the effectiveness of physician assistants (Hammerly, Harmon, & Schweitzberg, 2014; Iseler & Adams, 2014).

A similar lack of research involves the impact of team-based learning on emotional intelligence. For this reason, healthcare schools, which are grounded in science and evidence-based practice, are sometimes reticent to adopt a TBL pedagogy. A quantitative study that shows that TBL does improve emotional intelligence would serve as a useful resource for administrators considering a change in their own curriculum. But that improvement of emotional intelligence...
intelligence is not just a test result; rather, it is the difference in patient quality of care, in listening skills, in compassion and empathy, and in the ability to make a real difference in a person’s life, in public policy, and in the global community.

**Research Problem, Questions, and Hypotheses**

The purpose of this quantitative study was to examine the effect of team-based learning on the trait emotional intelligence of graduate students in a physician assistant studies program in the northeast U.S.

These questions are not hypothetical in their concern, however. Healthcare providers who are more emotionally intelligent result in better patient outcomes and more compassionate care, and those realities make a difference not just in research, but in people’s lives.

**Research Questions**

**R1**: Does team-based learning affect trait emotional intelligence in physician assistant students?

**R2**: Does team-based learning affect emotional regulation in physician assistant students?

**R3**: Does team-based learning affect stress management in physician assistant students?

**R4**: Does team-based learning affect trait empathy in physician assistant students?

**R5**: Do confounding variables, such as age, gender, or ethnicity/race have a mitigating effect on trait emotional intelligence in physician assistant students?

**Hypotheses**

To address **R1**, this study investigated the following hypotheses:

**H1**: There is no statistically significant difference in pretest trait emotional intelligence as measured by the Trait Emotional Intelligence Questionnaire (TEIQue; Petrides, 2001) between the lecture-based group and the TBL group of PA students.
H2: There is a statistically significant difference in the change score between pretest and posttest trait emotional intelligence as measured by the TEIQue in the TBL group of students as compared to the lecture-based group.

To address R2, this study investigated the following hypotheses:

H3: There is no statistically significant difference in pretest emotional regulation as measured by the TEIQue between the lecture-based group and the TBL group of PA students.

H4: There is a statistically significant difference in the change score between pretest and posttest emotional regulation as measured by the TEIQue in the TBL group of students as compared to the lecture-based group.

To address R3, this study investigated the following hypotheses:

H5: There is no statistically significant difference in pretest stress management as measured by the TEIQue between the lecture-based group and the TBL group of PA students.

H6: There is a statistically significant difference in the change score between pretest and posttest stress management as measured by the TEIQue in the TBL group of students as compared to the lecture-based group.

To address R4, this study investigated the following hypotheses:

H7: There is no statistically significant difference in pretest trait empathy as measured by the TEIQue between the lecture-based group and the TBL group of PA students.

H8: There is a statistically significant difference in the change score between pretest and posttest trait empathy as measured by the TEIQue in the TBL group of students as compared to the lecture-based group.
To address R5, this study investigated the following hypotheses:

**H9:** The confounding variables of age, gender, or ethnicity/race have a statistically significant effect on the trait emotional intelligence of PA students.

**Definition of Key Terminology**

**Ability-based emotional intelligence:** as defined by Salovey and Mayer (1990), the ability to perceive, understand, use, and regulate one’s own and others’ emotions. It is a type of intelligence, that can be measured using maximal performance scores against standard performance scales.

**Emotional intelligence:** the ability to recognize, understand, and regulate one’s own emotions, and the ability to recognize, understand, and influence others’ emotions (Salovey & Mayer, 1990).

**Team-based learning:** a pedagogical approach developed by Michaelsen (Michaelsen & Sweet, 2008), that emphasizes student pre-class preparation, active learning, and peer and team feedback.

**Trait emotional intelligence:** as defined by Petrides and Furnham (2000) also known as trait emotional self-efficacy, denotes a constellation of emotional perceptions that appertain to personality, is not related to cognitive abilities, and is assessed by self-report.

**Trait Emotional Intelligence Questionnaire (TEIQue):** developed by Petrides (2001), the TEIQue is a 153 question Likert scale self-report of trait emotional intelligence, that produces a global trait score, along with 15 facets, and four broader factors.
Theoretical Framework

A theoretical framework can be defined as a blueprint for a dissertation (Grant & Osanloo, 2014). The purpose of a theoretical framework is to provide a guiding theory that informs the research problem, and provides limits and boundaries to the questions asked, the methodology, the analysis, and the conclusions drawn from the data. In quantitative research, the theoretical framework is used deductively to test the theory or proposed idea (Creswell, 1994).

The definition of a theoretical framework, however, is hardly monolithic. While acknowledging the lack of clarity and consistency in the terms, Anfara and Mertz (2015) defined it rather broadly as any number of theoretical approaches that provide insight into a phenomenon. Grant and Osanloo (2014) argued for a theoretical framework as distinct from a conceptual framework, which they defined as concepts and assumptions that guide the research process. Contrary to Grant and Osanloo (2014), however, Maxwell (2005) conflated theoretical and conceptual frameworks as interchangeable terms and defined a conceptual or theoretical framework as a model or theory of the proposed research phenomenon. For the purposes of this study, the approach advocated by Grant and Osanloo (2014) will be ascribed to of terms that can be used interchangeably and provides a rational framework for this work.

Embedded in any theoretical framework is a worldview, epistemological assumptions, and an approach to research, the exposition of which is demanded by one’s positionality. The theoretical framework adopted for this research is grounded in a pragmatist approach to research, in which the research question determines the approach (Muijs, 2011). Rather than be confined by a constructivist or post-positivist approach that pre-determines the question and method, the pragmatist researcher begins with the question, and then derives the method and approach that
best suits it. Epistemologically, the starting place is not whether there is objective truth, but rather, will this approach get the researcher to the desired end (Muijs, 2011). Since the question which was explored sought cause and effect, explanation of phenomena, and several possible hypotheses, a quantitative approach was demanded.

A Critical Rationale for Trait Emotional Intelligence

For this research, the theoretical framework not only serves as an organizing principle for this work, but also as the dependent variable in the study: trait emotional intelligence (Creswell, 2013). The literature review in Chapter 2 serves to thoroughly define the terms of emotional intelligence, as well as define the distinctions in the field among ability-based (Salovey & Mayer, 1990), self-reported (Bar-On, 1997), mixed model (Goleman, 1995) and trait emotional intelligence (Petrides & Furnham, 2000). For Salovey and Mayer (1990), who are often regarded as the seminal thinkers in the field, emotional intelligence can be described as a kind of cognition that enables a person to recognize her own emotions and those of others, regulate her emotional life, and manage her relationships. It is considered an ability-based model, that like IQ is fixed rather early in life and can be measured using a series of problem-based exercises, with a set of presumably right answers as measured against the general population. Bar-On (1997) articulated his own approach to what he termed “emotional quotient” (EQ) in his 1988 unpublished doctoral dissertation: Bar-On understood EQ as a set of skills and traits which could be assessed using a self-report instrument. Goleman (1995), considered a pop psychologist by many, relied on Salovey and Mayer’s ability-based model, but amplified and expanded it with other sources. Finally, Petrides and Furnham (2000) developed a different model of trait emotional intelligence: a “constellation of emotional self-perceptions” that are grounded in personality, and thus, have potential for significant growth and change (Petrides, Pita, &
Several self-reported measurements have been developed, including the TEIQue which utilizes a Likert scale self-report of 153 items consisting of global trait emotional intelligence, 4 subfactors and 15 subscales including emotional expression, perception, regulation, and management, self-motivation, stress management, and empathy (Petrides, 2001).

After a careful review of the distinctions among the various types of emotional intelligence and the various assessments developed to measure them, the trait model of Petrides and Furnham was chosen both as the theoretical framework and as the dependent variable. Trait emotional intelligence is related to personality traits and does not rely on the cognitive approach of Salovey and Mayer (Petrides & Furnham, 2000). Salovey and Mayer’s approach is grounded in cognition, and many researchers believe that cognition is relatively fixed (Mackintosh, 1998), while personality traits, which ground Petrides & Furnham’s model of emotional intelligence, are by their nature, more malleable (Roberts et al., 2017).

**Applying Theoretical Framework to the Proposed Research**

Because the problem of practice is defined by the theoretical framework, the alignment of the research to the theoretical framework is obvious: the problem of practice is the possibility of the development of emotional intelligence, and the research questions, both the overarching questions and the sub questions, all deal directly with trait emotional intelligence. The data collection was based on an emotional intelligence assessment that has shown good reliability and validity (Petrides, 2009a), and the methodology was a quantitative study because of the nature of the assessment tools that derive quantitative data. An interesting note, however, is the fact that albeit dealing with emotions and perceptions, most studies dealing with emotional intelligence are quantitative, not qualitative studies. This is an area that begs for more research and meaning.
Conclusions on Theoretical Framework

This research examined the impact of team-based learning on trait emotional intelligence in a group of physician assistant students as compared to traditional lecture-based students. Trait emotional intelligence, as articulated by Petrides & Furnham (2000) serves as both the theoretical framework and the dependent variable for the research. The problem of practice is defined by the EI framework of understanding, the research questions are limited by its parameters, and the methodology and the data collection are delimited by previous research in the field and the approach to the subject matter by other researchers. If the research assists future healthcare providers to develop better individual emotional intelligence skills, and leads to better patient care, then the work will have been worthwhile.
Chapter Two: Literature Review

To undergird this research, this literature review will explore the existing research concerning ability, mixed, and trait individual emotional intelligence, including its history and various assessment tools. The impact of emotional intelligence on healthcare education will be explored, and finally, the literature concerning team-based learning in healthcare education will be examined.

To engage in this literature review, the OneSearch database was utilized, and searches were conducted using various combinations of the following terms: emotional, intelligence, trait, ability, healthcare, education, team-based learning, assessment, physician assistant studies.

**Emotional Intelligence**

The historical antecedents to the theory of emotional intelligence can be traced to the 17th century Dutch-Jewish philosopher, Baruch Spinoza, who believed that there were three different levels of knowing: emotional, intellectual, and intuitive (Sharma, 2008). Similarly, E. L. Thorndike, in 1920, suggested that there were three forms of intelligence: abstract, mechanical, and what Thorndike referred to as social intelligence without much further explanation or theoretical grounding (Landy, 2005). In 1983, Howard Gardner’s book, *Frames of Mind*, articulated eight different modes of intelligence including internal human dimensions: intrapersonal knowledge or ability to access one’s interior thoughts and feelings, and interpersonal knowledge, which is the ability to notice and understand other people.

The term “emotional intelligence” appeared for the first time in print in a study by Michael Beldoch (1964) in which he postulated the existence of an emotional sensitivity which can be studied empirically. Shortly afterwards, Leuner (1966) published a psychological study of women entitled *Emotionale Intelligenz und Emanzipation* in a German psychological journal, exploring the ability of women to experience emotions within the family setting. The first
published dissertation which used the term was by Walter Payne (1985), in which the author proposed a guidebook on how to relate to emotions to move beyond the ignorance of addiction, violence, depression, and war. In all these early references, however, though the term was used, it was not developed or defined.

Salovey and Mayer (1990) offered the first widely accepted study of emotional intelligence and their subsequent substantial body of research, along with a new collaborator, David Caruso, served to define the terms and the field (Caruso, Mayer, & Salovey, 2002; Mayer & Salovey, 1993; Mayer, Salovey, & Caruso, 2008; Mayer, Salovey, & Caruso, 2012; Mayer, Salovey, Caruso, & Sitarenios, 2001).

It was, however, with the publication of Emotional Intelligence (Goleman, 1995), that the field of emotional intelligence became popular among the masses, albeit critiqued by many scholars (e.g. Birks & Watt, 2007; Conte, 2005; Elam, 2000).

Since the publication of Goleman’s book, several distinct approaches to emotional intelligence have developed. These various approaches can be classified into four categories:

1. the ability-based EI model popularized by Salovey and Mayer (1990),
2. the mixed EI model best exemplified by Goleman (1995),
3. the Bar-On model (1997) which is grounded in assessment rather than approach, and
4. the trait EI model, as articulated by Petrides and Furnham (2000).

**Ability-Based Emotional Intelligence**

Ability-based emotional intelligence can best be described as a set of performance skills that serve to assess and regulate one’s own emotions and those of others, as well as utilize emotions as a motivating and planning tool in one’s own life and relationships (Salovey &
Significant to the ability-based approach is the understanding that EI is a subset of social intelligence, and not just a model for understanding (Salovey & Mayer, 1990). In other words, according to Caruso, Mayer, and Salovey (2002), EI is not just about personality, but is in fact a kind of cognition or intelligence. For EI to be considered an intelligence, it must meet three scientific criteria: it must be capable of being operationalized, the various components must be inter-correlated and relate to other forms of intelligence but with its own uniqueness, and the intelligence must be age and environmentally developmental (Mayer, Caruso, & Salovey, 1999).

Emotional intelligence is a comprehensive term which includes verbal and non-verbal self-expression and understanding, and the ability to perceive others’ emotional reality and provide an empathetic response. It provides a mechanism to regulate one’s emotional responses and to respond appropriately to the emotions of others. Finally, it allows one to think creatively, be adaptive, stay motivated, and redirect moods when necessary (Salovey & Mayer, 1990). Four distinct and assessable skills are defined: the ability to identify, use, understand, and manage emotions (Caruso et al., 2002).

Several different assessment tools attempt to measure these four distinct and assessable skills. Salovey and Mayer’s approach led to the development of their Multifactor Emotional Intelligence Scale (MEIS; Mayer et al., 1999), and later, a shorter version, the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT; Caruso et al., 2002). The MEIS consists of 12 ability measures focused around the four key EI abilities, resulting in 401 test items. The MSCEIT is a briefer, 104-item measure of the same correlated abilities. Participants are asked to identify emotions based on pictures or music excerpts, define feelings, or rate appropriate responses to emotional vignettes (Mayer et al., 1999). Results are then measured against consensus responses from other participants and against expert responses. Results are
adequately reliable as compared to similar intelligence scales (Mayer et al., 1999). Key findings of the initial studies were that sections of the test that had higher numbers of items were also more statistically reliable than sections like Understanding Emotions which only had eight items. Researchers also found connections between emotional intelligence and career choice in the MSCEIT: expressed interests in helping professions and disinterest in business professions were correlated to higher levels of emotional intelligence (Mayer et al., 1999). Licensing and use are controlled exclusively by Multi-Health Systems (MHS) Assessments of Toronto, and cost, even for academic or research purposes, is prohibitive, requiring certification to administer the MSCEIT test.

Another approach to ability-based EI was introduced by Schutte et al. (1998) which relied on the Mayer and Salovey framework with its process-oriented and developmental approach but utilized a self-report measure. An oft-cited finding of this study was that there was a correlation between incoming college students’ emotional intelligence and their end-of-year grade point average for that first year of study. A subsequent study by Goldenberg, Matheson, and Mantler (2006) compared Caruso, Mayer, & Salovey’s performance-based MSCEIT with the Schutte et al. self-reported measure (1998) and found that there was not a significant correlation between the performance-based test and the self-report findings. Considering those results, Goldenberg et al. (2006) proposed that the self-report may be a better indicator of key elements of EI than the performance-based tests, such as coping skills and depressive affect.

Despite the efforts of Schutte and others, the MEIS, and especially its shorter version, the MSCEIT, are still considered the flagship of EI ability assessment tools, though there are some scholars who continue to debate their merits and their ability to accurately measure results. Questions linger about the reliability of consensus-based scoring and whether locally observed
scores can be extrapolated to universal scores (Maul, 2012). Scholars like Maul (2012) advocated a more causal approach to explanations of variations to improve scientific validity. Day & Carroll (2004), questioned the construct and criterion-related validity of the MSCEIT, especially as it related to decision-making. Their findings were inconclusive: Day and Carroll (2004) saw the promise of EI, but also saw the need for more rigorous scientific study.

Considering questions regarding reliability and validity of the MSCEIT, other scholars attempted to create or adapt other EI ability-based assessment instruments. Warwick, Nettelbeck, and Ward (2010) developed an Ability Emotional Intelligence Measure (AEIM) which introduced different emotional perception and management items and a new scoring rubric, and which showed initial promising results.

Scholars like Krishnakumar, Hopkins, Szmerkovsky, and Robinson (2016) questioned the abstract measurements of the MEIS and MSCEIT, and its lack of context and whether those abstract conclusions can accurately predict real-world outcomes. Subsequently, those researchers designed the North Dakota Emotional Abilities Test (NEAT) which was modeled after the logic and framework of the MEIS and MSCEIT, but which focused specifically on the workplace. Initial results were promising, though questions remained about reliability and isolated sections that relied on self-response.

**Goleman and the Mixed Approach**

In 1995, Daniel Goleman, a psychologist and author, published the international bestseller, *Emotional Intelligence*, based on the work of Salovey and Mayer. Goleman (1998) explained emotional intelligence as a set of competencies that involve thought and feeling, and which once learned and developed, result in work and personal improvement. Goleman described five dimensions of emotional intelligence: self-awareness, self-regulation, and
motivation, which are focused on the self, and empathy and social skills, which are focused on the other. Goleman did not originally propose an assessment tool for his approach, though he suggested an approach that would incorporate both self-reports and 360-degree feedback. Boyatzis (2011) was credited with the development of the assessment tool based on that suggested Goleman model: the Emotional and Social Competencies Inventory (ESCI).

Scholars often critiqued Goleman’s approach as lacking the necessary scientific rigor, filled with unsubstantiated claims, and poorly defined terms (Murphy, 2006), while Boyatzis’ inventory is criticized as lacking valid measurements and discriminant knowledge (Conte, 2005).

Goleman and colleagues responded to their critics with a peer-reviewed response in *Educational Psychologist*, in which Goleman recanted the misunderstood claim from his book that EI accounts for 80% of success in life, and the researchers encouraged future work in this nascent field to provide increasingly reliable evidence-based practices and data (Cherniss, Extein, Goleman, & Weissberg, 2006).

**Bar-On’s Model of Emotional Intelligence**

A unique approach to emotional intelligence is found in the work of Reuven Bar-On. Bar-On (2006) defined EI, which he called emotional quotient, or EQ, as a set of social and emotional competencies and skills that help us understand ourselves, others, and our daily lives. Bar-On situated EI within the broader construct of emotional-social intelligence, and developed a self-report instrument, the Emotional-Quotient Inventory (EQ-i), *before* he articulated the model (Bar-On, 2000). Bar-On, who began his work as a doctoral student, focused first on the development of an assessment tool for emotional intelligence, and then after the fact, articulated the grounding theory. The EQ-i is a self-report that contains 133 statements, utilizing a Likert scale, and provides an overall score and scores for a series of five scales, comprising fifteen
subscales (Bar-On, 2006). Bar-On developed a later version of the EQ-i (EQI-Hed) specifically tailored to the needs of college students (Burgess-Wilkerson & Frankforter, 2012). Scholars observed that the EQ-i is the first psychometrically researched test for EI (Derksen, Kramer, & Katzko, 2002). Bar-On (2006) affirmed through his work that this model of social-emotional intelligence can be taught or enhanced through training, though the details of those interventions are not described. Scholars support the validity of the EQ-i as promising and worthy of further study (Dawda & Hart, 2000; Derksen et al., 2002). Derksen et al. (2002) confirmed Bar-On’s assessment that social-emotional intelligence is not cognitive and does not correlate with other intelligence tests. Yet, other scholars have been critical of the Bar-On model, claiming that despite some validity and reliability, the EQ-i lacks discriminant validity evidence and that it offers nothing that was not already known from cognition or the so-called Big Five personality schemes. Like the MSCEIT, the EQ-i, along with subsequent iterations, are licensed through MHS in Toronto, costs are prohibitive, even for research or scholarship, and require certification for administration and assessment.¹

**Trait Emotional Intelligence**

Trait emotional intelligence, a concept developed as an alternative approach to ability-based EI, is typically predicated against the earlier abilities-based work of Salovey & Mayer. One of the earliest mentions of the term was by Petrides and Furnham in 2000 as a response to what they perceived as a failed attempt by Schutte et al. (1998) to create a self-report assessment of the Salovey and Mayer abilities-based test of emotional intelligence. Consequently, Petrides

¹ For the purposes of full disclosure, the Principal Investigator (PI) for this study is a trained and certified EQ-i 2.0 coach and uses the instrument regularly with clients.
and Furnham (2000) proposed a trait-based approach to emotional intelligence which “appertains to the greater personality realm” (p. 313). Trait EI does not rely on a cognitive definition as does the abilities-based approach. Rather, trait EI relies on personality traits like empathy or optimism and resides within the complexity of personality, and not cognition. For this reason, Petrides and Furnham (2000) affirmed that it is the type of measurement, i.e. self-report, which determines the model of EI. For Petrides (2009a), emotions are highly subjective, and it is only the individual who can rightly make observations about their own emotional landscape. For Petrides and Furnham (2000), abilities-based EI is an information-processing approach, and should be measured, like traditional intelligence tests, by maximal, not average or consensus, performance. Petrides (2001) developed the Trait Emotional Intelligence Questionnaire (TEIQue), a self-report which consists of 153 statements and a 7-point Likert scale which takes about 25 minutes to complete (see Appendix A). As Figure 1 illustrates, the TEIQue operationalizes trait emotional intelligence theory, by exploring fifteen different facets of emotional intelligence using different subscales. The TEIQue also provides insights on four broader factors: well-being, self-control, emotionality, and sociability (Petrides, 2009a).
Although trait EI is grounded in personality theory (Balakrishnan & Saklofske, 2015), research clearly showed that the TEIQue does in fact have its own incremental validity and is sufficiently distinct from the so-called Big Five personality traits to warrant its own investigation and use (Tett, Fox, & Wang, 2005).

Scholars recognized the TEIQue for its cross-cultural applicability, and respectable psychometric properties (Andrei, Smith, Surcinelli, Baldaro, & Saklofske, 2016). It is available as a free download from the London Psychometric Labs (psychometriclab.com) which Petrides directs, and after paper and pencil administration, can be scored for free from the same website using a free scoring template. The London Psychometric website provides significant support,
resources, theoretical background, and research. At the behest of Dr. Petrides, the TEIQue is also available through Thomas International (thomasinternational.net), which provides online administration and scoring of the instrument for cost, along with personalized reports, and significant technical support and training.

A challenge to self-reporting assessments like the TEIQue, however, is the problem of participants who embellish or “fake” their responses (Hartman & Grubb, 2011). Hartman and Grubb (2011) defined faking as the desire to appear more socially acceptable by falsifying responses. Their research into self-assessments found that the areas of emotional intelligence which were most susceptible to faking were general mood and stress management, thus challenging the overall validity of self-reporting in EI assessments.

Apart from the validity challenges of faking, another challenge to self-reports was the length of time required to complete them. The Brief Emotional Intelligence Scale (BEIS 10) was an attempt to address this concern (Davies, Lane, Devonport, & Scott, 2010). Balakrishnan and Saklofske (2015), however, found that there was only limited validity and reliability to the BEIS 10, and that the abbreviated format ran the risk of diluting the data by limiting the number of questions.

The state of research regarding trait-EI is confused by imprecision of language and description. For example, Tett, Fox, and Wang (2005) predicated their research in trait-EI measures on the work of Salovey and Mayer, whose research they described as dispositional, even though most scholars consider Salovey and Mayer the benchmark of abilities-based EI.

Another example of imprecision in the language and science of trait EI is visible in the previously discussed research of the Schutte et al. (1998) model of ability-based EI with its self-assessment. Subsequent scholars often mistakenly identified the Schutte model as a trait
emotional intelligence model (Saklofske, Austin, & Minski, 2003), because one of the key
determinants of trait EI was the method of assessment, this even though Schutte’s theoretical
foundation was radically grounded in the abilities-based work of Salovey and Mayer.

Conte (2005), a vocal critic of EI research, strongly suggested that because researchers
have been inconsistent in their use of language and terms in the EI field, the results derived from
their research are questionable, at best.

Conclusion

Emotional intelligence is a relatively young field, albeit with significant historical and
philosophical antecedents. Because it is a nascent science, language is often imprecise, and
assessments are unproven. The literature describes four different approaches to EI: 1) ability-
based, as exemplified by Salovey and Mayer which continues to be for many the benchmark of
the field, 2) the mixed model populist approach of Goleman, 3) Bar-On’s social-emotional
intelligence approach grounded in its method of self-assessment, and finally, 4) the trait-based
approach of Petrides and Furnham. Each of the aforementioned approaches has both its disciples
and critics, and each has its own strengths and weaknesses in concept and assessment.

The trait-based approach of Petrides and Furnham (2000), however, is most convincing
for the purposes of this research. Trait EI is grounded in a solid theoretical foundation, has
shown good validity and reliability, and is psychometrically sound. Petrides and Furnham
rejected the idea that emotional intelligence is a kind of intelligence that can be measured in the
same way as intellect. Instead, they recognized the utter subjectivity of one’s emotional
landscape, and admitted to the reality that there is no right answer to one’s emotions, and that
only an individual can accurately assess their own emotional life and skills. Finally, the trait EI
assessment instrument, the TEIQue, is readily available, even free under certain conditions, and
is supported by substantial documentation, research, and administrative support. There is no other EI assessment instrument that can make that same claim.

**Emotional Intelligence in Healthcare**

Patient-centered care is the buzzword in healthcare today. Patient-centered care focuses on the needs of the patient for timely information, sees the patient as a person and not just a disease or diagnosis, and seeks always to improve the patient-provider relationship (Birks & Watt, 2007). The ability to listen actively, to work collaboratively in teams, to respond to a patient’s mood and emotions, to deliver both good and bad news, to manage high levels of stress, and to regulate one’s own emotions and those of nervous or angry patients is essential to success in healthcare today (Goleman, 2017). Yet, personal stories abound about healthcare providers who are not adept at understanding the patient’s perspective or in delivering truly compassionate care.

Interpersonal and communication skills, especially the ability to empathize with others, are key competencies for medical providers to possess and develop for their success (Grewal & Davidson, 2008). However, amid constant stress, trauma, suffering, and an increasingly fast-paced practice, the need for self-care is also critical. Studies have shown that constant exposure to the various stressors that are simply constitutive of healthcare practice today has deleterious and long-term effects (Măirean, 2016). The ability for healthcare workers to manage and regulate their own emotions, and to develop effective stress management skills is key to the success of today’s healthcare practitioner. Thus far, attempts at how to cultivate those emotionally intelligent skills have been limited.

Some of the scholarly writing regarding emotional intelligence and healthcare appears resistant to the idea that emotional intelligence may hold the key to improving the skills
necessary to provide patient-centered care. Elam (2000), for example, suggested that though EI is a promising concept, it lacks scientific rigor. Elam’s commentary is replete with questions about the science of emotional intelligence, what it measures, and whether it is psychometrically sound. The title of her op-ed places “emotional intelligence” in quotation marks, presumably to call attention to questionable language or science. As recently as 2007, some 20 years after the publication of Mayer and Salovey’s work, British researchers exploring the import of EI and patient-centered care observed that more research needs to be conducted before EI as a science can be established (Birks & Watt, 2007).

**EI and Healthcare Education**

Despite the presence of some scientific naysayers, studies abound which support the role of EI in healthcare education. A study by Austin, Evans, Goldwater, and Potter (2005) involving first year medical students showed some correlation between EI and academic success, and there was a positive association between physician empathy as measured by a psychometrically valid tool and EI. Also significant to this study was the finding that females scored significantly higher on EI than did their male counterparts.

Similar findings were reported by Doherty, Cronin, and Offiah (2013) in their study on a medical school curriculum and EI. The curriculum included explicit EI training within the context of three sessions on leadership and emotional intelligence. Their findings correlated with those of Austin et al. (2005): there is a positive correlation between EI and academic assessments, and females in healthcare education demonstrated higher EI skills than their male counterparts. Doherty et al. (2013) found no correlation between self-report EI and ability EI. Similarly, Cook, Cook, and Hilton (2016) found a correlation between EI and academic success, though admittedly weak, but found no correlation between EI and other measures of medical
school admissions. However, the researchers did not dismiss EI as unpredictable. Instead, Cook and his colleagues (2016) suggested that the current assessment tools do not accurately measure the concept of EI. Cook et al.’s work suggested that though instruments have not been refined or sufficiently tested, there is a strong sense that EI is connected to important healthcare skills, like empathy and leadership, and that academic success may be related to EI. These skills have not traditionally been well-cultivated in healthcare education curricula, so these studies bear witness to the need to address more carefully these important healthcare competencies. These studies suggested that EI may be one way to address the development of these critical patient-centered skills.

In another study, researchers compared the impressions of a faculty interview for a general surgery residency with the applicant’s EI as measured by the TEIQue. Traditional residency selection processes typically rely exclusively on academic achievement. Interviews may be scheduled to provide a more holistic approach to admissions or to quantify the non-cognitive soft skills of an applicant. Lin, Kannappan, and Lau (2013) found that the interviews did not correlate to the applicant’s EI as measured by the TEIQue, strongly suggesting that a different method of assessing non-cognitive skills is required than the interview process. Unlike previous studies, there was no correlation between EI and academic success. The authors of the study also admitted that the literature in the field is confusing, and the measurements and assessments are varied; as a result, it makes comparisons difficult (Lin et al., 2013). What the study revealed is that though medical school administrators recognize the value of assessing non-cognitive skills, their reliance on in-person interviews fails to achieve that end, while EI testing may provide some useful insights into potential candidates.
Jones-Schenk and Harper (2014), recognizing that traditional admissions criteria, like GPA, were not adequate predictors of success in nursing school, studied EI as an admissions criterion. Results showed that students who persevered in the program exhibited higher levels of EI than those who left, suggesting the value of EI assessments as part of the admissions process.

Chan, Petrisor, and Bhandari (2014) studied the role of emotional intelligence in orthopedic surgery residents, while also looking at the effect of gender, race, and training. Problematic to this study, however, was the fact that researchers used an a priori cut off to measure competence levels of emotional intelligence. Results found that only 10% of respondents were determined competent by this questionable measure, but junior residents, Caucasians (sic), and those under 30 had higher EI scores. The use of the term Caucasian is also problematic: race scholars today criticize the term as Eurocentric, antiquated, and racist (Mukhopadhyay, 2008).

In a study that examined the relationship between empathy and emotional intelligence in medical students there was a strong correlation found among empathy, EI, and personality traits, while Asian-Americans were shown to have statistically lower empathy. Additionally, this study supported previous research showing that females have higher empathy scores than men (Bertram, Randazzo, Alabi, Levenson, Doucette, & Barbosa, 2016).

However, in a critical review of EI in medical education, Cherry, Fletcher, O’Sullivan, and Dornan (2014) drew the conclusion that EI should not be used as a selection criterion because of the lack of convincing evidence. After exploring what they saw as methodological issues with EI, they raised a concern about the cost of administering the EI tests, at a cost of $3.50 per participant, suggesting that it might be cost-prohibitive (Cherry et al., 2014). The potential biases of the authors would have been a helpful addendum to this study. Detractors of
EI notwithstanding, the research clearly suggested that EI can be a valuable tool in healthcare education (Austin et al., 2005), in admissions (Jones-Schenk & Harper, 2014), in the classroom (Doherty et al., 2013), and in the pursuit of academic success (Cook et al., 2016).

**EI and Healthcare Practice**

Studies have explored the relationship of EI not just to healthcare education, but also to clinical practice. In one of the earliest studies of its kind, Wagner et al. (2002) investigated the relationship between a physician’s EI using the Bar-On EQ-i and patient satisfaction. Patient satisfaction led to therapeutic advantages for the patient, and greater patient loyalty. The study showed that the need for a physician to deal with patients in a manner that leads to real patient satisfaction is not only desirable but also financially beneficial to the physician’s practice by maintaining a happy client base. Findings revealed that the happiness of the physician was directly related to the satisfaction of the patient. A significant observation from this study was the fact that preceptors and clinical instructors who serve as role models in the field for healthcare students can incorporate these findings into their interactions with students thereby directly impacting the students’ attitudes and dispositions and recognizing the personal and financial benefit that can be ascribed to honing emotional intelligence skills and dispositions (Wagner, et al., 2002). In other words, happy healthcare workers who have an ability to perceive and regulate their own emotional lives and to manage every day stressors make for happy patients who are loyal to their practitioners, while unhappy clinicians have empty clinics.

A similar study by Weng (2008) attempted to assess the impact of a physician’s EI on patient trust. A significant development in Weng’s work was the addition of other sources of data to the determination of findings, including the patient’s compliance with plan of care. When higher physician EI was combined with higher levels of patient compliance, it led to
patient trust. Since the results were not simply reliant on the physician’s self-report, the findings avoided the variances found in other such studies. This study was significant because the research showed that a provider’s EI is directly related to the patient-provider relationship, which leads not only to a better professional relationship, but more importantly, also to better outcomes (Weng, 2008).

McKinley et al. (2014) specifically studied the gender differences in emotional intelligence in physicians using the TEIQue and found that women scored higher in impulse control and relationships, but men scored statistically higher in stress management and emotion management.

Studies that explored the impact of EI on non-physician healthcare providers evidenced similar results. Adams and Iseler (2014) studied the correlation between nurses’ EI, assessed through use of the MSCEIT, and quality of care delivered to patients, as determined by the number of infections, falls, or screenings which the patient experienced during the hospital stay. Nurses want to have an emotional connection to their patients, yet in an increasingly technological field, there can be a temptation to neglect the interpersonal and affective dimensions of nursing care. Findings confirmed that EI of nursing staff was directly correlated to quality of patient care (Adams & Iseler, 2014). Like the Weng study (2008), Adams & Iseler (2014) found that a provider’s EI not only improved the relationship with the patient, but that EI led to better patient-centered care and improved patient outcomes.

Another study looked at the impact of nurses’ self-reported EI on desirable nursing practices: sportsmanship defined as a lack of complaining or criticizing, conscientiousness, civic virtue, altruism, and courtesy (Vandewaa et al., 2016). Some correlation was found among several different dimensions of EI, with the most significant finding that emotional regulation is
most directly related to nursing success and desirable behaviors. Emotional regulation, a key component of all EI constructs, allows a person intentionally to change, prevent, reduce, or increase an emotional response based on circumstances and possible outcomes. This trait is closely linked to patient satisfaction, since the ability of a healthcare worker to respond appropriately to difficult or emotionally charged situations without overreacting leads to better work environments and patient care.

Nursing studies have shown the link between empathy and emotional intelligence. In a recent study by Giménez-Espert and Prado-Gascó (2018), researchers found that there was a strong connection between nurses’ levels of empathy and emotional intelligence and their ability to communicate effectively and compassionately with their patients. The ability to take the patient’s perspective, central to the notion of empathy, makes a significant difference in patient care and successful outcomes, and contributes to professional wellbeing and satisfaction.

Another study in nursing practice revealed a connection between emotional intelligence and stress management in emergency department nursing staff (Nespereira-Campuzano & Vázquez-Campo, 2017). Nurses with greater emotional intelligence evidenced a greater ability to be aware of their own emotions and deal with stress in more holistic and constructive ways.

The lack of empirical studies, methodological consistency, and validity and reliability of EI challenges the scientific method of the medical education model. Intuitively, one can appreciate the need for healthcare workers who can understand the patient, listen, and compassionately respond. But despite ample research, the empirical evidence is limited or at least unreliable, and authors of some studies appeared to possess only a cursory understanding of the field of emotional intelligence and its measurement tools. A recent article published in the peer-reviewed *Journal of Healthcare Management* argued for the need for EI assessments in
healthcare providers to more closely align practice with required core competencies, like professionalism and interpersonal/communication skills. Yet this article did not espouse an approach to trait or ability-based EI and instead, argued for the use of 360° feedback on behaviors that exhibit EI in the workplace (Hammerly et al., 2014). The article used the language of EI with other HR best practices, like 360° evaluations, without any reference to the many differences in EI approaches or various possible evidence-based assessments.

**Conclusion**

Anecdotal stories of bad bedside manner could fill the Library of Congress. Doctors who are incapable of delivering bad news, nurses who are too busy to listen, or physician assistants who are too uncomfortable to look the patient in the eyes while speaking are still far too common in healthcare. Healthcare professionals intuitively understand the need for empathy, stress management, and emotional regulation. Healthcare educators appreciate the need to admit and train future caregivers who will not only know how to diagnose and treat, but who will always provide empathetic and compassionate patient-centered care. Research showed that scholars argue that EI is the panacea, while others argue it is simply another placebo (Vandewaa et al., 2016). Quantitative research that is rigorous, well designed, has clear outcomes, and is grounded in solid theoretical foundations, will contribute greatly to the science of EI, and more importantly, to improved patient care.

**Team-Based Learning**

Team-based learning (TBL) is a pedagogical approach developed by Larry Michaelsen in the 1970’s that relies on learning through small group work (Michaelsen & Sweet, 2008). Students are intentionally organized into groups for the duration of the course, and most work is shared. A typical TBL class session follows a prescribed format. First, there is pre-work: the
student prepares assigned materials in advance of the actual class time, including readings, videos, or presentations. Second, at the beginning of the actual class, students take an Individual Readiness Assurance Test (IRAT): a brief multiple-choice quiz, typically online, that provides an opportunity to assess the student’s knowledge base. Immediately following the IRAT, the team takes the same test again (Team Readiness Assurance Test-TRAT), with the group needing to work together towards consensus. Typically, the team uses scratch cards, known as Immediate Feedback Assessment Technique (IF-AT) response cards, to select the right answer. Team scores for the TRAT typically outperform individual scores for the IRAT. A process of appeals follows, with students debating the merits of answers or faulty questions, followed by instructor feedback, adjustment, and clarification. Finally, the remainder of the class session involves application-oriented activities to practice using the newly-acquired knowledge. A typical application exercise in healthcare education might be a case study with questions. Peer, group, and self-evaluations are a regular and required component of the process and are included in the overall grading strategy (Michaelsen & Sweet, 2008).

Four principles undergird the success of TBL: 1) groups must be intentionally teacher-designed and managed, 2) students are held accountable for their individual and group work, 3) students must get regular feedback, and 4) attention must be paid to team learning, development of trust, and group cohesiveness (Michaelsen & Sweet, 2008). In other words, working in groups is just as much about the group process as it is about the group product. TBL requires an attention to the dynamics that allow a group not only to function, but to excel. Intentionality of group design means groups that are deliberately diverse: gender, race, GPA, personality traits—all are considered and intentionally manipulated to form truly diverse yet balanced working groups. Regular feedback comes in various but expected forms: anonymous peer and team evaluations
through various online instruments (i.e. CATME.org), facilitated team face-to-face feedback, and frequent feedback to and from the professor, all of which cultivates the soft skills of delivering bad news and having difficult conversations. Because students provide graded peer and team feedback as part of their coursework, students are held accountable for their work. A student who does not come prepared or does not do their share of the teamwork will invariably be scored lower by their teammates than others on the team, and that will adversely affect their course grade, providing added incentive for all team members to contribute fairly and consistently.

Stein, Colyer, and Manning (2016) examined student accountability in TBL and showed that team members who came to class, were prepared, and were involved, consistently received the highest peer evaluations, while teammates who were often absent, did not prepare for class, or did not contribute were consistently rated the lowest.

The application activities are both the most engaging part of TBL and the most challenging for new teachers to realize successfully. The design of application activities is governed by the Four S’s: significant problem, same problem, specific choice, and simultaneous reporting. The application activity needs to address a significant problem that cannot be easily solved with a quick Google search to engage the students in teams. All teams need to be working on the same problem, rather than each team dealing with a different problem, and then reporting out to the larger group as experts. In TBL, working on the same problem encourages mutual learning and discussion and even healthy debate. TBL also requires specific choice (i.e. a team’s answer to the problem needs to be within a prescribed number of choices, like a multiple-choice question, finding a location, or determining a diagnosis). Finally, all the team answers need to be revealed at the same time, so that no group must go first or is able to change its own answers based on earlier responses (Sibley et al., 2014).
Perceptions of TBL

An innovative pedagogical approach like TBL can only be transformative and effective if it is perceived well by students and teachers alike. In a survey study of first year medical students, Kazory and Zaidi (2018) showed that 74% of students preferred TBL to a traditional didactic lecture format, and a similar percentage felt that TBL helped them to recall information. Surprisingly, however, the same study found that fewer than half of those same students believed that TBL improved their grades, and they had concerns, due to the teamwork component, about student accountability. Similar results were reported by Palmer (2013) who investigated both student perceptions and effectiveness of TBL among physical therapy students. Although Palmer did not find a statistically significant difference between traditional lecture format and TBL in student scores, Palmer’s research revealed that students preferred TBL as a pedagogical approach because it assisted them in studying more productively, increased their understanding of the material, promoted teamwork, and engaged students more dynamically in application exercises. In another study of undergraduate anatomy and physiology students, students preferred TBL to a traditional lecture format, were satisfied with TBL as a pedagogical approach, and felt it increased their accountability in class (Luckey & McLaughlin, 2016). The results found in these examples confirm that students like TBL for its student engagement, accountability, and approach to teaching and learning.

A study of perceptions of pharmacy students by Frame et al. (2015) offered a slight caveat. When students were exposed to TBL before a traditional lecture format course, their perceptions were in line with previous studies. Yet, when students participated in TBL after a traditional didactic course, their perceptions were less enthusiastic (Frame et al., 2015). These are helpful findings for anyone considering transitioning an academic program from lecture
Student enthusiasm for TBL is matched by the enthusiasm of faculty who use it in their classes. In a study by Morris (2016) of nursing teaching faculty, instructors recognized the significant time commitment involved in restructuring a course from lecture format to TBL, but nevertheless, recognized the value of TBL and its potential for other courses in the curriculum, and the increased level of engagement and enthusiasm among students. Tweddell, Clark, and Nelson (2016) reported similar findings in a study of pharmacy instructors: TBL enhanced student engagement and peer learning, increased faculty satisfaction in teaching, and developed transferable skills, but the work required to migrate a course from lecture-based to TBL was substantial, and the skill set required of the teacher to transition to facilitator was daunting. The researchers, however, were emphatic that the benefits of TBL outweighed the challenges (Tweddell, Clark, & Nelson, 2016).

Student benefits of TBL cannot be overstated: increased engagement, enthusiasm, understanding, and accountability. Yet, despite these obvious benefits, faculty still seem conflicted by competing priorities in TBL: student engagement vs. increased workload. In a longitudinal study that examined faculty perceptions after several semesters of TBL, all faculty who participated in the study felt that student engagement and satisfaction improved as compared to a traditional lecture format, regardless of the number of semesters (Kebodeaux, Peters, Stranges, Woodyard, & Vouri, 2017). Workload for faculty increased for the first semester, but faculty reported that after three semesters, faculty workload remained the same or decreased. Perhaps most significantly, though, was the fact that Kebodeaux, Peters, Stranges,
Woodyard, and Vouri (2017) found that the longer faculty taught using TBL, the more likely they were willing to use it in other courses.

**TBL and Student Success**

Studies have shown definitively that both students and faculty agree that TBL is engaging (Kazory & Zaidi, 2018; Morris, 2016) and promotes both student and faculty satisfaction (Palmer, 2013; Tweddell et al., 2016), even if that comes with added work or the need for a new set of skills. But does TBL work? Does it promote learning and contribute to student success?

Sisk (2011), in a systematic research review of TBL, examined 17 original studies and in addition to student engagement and satisfaction, also looked at test scores. Although Sisk pointed out that researchers needed to be more rigorous in their research designs, Sisk observed that test scores did improve among TBL students, and notably, academically under-performing students were more successful in TBL courses than in more traditional lecture-based formats. A study by Koles, Stolfi, Borges, Nelson, and Parmelee (2010) similarly found that medical students instructed in a TBL format achieved nearly 6% higher mean scores than their peers who were taught using a traditional lecture format. Students in the lowest quartile academically showed the greatest benefit, with a nearly 8% higher mean score, but students in the highest quartile academically showed nearly a 4% improvement. Isbell, Makeeva, Caruthers, and Brooks (2016) compared test scores of PA students in a gross anatomy course taught using TBL with a cohort who were taught in a traditional dissection lab. TBL students scored higher on 75% of the written and laboratory practical exams and scored higher in final grades. In a different study, healthcare management students in a TBL course evidenced better test scores, increased knowledge retention, and greater student satisfaction than their lecture/exam format counterparts (Rezaee, Moadeb, & Shokrpour, 2016). In a longitudinal study by Warrier,
Schiller, Frei, Haftel, and Christner (2013), results showed definitively that both short-term and long-term exam scores improved significantly, showing that TBL assisted in knowledge gains that extended into the next academic year, a critically important piece of data for educators concerned with the care of future patients.

**TBL and Healthcare**

In 1998, no medical school in the US was using TBL. By 2015, more than 100 medical schools had adopted TBL in some fashion (Haidet, Kubitz, & McCormack, 2014). There are several reasons why healthcare educators embraced the concept of TBL. Because healthcare education today requires that students absorb an ever increasing and constantly changing body of knowledge, pass multiple choice licensing exams, evidence core competencies, and then be able to think critically and apply that knowledge in a practical way with their clients and patients, TBL in healthcare education seems like a natural fit (Parmelee, 2008). Healthcare professionals today need an appreciation of teamwork, problem solving skills, self-awareness, strong communication, and social skills. All these skills are intentionally cultivated in a TBL setting (Sibley & Parmelee, 2008). The structure of TBL teaches future healthcare workers how to work collaboratively in teams, think critically, problem solve, apply knowledge in real life settings, and pay attention to how they communicate with others, respect differences, listen, and ensure that everyone’s voice is heard. Students in TBL are challenged to grow in self-awareness, self-reflection, and self-care, while learning to work and grow with others on a team who are engaged in the same pursuits. Teamwork is critical to the success of healthcare providers because of the increased emphasis on interprofessional teams in healthcare settings, and the need to collaborate across disciplines (Michaelsen & Sweet, 2008). TBL’s emphasis on teamwork provides an opportunity within the construct of a healthcare curriculum to hone interpersonal skills like
listening, patience, tolerance of diverse perspectives, difficult conversations, compromise, and assertiveness (Seymour, 2013). Amid contentious team discussions or interpersonal conflict, students hone emotional regulation and stress management skills. While role playing patient-provider encounters or in dealing with fellow teammates, students cultivate empathy by being immersed in the experience of a suffering patient, or a struggling team member. TBL is not just about assignments and grades; rather, TBL, while developing critical skills, also develops emotionally intelligent providers of patient-centered care.

Another important value in TBL for healthcare education is the importance of critical thinking and learning (Janssen, Skeen, Schutt, & McMahon, 2008). Traditionally, healthcare education has utilized a didactic model of textbooks, lectures, and exams. TBL utilizes an active learning approach that can best be described as “dialectic”, based on the Socratic method of questions and answers which encourages students and teachers to question and determine the validity of a statement or response (Janssen et al., 2008, p. 78). The ability for students to learn from one another, to question their own ideas and assumptions, to be challenged by others, and to have a mutual exchange of ideas and knowledge helps to clarify one’s thinking, challenge implicit and explicit biases, and provide rich opportunities for new learning and insight (Black, Blue, Davidson, & McCormack, 2016). When compared to traditional lecture/exam formats, TBL has been shown to be perceived by students to improve verbal communication and critical thinking better than the traditional didactic approach (Huggins & Stamatel, 2015). Through this pedagogical approach, healthcare students learn to refine their diagnostic and clinical skills, while learning the knowledge required to be an effective clinician.

TBL is still considered rather new to healthcare education, so disciplines have adopted the TBL approach with differing enthusiasm and willingness (Burgess & Mellis, 2015). Nursing
programs have been eager to adopt TBL as a pedagogy, with positive results. Nursing studies have shown the efficacy of TBL in promoting class engagement and self-directed learning (Cheng et al., 2014), problem solving, knowledge, and clinical performance (Kim, Song, Lindquist, & Kang, 2016), and team learning and efficacy (Wong et al., 2017).

Physician assistant studies programs have been slower than other healthcare professions to endorse the use of TBL as a pedagogical approach. Nevertheless, studies support the benefits: how to problem solve in real time, and how to collaborate with future professional colleagues (Philpot, 2008). University of Alabama at Birmingham utilized TBL in PA studies as part of its gross anatomy course, not only to improve student outcomes, but also to deal creatively with the increasing lack of cadavers available for dissection, a central part of any gross anatomy course. Findings showed improvements in short-term knowledge outcomes. The study also recognized the benefit of well-prepared students filling in knowledge gaps for students who had not prepared as well, or who had less of a working command of the information (Isbell, Makeeva, Caruthers, & Brooks, 2016). In a related pilot study at LIU Brooklyn, students were asked to compare the effectiveness of TBL and more traditional lecture/exam formats. Most students found the TBL activities helpful in preparing for class though the study could not determine the effect of TBL on long term retention (Nguyen, Wong, & Pham, 2016).

**Team-Based Learning and Emotional Intelligence.** A significant lack of research exists in the study of TBL and emotional intelligence in healthcare education. Only three studies were identified in a database query of both team-based learning and emotional intelligence. Borges, Kirkham, Deardorff, and Moore (2012) studied the effect of TBL on group emotional intelligence during an internal medicine clerkship and found that in the areas of emotional self-awareness, recognizing others’ emotions, and managing others’ emotions, there was a
statistically significant improvement from pretest to posttest. However, the Borges et al. study (2012) was a one-group study that lacked a comparison group, thus rendering the results less reliable.

Borges et al. (2015), likely to strengthen the findings in her earlier research, studied the impact of team emotional intelligence and gender, this time, using a comparison group. Results showed that though both the lecture and the TBL group experienced increases in group EI from pretest to posttest, the TBL group experienced significantly higher gains than did the didactic group. Gender, however, was not a significant factor.

A longitudinal study by Zgheib, Dimassi, Bou Akl, Badr, and Sabra (2016) of TBL, team performance, and peer evaluations. Though this study did not explicitly examine the connection between TBL and EI, it did mention EI and the research of Borges and her colleagues (2012) in its literature review, and it explored issues of communication, professionalism, and personal development, all of which are the realm of EI. Their findings, like those of Borges et al. (2012, 2015), showed that TBL improved team dynamics, problem solving, professionalism, and personal development (Zgheib, Dimassi, Bou Akl, Badr, & Sabra, 2016).

These studies, taken together, provide significant support for the impact of TBL in the development of emotional intelligence skills.

Conclusion

Team-based learning has flipped the traditional classroom on its head. Studies showed that once students and teachers were familiar with the approach and the process, student engagement improved dramatically (Kazory & Zaidi, 2018; Morris, 2016), student and teacher satisfaction increased (Palmer, 2013; Tweddell et al., 2016), and critical thinking, knowledge, and student test scores improved, over the short and long term (Isbell et al., 2016; Koles et al.,
The challenge of TBL, however, is in its conception. Students and teachers have been indoctrinated into a passive education model that is supported by the lecture and exam format. It requires a significant amount of time and training on the part of educators to migrate their courses to an active learning TBL model, and students are required to be open, willing to risk, and try something new. But if teachers and students take the risk, the benefits outweigh the costs.

**Summary**

To study the effects of team-based learning on the emotional intelligence of physician assistant students, this literature review first examined the development of the concept of emotional intelligence, then explored ability-based, trait, and mixed emotional intelligence approaches. Each approach has its own school of thought, along with a cadre of supporters and critics. No one approach is overwhelmingly accepted.

Both performance-measure instruments and self-reported instruments were examined as methods to measure EI. Like the various approaches themselves, each assessment instrument has its disciples and detractors, and no one assessment was overwhelmingly accepted or endorsed.

The field of emotional intelligence is still relatively young, albeit rather extensively studied. Scholars and practitioners are still understanding and exploring the field and its many questions. The science, if one is willing to admit to that reality, is nascent. Language, consequently, is imprecise and still developing, and the scholarship is not always sufficiently rigorous or comprehensive in the review of the field and its nuances.

Because of the imprecision of the field, its related measures are equally imprecise. The relationship of trait to ability-based approaches, and the validity and reliability of self-reports and
performance-based measures continues to be a developing field of research, worthy of further study and exploration. Other new measures, like 360° reporting which derive from other fields like human resources and organizational development, are also worthy of consideration and further study. But without rigorous scholarship, the field runs the risk of being doomed to pop psychology, populist authors, and questionable research.

Team-based learning in healthcare education is also a relatively new phenomenon, and even as more healthcare programs look to TBL as a possible pedagogical approach, the research that supports that theoretical perspective is limited and sometimes unreliable, and statistically or methodologically questionable. Like the field of EI itself, TBL, and similar problem-based and group-based pedagogical methods, are all the rage in educational circles (Burgess et al., 2017). But what does the research say about the validity of those approaches? This literature review confirmed the fact that not only is TBL a good fit for healthcare education, but that many of the desired learning outcomes are in fact realized. TBL improves communications and interpersonal skills, develops assertiveness and leadership traits, leads to academic success especially for underperformers, promotes self-awareness, improves problem solving, and strengthens critical thinking (Michaelsen & Sweet, 2008; Sibley & Parmelee, 2008). All these skills are clearly crucial to success in tomorrow’s healthcare professionals.

What continues to be unclear, however, even as healthcare education moves towards increasing endorsement of TBL approaches, are the results from more longitudinal studies about long range effects of TBL on learning outcomes and on group and individual EI. How does TBL impact the EI of an individual in a team setting? How does TBL influence EI over time? What kind of EI training can be used in a healthcare education setting to improve EI outcomes? What valid measures can we use to study those questions?
This study explored some of those outstanding and critical questions. This quantitative study of physician assistant students in a graduate healthcare institution in the Boston area explored the impact of team-based learning on individual trait emotional intelligence using Petrides’ TEIQue (2001). The study provided an opportunity to explore the reliability and scientific rigor of the field of EI, and perhaps most importantly, to strengthen the EI of future healthcare providers, to ensure the satisfaction, wellbeing, and health of the next generation of patients and clients.
Chapter Three: Methodology

The purpose of this quantitative research study was to explore the effects of team-based learning on the trait emotional intelligence of physician assistant students in a New England graduate school. Since the PA program being studied is a relatively new one, quantitative research would provide a foundation from which to engage in future qualitative research to explore student satisfaction or perceptions, as well as to support ongoing program efforts and funding. In addition, the literature review of Chapter 2 evidenced a need for emotionally intelligent healthcare workers. Quantitative research that clearly establishes team-based learning as an effective pedagogy in developing emotional intelligence would support that need.

Good research demands good design (Knight, 2010). In order to provide the methodological backbone to engage in this study, this chapter will examine the research questions and hypotheses, the research design that supports those hypotheses, the sampling strategy, the process of data collection and analysis, issues of validity, reliability, and generalizability including the researcher’s own positionality statement, and finally, the ethical demands that are essential to the protection of human subjects and the integrity of the researcher’s task.

**Research Problem, Questions, and Hypotheses**

The purpose of this quantitative study was to examine the effect of team-based learning on the trait emotional intelligence of graduate students in a physician assistant studies program in the northeast U.S.

**Research Questions**

**R1:** Does team-based learning affect trait emotional intelligence in physician assistant students?

**R2:** Does team-based learning affect emotional regulation in physician assistant students?
R3: Does team-based learning affect stress management in physician assistant students?

R4: Does team-based learning affect trait empathy in physician assistant students?

R5: Do confounding variables, such as age, gender, or ethnicity/race have a mitigating effect on trait emotional intelligence in physician assistant students?

Hypotheses

To address R1, this study investigated the following hypotheses:

H1: There is no statistically significant difference in pretest trait emotional intelligence as measured by the TEIQue between the lecture-based group and the TBL group of PA students.

H2: There is a statistically significant difference in the change score between pretest and posttest trait emotional intelligence as measured by the TEIQue in the TBL group of students as compared to the lecture-based group.

In R1 and its hypothesis H1, the dependent variable was trait emotional intelligence. In H2, the dependent variable was the change score between pretest and posttest, derived by subtracting the pretest score from the posttest score. These dependent variables are continuous or scale variables because they exist "along a continuum" (Fraenkel, Wallen, & Hyun, 2014, p. 77). These dependent variables were operationalized using the TEIQue, a trait emotional intelligence instrument developed by K. V. Petrides (Petrides, 2001). The TEIQue is an online, self-administered 153 question survey that examines 15 distinct facets of trait emotional intelligence, four factors, and global trait emotional intelligence (Petrides, 2009a). It was chosen because of its ease of access, free cost, and because trait emotional intelligence is understood as a set of skills that can be developed, against ability-based emotional intelligence which is considered a kind of cognitive intelligence, like IQ (Salovey & Mayer, 1990).
The independent variable was team-based learning, a nominal or categorical variable, “in which the numbers given are merely a descriptor of that category” but cannot be ordered (Muijs, 2011, p. 85). Other scholars described this sort of variable as dichotomous: a “qualitative variable, such as gender, (which) can take on only two values” (Portney & Watkins, 2009, p. 64). To render team-based learning as a nominal variable, the data for the two groups of PA students were coded as 1 for the lecture-based group, and 2 for the TBL group.

To address R2, this study investigated the following hypotheses:

**H3:** There is no statistically significant difference in pretest emotional regulation as measured by the TEIQue between the lecture-based group and the TBL group of PA students.

**H4:** There is a statistically significant difference in the change score between pretest and posttest emotional regulation as measured by the TEIQue in the TBL group of students as compared to the lecture-based group.

To address R3, this study investigated the following hypotheses:

**H5:** There is no statistically significant difference in pretest stress management measured by the TEIQue between the lecture-based group and the TBL group of PA students.

**H6:** There is a statistically significant difference in the change score between pretest and posttest stress management as measured by the TEIQue in the TBL group of students as compared to the lecture-based group.

To address R4, this study investigated the following hypotheses:

**H7:** There is no statistically significant difference in pretest trait empathy as measured by the TEIQue between the lecture-based group and the TBL group of PA students.
**H8:** There is a statistically significant difference in the change score between pretest and posttest trait empathy as measured by the TEIQue in the TBL group of students as compared to the lecture-based group.

In **R2-R4** and their hypotheses **H3-H8**, the dependent variables were three of the TEIQue trait-emotional intelligence facets: emotional regulation, stress management, and empathy, and their related change scores between pretest and posttest. The independent variable continued to be team-based learning. Emotional regulation, stress management, (Măirean, 2016), and empathy (Grewal & Davidson, 2008) have all been shown to be important soft skills for the success of healthcare providers; since the study focused on the education of future healthcare providers, the ability to focus the research on specific facets of trait emotional intelligence that targeted specific healthcare related skills were essential.

To address **R5**, this study investigated the following hypothesis:

**H9:** The confounding variables of age, gender, or ethnicity/race have a statistically significant effect on the trait emotional intelligence of PA students.

In **R5** and its hypothesis **H9**, the dependent variable continued to be trait emotional intelligence, while the demographic data, i.e. age, gender, and ethnicity/race, were categorical independent variables.

**Research Design**

The research questions and hypotheses evidence a post-positivist, quantitative methodological approach, because they are both empirically grounded and logical (Creswell, 2013), and because explanations concerning cause can be attempted (Mertens, 2010). Quantitative studies are typically positivist or post-positivist (Creswell, 2003). Rather than seeking to explore the experience or perspectives of a small sampling of people in a particular
setting as is true of qualitative research, the post-positivist perspective seeks to answer “yes” or “no” research questions, and to seek a possible objective truth or causal relationship (Creswell, 2003). What distinguishes the positivist from the post-positivist perspective is the possibility of one truth among others (Mertens, 2010). Significant to note, however, is that TBL, with its emphasis on group and applied learning, is itself a constructivist pedagogical approach (Harris, 2017). Constructivist theory assumes that knowledge is co-created and is impacted by the experience of those who encounter it (Mertens, 2010).

A quantitative research approach was appropriate for this study for several reasons. First, when testing the usefulness of an intervention like the effectiveness of team-based learning, a quantitative study is the preferred approach (Creswell, 2003). Secondly, as is evidenced by the literature review of Chapter 2, there was a very limited amount of quantitative research that examined the effect of team-based learning on emotional intelligence, so a quantitative study that attempts to answer the question as to whether TBL does in fact have the desired effect then allows for future qualitative research that could explore student perceptions, faculty resistance, or other related qualitative questions. Finally, in healthcare education settings which are grounded in science and evidence-based practice (Portney & Watkins, 2009), quantitative research provides legitimacy to a field like emotional intelligence that can often be dismissed as non-scientific, or falsely perceived as “a chimera, a fantastical creature made up by stitching together the parts of several real entities” (Matthews, Zeidner, & Roberts, 2002, p. 527)
The research design was a quasi-experimental intact group pretest-posttest design; random assignment, as per a pure experimental design, was not an option (Fraenkel et al., 2014). As Figure 2 illustrates, this design is also often referred to as a non-equivalent control group design or a non-equivalent group design using the NEGD acronym (Portney & Watkins, 2009). It relies on pre-existing intact groups, like classes of students, rather than randomized control and treatment groups.

Although an NEGD pretest-posttest design is limited by its lack of randomization, it does have benefits. One of the advantages of this design is that the research is conducted in a natural setting, so that researchers can be confident that the results can be replicated in another similar setting, rather than in the sterile environment of a laboratory (Muijs, 2011).

The treatment group was a class of PA students at a local graduate school of healthcare which recently implemented TBL for its new PA program. The comparison group was a different PA program, taught in a traditional lecture format, at a matched site: based on similarities of size of program, location, and student demographics. The comparison group’s school was familiar to the researcher, and readily available for research purposes. Both schools had average incoming classes of approximately 45-50 students. Both schools were in New England, and both programs agreed to participate after discussion between the chairs of each program and the researcher.
All first-year students in both PA programs were asked to participate in the study. Both groups were first tested using the TEIQue v. 1.50 (Petrides, 2001). The test could be done by all students online, without significant researcher interference, thus reducing researcher bias, a strong concern for post-positivist quantitative research (Creswell, 2013).

Students then underwent eight weeks of graduate academic work: either team-based learning or traditional, lecture-based teaching. After eight weeks, the TEIQue was re-administered to both groups.

**Design Limitations**

Though a quasi-experimental, NEGD pretest posttest design is considered one of the strongest non-randomized research designs, it does nevertheless have some limitations (Trochim, 2006). One of the threats to the internal validity of this design includes experimental mortality (i.e., comparison group students may drop out of the study because of their lack of participation in TBL).

Another limiting threat to internal validity is maturation; students simply grow and change due to their learning environment (Creswell, 2014).

Another threat to internal validity is the testing threat because of familiarity with the test from pretest to posttest (Portney & Watkins, 2009). This threat was mitigated by the eight-week gap between test and retest. Portney & Watkins (2009) asserted that the time between pretest and posttest needs to be considered seriously, while balancing an interval which is long enough to eliminate the effect of memory, but soon enough to avoid an unaccounted-for change in the dependent variable. Eight weeks was chosen arbitrarily to meet those conditions. Future research could propose different time intervals to study different effects.
Population and Sampling

For the purposes of this research, the treatment site was a graduate school of healthcare in the northeastern US. The school is affiliated with a leading US hospital and has a stellar reputation for educating healthcare leaders (U.S. News and World Report, n.d.). A few of its newer programs have adopted a team-based learning pedagogy though little research has been done to study the impact of that approach. Familiarity with the site, a demand for evidence-based practice among its new programs, and ease of access to those team-based learning programs and its students provided the rationale for choosing this treatment study site. The researcher is employed by the college and works directly with PA students. The chair of the program was familiar with the research proposal and agreed to cooperate and to encourage students to participate.

The comparison group study site was a similarly sized lecture-based PA program located in the same geographic area as the treatment group. The PA program there is the antithesis of the treatment group PA program: it is the oldest program in the area and is taught in an entirely lecture-based format. The program attempted both TBL and problem-based learning, and quickly abandoned both efforts as ineffective, too difficult to implement, and affecting student evaluations of the course/professor (R. Baginski, personal communication, 8/20/2018). The chair of this program was also familiar with the study proposal, agreed to cooperate and to encourage students to participate.

Target population was graduate physician assistant studies students. Convenience sampling was employed by using currently registered, first year students in both PA programs. Convenience sampling was utilized since the two programs had pre-existing class structures (Creswell, 2003).
Approximately fifty students were in each group. An a priori power analysis, utilizing G*Power 3 software (Faul, Erdfelder, Lang, & Buchner, 2007), was used to determine the optimum sample size to reject the null hypotheses accurately, or when in fact the null hypotheses are false, to avoid a Type II error (Portney & Watkins, 2009). Using commonly accepted alpha or statistical significance value = .05 and an amount of power = .80, and a rather arbitrary effect size = .5 resulted in a minimum group size of 34, or a total sample of 68 participants, well below the approximately 90-100 students who were invited to participate in the study (Creswell, 2003).

This convenience sampling, despite its obvious usefulness, creates a challenge to the external validity, i.e. the generalizability of the research. To address that concern, in the future, the study should be replicated 1) in other schools with similar programs, and 2) in other academic areas that use team-based learning approaches. Since a randomized sample was not possible, anonymous demographic details (i.e., gender, age, ethnicity/race) were not collected so that the reader can determine the generalizability of the data for their own purposes.

**Data Collection**

**Instrument**

Since the research design relies on the theory that emotional intelligence can be developed, the choice was made to measure trait emotional intelligence (Petrides & Furnham, 2001), since that EI construct relies on the idea that like other personality traits, EI can, in some settings, change (Petrides, 2009b). Further, emotional experience is by its nature subjective and as such, is better suited to self-reporting (Lin et al., 2013).

The TEIQue (Petrides, 2001) is a trait EI test developed by K.V. Petrides and his colleagues. As Appendix A indicates, the test consists of 153 statements to which participants respond using a 7-point Likert scale (1 = *Completely Disagree* to 7 = *Completely Agree*).
Significant to note is that responses 2-6 have no explanatory titles so that respondents are left to assume what the values 2-6 represent. A typical item is: “I’m usually able to control other people” (Petrides, 2018, #1). There are 153 items which correlate to the 15 facets of trait EI, with about 10 items per facet. The instrument is self-administered online through Thomas International. Scores are reported on a scale from 1 to 7, with a theoretical average of 3.5 (Petrides, 2009a).

The TEIQue does not measure cognitive skills like an IQ test does; rather, the TEIQue is a self-report of abilities, perceptions, and attitudes (Petrides, 2001). There are twenty variables in the TEIQue: global trait EI, 4 factors, and 15 facets. In addition to a global trait EI score, the TEIQue assesses four broader factors: well-being, self-control, emotionality, and sociability (Petrides, 2009a). The TEIQue also comprises 15 facets or subscales (i.e., adaptability, assertiveness, emotion appraisal of self and others, emotion control, emotion expression, emotion management of others, low impulsiveness, relationships, self-esteem, self-motivation, social awareness, stress management, trait empathy, trait happiness, trait optimism). Three of those facets, namely emotional regulation, stress management (Măirean, 2016), and empathy (Grewal & Davidson, 2008), are particularly valuable skills for healthcare workers, and, with global EI, were dependent variables in the study. Petrides (2009b) defined emotional regulation as the capacity to control one’s emotions, stress management as the capacity to withstand pressure and regulate stress, and empathy as the capacity to understand someone else’s perspective.

In addition to the 153 item self-report, the TEIQue collects demographic information (e.g., gender, marital status, education level, ethnicity, salary, political affiliation; Appendix A). It is estimated by the developer of the assessment tool that it should take someone about 20 minutes to complete the instrument (Petrides, 2009a).
The assessment is taken online through a link to the website of Thomas International, a company that has proprietary interest in the TEIQue and has direct access to its author, Dr. Petrides. Test data is stored electronically in encrypted cloud-based storage. Once the assessment is completed, Thomas International can provide the raw data for research purposes using a password-protected Excel spreadsheet and can generate a report for the participant through a unique identifier number. For this study, the report was generated only after the second iteration of the assessment so as not to compromise the results of the second assessment, impact the test-retest reliability, and to provide further impetus to participants to complete the pretest-posttest study.

The TEIQue is psychometrically validated (Lin et al., 2013) and is notable for its strong theoretical foundation (Andrei, Siegling, Aloe, Baldaro, & Petrides, 2016). Trait emotional intelligence, also referred to as emotional self-efficacy, is described by Petrides as located at the lower levels of personality hierarchies and has incremental validity distinct from the Big Five and the Giant Three personality traits (Petrides, 2009b). A recent systematic review of the literature and meta-analysis examined incremental validity of the TEIQue and confirmed the distinctiveness and importance of trait EI as distinct from personality (Andrei, Siegling et al., 2016). Internal consistencies are all satisfactory (Appendix B), excellent at the whole scale level (Jolić-Marjanović & Altaras-Dimitrijević, 2014) and the alphas are robust even in small samples as was the case in this study (n < 50; Petrides, 2009b).

The normative sample from which TEIQue analyses were reported are quite like the intended sample for this study: of 1721 individuals, 53% were female, 58% were White, and the mean age was 29.6 (Petrides, 2009a).
Test-retest reliability of the TEIQue instrument raised issues for this study, since the study proposed to explore whether team-based learning influenced emotional intelligence, presuming the mutability of EI over time. Petrides (2009a) observed that EI self-perceptions should remain relatively stable over a lifespan. Change is possible, according to Petrides, only under two different circumstances: 1) major life issue like a death or divorce, or 2) a “conscious effort on the part of the individual” (p.21). All TEIQue test-retest facet scales over the course of 12 months, except empathy, had statistically significant correlations (Petrides, 2009a).

The TEIQue has shown positive external validity and generalizability: it has been translated into more than 20 languages, and research using those translations continue to affirm the instrument’s validity and reliability across cultures and languages (e.g., Aluja, Blanch, & Petrides, 2016; Jolić-Marjanović & Altaras-Dimitrijević, 2014; Stamatopoulou, Galanis, & Prezerakos, 2016). Unlike other personality profiles that contextualize personality dimensions based on setting (e.g. leadership personality), the TEIQue is widely used in many different settings, including education and healthcare which enhances its generalizability and internal consistency (Petrides, 2009a).

**Procedures**

The researcher emailed all first-year students from both PA programs and asked everyone to participate in a research opportunity, but with a clear opt-out option, and with an emphasis on the fact that grades would not be impacted by participation (see Appendix C). At the TBL site, the students were familiar with the researcher, due to previous involvement in the program and the small size of the institution. Since that familiarity does create a potential for pressure to participate, students were reminded throughout the process that they were not required to participate, could opt out at any point, and could rescind permission to use their information.
All students then received an email from Thomas International (Appendix D) that included the required IRB consent form, and a link to the actual assessment, along with a unique username and password. Students from both institutions were given time in class to complete both assessments. All participants who completed the second assessment received a free personalized emotional intelligence report from Thomas International. Students were also given the opportunity to participate in a lottery for a $50 Amazon gift card.

After the initial TEIQue self-assessment, students underwent either 8 weeks of TBL or lecture-based curriculum. Then, the TEIQue was re-administered using the same process: an email from the researcher was sent out (Appendix E), followed by an email with a clickable link from Thomas International. Class time was again provided for students to complete the assessment.

Collected data was then exported by Thomas International to the researcher using a password-protected Excel spreadsheet.

**Data Analysis**

Data analysis was conducted with IBM SPSS Statistics, v.21. Data sets, provided as Excel spreadsheets from Thomas International, were imported into SPSS. SPSS was utilized first to clean the data, to check for consistency, and to highlight missing data.

Study variables were presented using descriptive statistics, such as the mean, standard deviation, and minimum/maximum values for continuous variables (e.g., global trait emotional intelligence, stress management, emotional regulation, and empathy) and frequencies and percentages for categorical variables (e.g., team-based learning, age, gender, and ethnicity/race).

Independent samples t-tests were conducted using SPSS to test the various hypotheses. T-tests are used to compare means between and within groups. Several assumptions must be met
to use independent t-tests: the dependent variable must be continuous, there can only be two groups, and ideally, there must be random samples. Emotional intelligence is a continuous variable, and there are only two school groups, but those groups are not random. Because the samples were similarly sized (i.e. 45-50), however, the t-test results should be quite robust if the sample is large enough (Muijs, 2011). Another assumption that must be met to use independent samples t-tests is the assumption of normality of the dependent variable: emotional intelligence. Histograms were used to visualize the distribution. Finally, independent samples t-tests assume homogeneity of variance (e.g., that the means of each group are relatively the same). Levene’s test of equality for variance was utilized to test that assumption (Portney & Watkins, 2009).

Hypotheses 1, 3, 5, and 7 all compared intact groups of TBL and lecture-based students. The independent or unpaired t-test is a parametric test used in cases like these when groups are “composed of an independent set of subjects” (Portney & Watkins, 2009, p. 437). These hypotheses examined the mean differences between the two independent groups at pretest; hence the unpaired or independent t-test is an appropriate measure.

Hypotheses 2, 4, 6, and 8 compared change scores between groups from pretest to posttest. Several different approaches to analyze these hypotheses could be used. Independent t-tests could still be used, since these hypotheses meet all the t-test assumptions. A new variable would be created that is the change score between pretest and posttest, then independent samples t-tests could be conducted. However, multiple t-tests increase the risk of Type 1 errors or finding results that are in fact not there, so a different method was preferred (Portney & Watkins, 2009).

A better approach was the mixed model analysis of variance (ANOVA), sometimes referred to as the split plot ANOVA, which tests differences in means between two independent groups (e.g., TBL vs lecture group) and within groups (e.g., various emotional intelligence
scores), across repeated measures (e.g., pretest and posttest; Muijs, 2011). Mixed model ANOVA provided three results: 1) a main effect of groups: is there a mean difference between the two groups overall? 2) a main effect of time: is there a change over time from pretest to posttest regardless of group? and 3) a main effect of groups by time: is the pattern of means different over time between the two groups?

To address R5 and its H9 hypotheses, covariates were included in the mixed model ANOVA. Results showed whether gender, age, or ethnicity/race had any effect on global trait emotional intelligence, or any of the facets of empathy, emotional regulation, or stress management.

**Protection of Human Subjects**

The rights and privacy of participants in research is tantamount (Creswell, 2013). IRB approvals from two institutions were required and obtained from the two study sites and from the researcher’s institution. Informed consent was explained several times throughout the course of the study: in both emails from the researcher, and in both emails from Thomas International, with an emphasis on an understanding that there was no pressure to participate, grades were not dependent on participation, and non-participation would not affect student standing. Participants were all adults, and able to make their own decisions about participation.

No names were used in any data collection. Thomas International provided a unique identifier and password to each participant. Test data was saved in encrypted cloud-based storage and emailed to the researcher using a password-protected Excel spreadsheet. Data was stored on an encrypted laptop using password-protected Dropbox files for virtual storage. Any hard copies of data were kept in a locked file cabinet and will be shredded after three years.
Any discussion of emotional intelligence has its risks, since it can lead to deeper self-awareness, and discussions about appropriateness of career choices or lack of aptitude for certain types of work. Part of the informed consent addressed that concern, so that participants a priori were prepared for the possibility and understood the risks.

The emotional intelligence test is confidential, so the risk to the participants was minimal, but some demographic information was collected, so all possible risks were explained in detail and available online when the student agreed to participate. Since part of the design utilized dependent samples and the two classes were intact and not randomized, anonymity was not assured, only confidentiality.

**Positionality**

A description of this study necessitates a discussion not only of design limitations, but arguably more importantly, of the researcher’s limitations, or more precisely, the positionality of the researcher. Positionality can be understood as the intersection of a researcher’s unique identities, biases, and perspectives that condition and qualify her/his work (Parsons, 2008). Recognizing and controlling these explicit and unconscious biases, even among well-intended people, is key (Banaji & Greenwald, 2013; Machi & McEvoy, 2016). My understanding of bias is important to my research. Bias typically has a negative connotation, and historically, has been seen with a good deal of skepticism by scholars. My approach is more post-foundationalist: simply to be explicit about my positions and attitudes, and constantly to be engaged in a reflective awareness of my positionality relative to my work (Roulston & Shelton, 2015). Positionality demands that I address these key questions: Who am I at this moment? What do I think I know about my participants and the institutions I will be studying? What do I think I know about my subject matter?
Who Am I?

I am a White, middle-aged, middle class, first generation, college-educated, cis-gendered gay man who works in a graduate school of healthcare in the Northeast U.S. None of these categories are monolithic or rigidly defined however (Parsons, 2008), and the intersectionality of those various identities are uniquely my own and define me as this scholar-practitioner (Nganga, 2011). I grew up in a blue-collar melting pot in New England. I was privileged to attend a private Catholic high school, and I participated in that privilege, if only from a distance: I was gay, unathletic, and poor, only allowed to be there on an academic scholarship, but always made to feel like the outsider. My undergraduate academic work was equally privileged but always as the outsider looking in. During my education, I had deeply formative team-learning experiences through educators who experimented with flipped classrooms and group projects that convinced me of the value of collaborative learning and the impact of team-building to psycho-social development.

For twenty years I lived and worked as a Catholic priest. It was during this part of my professional life that I learned the importance of emotional intelligence, albeit without the terminology to articulate it. The ability to understand and manage my own feelings, while at the same time being able to intuit and negotiate the feelings and attitudes of others, enabled me to be a highly effective priest and counselor, to engender trust, and to build relationships, teams, and communities.

My partner and I live in a very diverse ethnic, racial, and religious community. As a gay man who experienced homophobia and bigotry firsthand, I developed a radical posture towards difference and the need to agitate for change, and see difference as structure, not deficit (Jupp & Slattery, 2006).
My unique perspectives are those of a gay, middle class, educated, White man who has known privilege and power throughout my life. I have not walked in the shoes of a Black woman, a 20-something healthcare student, or an undocumented Muslim immigrant. These perspectives condition and bias my thinking and approaches, and can impact research and conclusions, hence the need to articulate them at the outset.

**What Do I Know About My Participants and Institutions?**

I worked closely with two groups of PA students at two different institutions of learning, one of which is at my own institution. Those students are, by my limited observation, mostly female, mostly White, and mostly millennial (e.g., born in or after 1982; Howe & Strauss, 2000). Because of the high tuition of the programs and the cost of living in an urban Northeast setting, I assume, perhaps falsely, that many of these students come from rather affluent backgrounds. As a baby boomer, I am often challenged by stereotypical thinking about millennial students: entitled, spoiled by their helicopter parents, technologically crippled, socially awkward, and self-absorbed, while at the same time, tolerant to a fault, and with a deep sense of social commitment. Those biases are often proven false in my dealings with these same millennial students, but the biases exist, always smoldering not far from the surface. I need to be constantly aware of this bias so that my conclusions in my research are drawn from the data, and not from my pre-existing biases about millennial participants.

At my own institution, the PA students, faculty, and staff know me, trust me, and esteem me as a collaborator and colleague. I am not the outsider looking in. Rather, I work closely with the program and its students: I am actively involved in the admissions process, am a frequent workshop presenter, and spend significant time working on soft skills and group dynamics with each of the TBL teams. But I am also the White male of power and privilege who conducted the
research, and that position of power can compromise the integrity of the research and challenge the ability of mostly female participants (Briscoe, 2005). I need to at least acknowledge the fact that the power differential between me and “the other” can impact my research. Were students honest in their responses, or were they saying what they thought I wanted to hear because of my position?

The second group of physician assistant students was at an institution about whose PA program I was unfamiliar. They simply were willing to engage in the research as a PA program that does not utilize TBL as its principal pedagogical approach. I clearly was biased towards TBL and need to be sure that I treated this comparison group in the same way as the more familiar TBL group at my own institution.

I chose both programs because they were logistically convenient, provided readily available sources of data, and presented differing pedagogical perspectives, making the contrast of the two groups potentially more illuminating.

A statement of positionality also predicates an honest reflection on the possible positionality of my participants and institution, since all of these are factors in the conceptual framework of my research (Ravitch & Riggan, 2012). Which perspective do these students have towards emotional intelligence in a highly individualistic and technological age? Does the evidence-based and highly scientific organization for which I work view emotional intelligence as a real value and an assessable trait? Both possible positions can affect the integrity of my work as much as any bias I bring to the endeavor.

**What Do I Know About My Research Topic?**

My life experience and professional background have enabled me to be keenly aware of others’ feelings and needs, while at the same time, aware of and able to manage my own
emotional realities. I have spent most of my professional career working in various kinds of group settings: leading teams, participating in group retreats, or being involved with staff development. I have facilitated conversations about difficult topics and have seen the need for emotionally intelligent adults and relationships. I know what happens when a doctor has no bedside manner, when a leader delivers bad news without any real empathy, or when a gay man is treated without dignity.

I have experienced the value of team-based learning, especially in healthcare education. I admit my biased perspective here: adult learners, who have been socialized in group settings, learn better in a group of peers who are not only learning subject matter, but also, and more importantly, who are learning life skills: how to negotiate, how to fail, how to share work, how to hold one another accountable, and especially, how to give and receive critical feedback. Those emotionally intelligent skills will lead to better healthcare practitioners, and that will make a real difference in the lives of countless patients and their families.

Conclusions

This positionality statement should be dated and time-stamped, since I am forced to admit that self-knowledge is conditional, or what I think I know. Now, affected by unconscious bias, with growing self-awareness and introspection my knowledge and bias will evolve (Machi & McEvoy, 2016). Here is the key to any positionality statement: the scholar-practitioner is never done with the task of knowing self, knowing the subject of the research, and knowing the perspectives and experiences that color that research (Nganga, 2011).

Summary

The purpose of Chapter 3 was to describe in detail the methodology and design of this quasi-experimental, non-equivalent control group, pretest-posttest design. The overarching
research questions examined the effect of team-based learning on trait emotional intelligence, using the well-researched and psychometrically-validated TEIQue instrument. The effect of gender, age, and race/ethnicity were also examined. Population and sampling were discussed, along with data collection and analysis utilizing SPSS. Ethical concerns, the limitations of the study design, and the positionality of the researcher were also detailed.
Chapter Four: Data Analysis

Research Problem, Questions, and Hypotheses

The purpose of this study was to examine the effect of team-based learning (TBL) on the trait emotional intelligence of physician assistant studies students by exploring five interrelated research questions:

Research Questions

R1: Does team-based learning affect trait emotional intelligence in physician assistant students?

R2: Does team-based learning affect emotional regulation in physician assistant students?

R3: Does team-based learning affect stress management in physician assistant students?

R4: Does team-based learning affect trait empathy in physician assistant students?

R5: Do confounding variables, such as age, gender, or ethnicity/race have a mitigating effect on trait emotional intelligence in physician assistant students?

Hypotheses

To address R1, this study investigated the following hypotheses:

H1: There is no statistically significant difference in pretest trait emotional intelligence as measured by the TEIQue between the lecture-based group and the TBL group of PA students.

H2: There is a statistically significant difference in the change score between pretest and posttest trait emotional intelligence as measured by the TEIQue in the TBL group of students as compared to the lecture-based group.

To address R2, this study investigated the following hypotheses:
**H3:** There is no statistically significant difference in pretest emotional regulation as measured by the TEIQue between the lecture-based group and the TBL group of PA students.

**H4:** There is a statistically significant difference in the change score between pretest and posttest emotional regulation as measured by the TEIQue in the TBL group of students as compared to the lecture-based group.

To address **R3**, this study investigated the following hypotheses:

**H5:** There is no statistically significant difference in pretest stress management as measured by the TEIQue between the lecture-based group and the TBL group of PA students.

**H6:** There is a statistically significant difference in the change score between pretest and posttest stress management as measured by the TEIQue in the TBL group of students as compared to the lecture-based group.

To address **R4**, this study investigated the following hypotheses:

**H7:** There is no statistically significant difference in pretest trait empathy as measured by the TEIQue between the lecture-based group and the TBL group of PA students.

**H8:** There is a statistically significant difference in the change score between pretest and posttest trait empathy as measured by the TEIQue in the TBL group of students as compared to the lecture-based group.

To address **R5**, this study investigated the following hypothesis:

**H9:** The confounding variables of age, gender, or ethnicity/race have a statistically significant effect on the trait emotional intelligence of PA students.
This chapter details the results of the data collection conducted between January and March 2019, using the TEIQue (Petrides, 2001), as provided by Thomas International, and the analysis of that data using SPSS, v. 21. To analyze the data, pretest descriptive statistical analyses examined the demographics of the two different groups at baseline. H1, H3, H5, and H7 were addressed by analyzing pretest EI scores between groups. H2, H4, H6, and H8 were addressed with posttest results, using mixed model ANOVAs to examine the difference in EI scores over time between both groups. H9 was addressed first at pretest, and then as part of the mixed model ANOVAs at posttest.

**Pretest Statistical Analyses**

**Sampling**

Two different graduate physician assistant studies programs in New England were invited to participate in the study. One cohort was taught exclusively using team-based learning, while the other used a traditional lecture format. Both programs had similar curricula: three semesters of academic work, often called the didactic year, followed by a year of clinical rotations in various medical settings. However, as Appendix F describes, what differentiated the two groups was when their respective programs began. The TBL group began its first-year studies in May 2018. By the date of their first TEIQue assessment in January, the TBL group had completed two semesters of coursework: Foundations of Medicine, The PA Profession, Essentials of Hematology & Oncology, Essentials of Dermatology, Essentials of Musculoskeletal Disease and Injury, Essentials of Neurology, Patient Care I, The PA in Practice, Essentials of Cardiovascular Disease, Essentials of Pulmonary Medicine, Essentials of Otolaryngology & Ophthalmology, Principles of Behavioral Medicine, Patient Care II, and Interprofessional Practice.
The lecture-based group began its studies in September 2018, four months after the TBL group. By the date of their first TEIQue assessment, the lecture group had completed only one semester of coursework: Medicine 1, Physical DX 1, Anatomy and Physiology 1, Pharmacology 1, Health Care Delivery, Orthopedics, Psychiatry, and a portion of Clinical Lab.

During the first week of their respective winter semesters which started two weeks apart, students were emailed by the researcher directly to introduce the study and invite their participation (Appendix C). One week later, students received an email from Thomas International asking them to participate in the study. The email included the IRB-approved consent form and a link to the assessment (Appendix D). Both groups were provided with 45 minutes of in-class time to complete the assessment. Students took the assessment directly through the Thomas International website (Appendix A); subsequently, the raw data was sent to the researcher electronically in a password-protected Excel spreadsheet, which was then uploaded to SPSS v.21 for analysis.

Checks for data integrity were conducted. Values outside expected ranges were deleted (e.g., year of birth = 9999). Missing data at the item level occurred only in the demographic section at a rate of less than 6%. Petrides (2018) recommended that if more than 15% of a participant’s data was missing then that case should be eliminated. No participants in the study had that rate of missing data, so no participants were eliminated. Even though there are no widely established cutoffs to deal with missing data and because it is generally accepted that missing demographic data is not imputed, the missing values were treated as null responses and included in the results (Dong & Peng, 2013).

Out of a total of 88 students enrolled in both classes, there was a 93% pretest response rate (N = 82), with an equal number of participants (n = 41) in both the TBL and the lecture-
based groups. Since a priori power analysis using G*Power 3 resulted in a minimum group size of 34 for a total sample size of 68 participants, \( N = 82 \) at pretest produced acceptable results.

**Pretest H1, H3, H5, and H7**

H1, H3, H5, and H7 concerned comparison of mean pretest emotional intelligence scores between schools. Since H1 hypothesized that there would be no statistically significant difference in global trait emotional intelligence score at pretest between the TBL and the lecture-based groups, an independent samples t-test was conducted to test the hypothesis. The assumption of normal distribution was visually confirmed using a histogram (see Figure 3).

![Histogram](image)

*Figure 3. Histogram for visual confirmation of normal distribution.*

All emotional intelligence scores were within the 1 to 7 range to correspond to the Likert scale used in the assessment: 1 = *Disagree Completely* to 7 = *Agree Completely*. Based on the pretest results, there were no statistically significant differences between the two schools in
global EI ($p = .83$), empathy ($p = .21$), stress management ($p = .73$), or emotional regulation ($p = .70$). Table 1 shows the results of the t-tests by school.

Table 1

<table>
<thead>
<tr>
<th>School</th>
<th>Mean (SD)</th>
<th>t (80)</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GlobalEI</td>
<td>5.21 (.47)</td>
<td>.211</td>
<td>0.83</td>
</tr>
<tr>
<td>TBL</td>
<td>5.19 (.49)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Empathy</td>
<td>5.44 (.65)</td>
<td>-1.265</td>
<td>0.21</td>
</tr>
<tr>
<td>TBL</td>
<td>5.62 (.59)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>StressMgmt</td>
<td>4.71 (.84)</td>
<td>-.353</td>
<td>0.73</td>
</tr>
<tr>
<td>TBL</td>
<td>4.78 (.97)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EmotionReg</td>
<td>4.67 (.82)</td>
<td>-.383</td>
<td>0.70</td>
</tr>
<tr>
<td>TBL</td>
<td>4.74 (.93)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$N = 41; df = 80$

Hence, hypotheses H1, H3, H5, and H7, which predicted that there would be no statistically significant difference in pretest trait emotional intelligence, emotional regulation, stress management, or empathy between the lecture-based and TBL groups, were confirmed, and an acceptable baseline could be established between the two groups at pretest.

Pretest H9

H9 examined the relationship of the covariates of age, gender, and ethnicity/race and their effect on emotional intelligence. Each covariate was examined at pretest and statistical significance was determined. Covariates were then added to the mixed model ANOVA at posttest.

Gender. As Figure 4 clearly shows, of the overall pretest sample, 62 (75.6%) were female and 20 (24.4%) were male. Differences in gender were observed between the two groups, with 80% females in the lecture-based group, but only 71% female in the TBL group. A
chi-square test of independence confirmed that at pretest, however, there was no statistically significant difference in gender between the two groups ($x^2 (1, N = 82) = 1.058, p = .304$). Chi square was chosen because the two variables, school and gender, are both categorical variables.

![Bar graph of gender by school](image)

*Figure 4: Bar graph of gender by school*

To assess whether gender should be considered as a significant covariate, an independent samples t-test was conducted with gender, a categorical variable, and test scores for global EI, empathy, stress management, and emotional regulation, all of which are continuous variables. In Table 2, pretest scores showed that in empathy, regardless of group, women scored statistically higher than men ($p = .008$). Cohen’s effect size value ($d = .72$) showed a medium to high effect size.

Conversely, pretest scores showed that in stress management, regardless of group, men scored statistically higher than women ($p = .025$). Cohen’s effect size value ($d = .60$) showed a medium sized effect.
Since there were significant gender differences, gender was included in the ANOVA analyses as a covariate.

Table 2

Comparison of Mean EI Scores Among Genders

<table>
<thead>
<tr>
<th>Gender</th>
<th>GlobalEI</th>
<th>Empathy</th>
<th>Media</th>
<th>EmotionReg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>62</td>
<td>5.24 (.46)</td>
<td>1.217</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>20</td>
<td>5.09 (.52)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>62</td>
<td><strong>5.63 (.62)</strong></td>
<td><strong>2.74</strong></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>20</td>
<td>5.21 (.55)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>62</td>
<td>4.62 (.90)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>20</td>
<td>5.14 (.82)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>62</td>
<td>4.61 (.89)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>20</td>
<td>4.99 (.78)</td>
<td></td>
</tr>
</tbody>
</table>

Age. Since the Thomas International version of the TEIQue instrument only asks for year of birth and not actual birth date, the variable data was recoded with an arbitrary calculation of age (e.g., 2019 – year of birth). Ages, using that recoding, ranged from 24-49, with a mean age for the lecture- based group of 27.76 (SD = 5.02) and a mean age for the TBL group slightly higher at 29.33 (SD = 3.80). An independent samples t-test showed that there was not a statistically significant difference in the mean age between the two school groups (t (72) = -.1.520, p = .13).

Pearson correlation analysis of age, a continuous variable, with pretest EI scores, also continuous variables, showed no statistically significant effect, as Table 3 indicates (p ≥ .10).

Since age showed no statistically significant effect, it was not considered at posttest as part of the mixed model ANOVA.
Ethnicity/Race. Ethnicity/race were distinguished by a lack of clearly-defined categories within the assessment instrument. The TEIQue instrument collects demographic information at the end of the 153-question instrument, as an optional section (Appendix A). Participants must first agree to answer the demographic questions by clicking Accept, then are asked to respond to several pre-determined questions which the researcher cannot adapt or change. Ethnicity/race categories are:

- Asian-not Hispanic or Latino
- Asian-Hispanic or Latino
- Black or African American- not Hispanic or Latino
- Mixed
- Other-Hispanic or Latino
- Other-not Hispanic or Latino
- White-Hispanic or Latino, and
- White- not Hispanic or Latino.

Little reliable analysis can be derived from these pre-existing, confusing categories. Data was recoded from a string variable to a nominal variable with nine categories including NULL for missing data. Based on the existing data as seen in Appendix G, it can be stated that 61% of

<table>
<thead>
<tr>
<th></th>
<th>GlobalEI</th>
<th>Empathy</th>
<th>StressMgmt</th>
<th>EmotionReg</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>.102</td>
<td>.036</td>
<td>.152</td>
<td>.191</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.39</td>
<td>0.76</td>
<td>0.20</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>74</td>
<td>74</td>
<td>74</td>
<td>74</td>
<td>74</td>
</tr>
</tbody>
</table>

**Correlation: Mean Age and Pretest EI Scores**

**. Correlation is significant at the 0.01 level (2-tailed).
each group self-identified in at least one of the two White categories. Because of the confusion and ambiguity among the categories, ethnicity/race was not considered at posttest as part of the mixed model ANOVA.

**Posttest Descriptive Statistical Analysis**

**Sampling**

Posttest TEIQue assessments were conducted in March 2019. The lecture-based group was assessed exactly eight weeks after their first assessment; the TBL-based group was assessed only 6 ½ weeks after their initial assessment since spring break was scheduled during their eighth week preventing them from being able to take the assessment in class during that week. For scheduling purposes, the decision was made by the researcher to move the date earlier into the 7th week, rather than delay it into the 9th week so as not to disadvantage the lecture-based group.

As was done for the first assessment, students were emailed by the researcher directly to remind them of the study and to invite their participation again (Appendix E). Students then received an email from Thomas International which included their unique identifier to pair the pretest-posttest samples, the IRB-approved consent form, and a link to the assessment. Both groups were provided with 45 minutes of in-class time to complete the assessment. The raw posttest score data was sent to the researcher, who checked the data for accuracy, paired the samples using the unique identifier code, and uploaded the file to SPSS for analysis.

Out of a total of 88 students enrolled in both classes, there was an 88% posttest response rate ($N = 77$), with $n = 36$ for the lecture-based group (a decrease of 12.2% from pretest), and $n = 41$ for the TBL-based group (no change in the response rate from pretest). Two participants from the posttest lecture-based group did not provide pretest scores resulting in 34 pretest-
posttest sets, or an overall response rate from the lecture-based group of 74%. The TBL-based
group had 41 pretest-posttest sets, or an overall response rate from the TBL-based group of 98%.

Since a priori power analysis using G*Power 3 resulted in a minimum group size of 34
for a total sample size of 68 participants, \( N = 75 \) pretest-posttest sets (lecture-based group: \( n = 34 \); TBL-based group: \( n = 41 \)) produced acceptable results.

**Posttest Mixed Model ANOVA**

To address H2, H4, H6, and H8, 2 (School: TBL vs. lecture) x 2 (Time: Pretest vs.
Posttest) mixed model ANOVAs were conducted using each of the dependent variables: H2-
global trait emotional intelligence, H4-emotional regulation, H6-stress management, and H8-
empathy.

To address H9, pretest analysis showed that both age and ethnicity/race should not be
considered as covariates in posttest analysis. Since gender was shown to have a statistically
significant effect at pretest, gender was included as a covariate in each analysis.

**H2-Global Trait Emotional Intelligence**

For H2, which predicted that there was a statistically significant difference in the change
score between pretest and posttest global trait emotional intelligence as measured by the TEIQ
in the TBL group of students as compared to the lecture-based group, the ANOVA revealed a
statistically significant Time x School interaction effect \( (p = .006) \) as Table 4 illustrates.

\[ \text{Eta-squared} = .102 \] is considered a medium sized effect.
To explore the nature of the significant interaction, post-hoc t-tests were performed comparing pre-test to post-test scores within each school. The dependent t-tests demonstrated that there was a significant decrease in global EI from pre-test ($M = 5.16$, $SD = 0.48$) to post-test ($M = 5.03$, $SD = 0.49$) for the lecture-based group, $t(33) = 2.996$, $p = .005$. For the TBL group, there was a slight increase in scores from pretest ($M = 5.19$, $SD = 0.49$) to post-test ($M = 5.25$, $SD = 0.57$), but that difference was not statistically significant, $t(40) = -1.266$, $p = .213$.

The main effects of time ($p = .245$), and school ($p = .300$) were not statistically significant.

Hence H2 which predicted that there was a statistically significant difference in the change score between pretest and posttest global emotional intelligence as measured by the TEIQue in the TBL group of students as compared to the lecture-based group, was confirmed.
**H4-Emotional Regulation**

For H4, which predicted that there was a statistically significant difference in the change score between pretest and posttest emotional regulation as measured by the TEIQue in the TBL group of students as compared to the lecture-based group, ANOVA revealed no statistically significant Time x School interaction effect ($p = .06$) as Table 5 illustrates.

The main effects of time ($p = .33$), and school ($p = .21$) were not statistically significant.

Table 5

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>1</td>
<td>.968</td>
<td>0.33</td>
<td>.013</td>
</tr>
<tr>
<td>School</td>
<td>1</td>
<td>1.594</td>
<td>0.21</td>
<td>.022</td>
</tr>
<tr>
<td>Time * School</td>
<td>1</td>
<td>3.591</td>
<td>0.06</td>
<td>.048</td>
</tr>
<tr>
<td>Error(Time)</td>
<td>72</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hence H4 which predicted that there was a statistically significant difference in the change score between pretest and posttest emotional regulation as measured by the TEIQue in the TBL group of students as compared to the lecture-based group, was rejected.

**H6-Stress Management**

For H6, which predicted that there was a statistically significant difference in the change score between pretest and posttest stress management as measured by the TEIQue in the TBL group of students as compared to the lecture-based group, ANOVA revealed no statistically significant Time x School interaction effect ($p = .25$) as Table 6 illustrates.
The main effects of time \((p = .47)\), and school \((p = .21)\) were not statistically significant.

Table 6

**ANOVA Model for Stress Management Scores**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>1</td>
<td>.517</td>
<td>0.47</td>
<td>.007</td>
</tr>
<tr>
<td>School</td>
<td>1</td>
<td>1.570</td>
<td>0.21</td>
<td>.021</td>
</tr>
<tr>
<td>Time * School</td>
<td>1</td>
<td>1.353</td>
<td>0.25</td>
<td>.018</td>
</tr>
<tr>
<td>Error(Time)</td>
<td>72</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hence H6 which predicted that there was a statistically significant difference in the change score between pretest and posttest stress management as measured by the TEIQue in the TBL group of students as compared to the lecture-based group, was rejected.

**H8-Trait Empathy**

For H8, which predicted that there was a statistically significant difference in the change score between pretest and posttest trait empathy as measured by the TEIQue in the TBL group of students as compared to the lecture-based group, ANOVA revealed no statistically significant Time x School interaction effect \((p = .96)\) as Table 7 illustrates.
The main effects of time ($p = .64$), and school ($p = .07$) were not statistically significant.

Table 7

**ANOVA Model for Trait Empathy Scores**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>1</td>
<td>.219</td>
<td>.64</td>
<td>.003</td>
</tr>
<tr>
<td>School</td>
<td>1</td>
<td>3.511</td>
<td>.07</td>
<td>.046</td>
</tr>
<tr>
<td>Time * School</td>
<td>1</td>
<td>.003</td>
<td>.96</td>
<td>.000</td>
</tr>
<tr>
<td>Error(Time)</td>
<td>72</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Computed using alpha = .05

Hence H8 which predicted that there was a statistically significant difference in the change score between pretest and posttest trait empathy as measured by the TEIQue in the TBL group of students as compared to the lecture-based group, was rejected.

**H9-Age, Ethnicity/Race, & Gender Covariates**

H9 predicted that covariates of age, ethnicity/race, and gender would have a statistically significant effect on the trait emotional intelligence of PA students. At pretest, age was shown to have no statistical significance; therefore, age did not need to be considered at posttest. Demographic data for ethnicity/race was determined not to be valid; therefore, ethnicity/race could not be considered at posttest.

For gender, an independent samples t-test showed that regardless of group, females had statistically higher pretest and posttest empathy scores, while males had statistically higher pretest stress management scores, as Table 8 illustrates.
Since gender was shown to be statistically significant at pretest, gender was considered as a covariate in all ANOVAs. Results, as detailed in Table 9, showed that gender had no statistically significant effect across time for global EI scores ($p = .39$), emotional regulation ($p = .65$), stress management ($p = .39$) or empathy ($p = .65$).

Hence H9 which predicted that the confounding variables of age, gender, or ethnicity/race would have a statistically significant effect on the trait emotional intelligence of PA students, was rejected.
Summary

The purpose of Chapter 4 was to report the findings derived from the data analysis of the pretest and posttest TEIQue scores for the TBL-based and the lecture-based PA groups collected between January and March 2019. Integrity checks were conducted, then data such as school and gender were recoded for use in SPSS. Pretest independent samples t-tests revealed there were no statistically significant differences at baseline between the TBL and lecture groups, thus affirming Hypotheses 1, 3, 5, and 7. Gender, at pretest, showed statistically significant differences regardless of group: women evidenced higher empathy scores, while men evidenced higher stress management scores. Age was not significant at pretest, and ethnicity/race provided unreliable data, so both age and ethnicity/race were not considered at posttest. Mixed model ANOVAs were conducted to examine change from pretest to posttest between groups. ANOVA revealed statistically significant Time x School interaction for global EI scores, thus confirming H2. Post hoc tests revealed a statistically significant decrease in global EI scores among the lecture-based group, but no statistically significant improvement among the TBL group. No significant differences were found for emotional regulation, stress management, or empathy, thus rejecting Hypotheses 4, 6, and 8. At posttest, gender was not a statistically significant covariate, thus rejecting Hypothesis 9. Table 10 summarizes the hypotheses and the findings.
Summary of Hypotheses and Findings

*ss = statistically significant, ↓ = decrease/lower, ↑ = increase/higher

<table>
<thead>
<tr>
<th>H</th>
<th>Summary of Hypothesis</th>
<th>Summary of Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>No ss* difference between groups in pretest global EI</td>
<td>T-tests: no ss* difference in global EI at baseline</td>
</tr>
<tr>
<td>H2</td>
<td>Ss change in global EI between groups</td>
<td>ANOVA: ss change (medium effect) in global EI; post hoc: ss ↓ in lecture. No ss change in TBL</td>
</tr>
<tr>
<td>H3</td>
<td>No ss difference between groups in pretest emotional regulation</td>
<td>T-tests: no ss difference in emotional regulation at baseline</td>
</tr>
<tr>
<td>H4</td>
<td>Ss change in emotional regulation between groups</td>
<td>ANOVA: no ss change</td>
</tr>
<tr>
<td>H5</td>
<td>No ss difference between groups in pretest stress management</td>
<td>T-tests: no ss difference in stress management at baseline</td>
</tr>
<tr>
<td>H6</td>
<td>Ss change in stress management between groups</td>
<td>ANOVA: no ss change</td>
</tr>
<tr>
<td>H7</td>
<td>No ss difference between groups in pretest empathy</td>
<td>T-tests: no ss difference in empathy at baseline</td>
</tr>
<tr>
<td>H8</td>
<td>Ss change in empathy between groups</td>
<td>ANOVA: no ss change</td>
</tr>
<tr>
<td>H9</td>
<td>Effects of age, ethnicity/race, gender on EI</td>
<td>Pretest Pearson correlation: age not factor; ethnicity/race-unreliable results</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gender, t-tests, across groups: females ss ↑empathy than males; males ss ↑stress management than females.</td>
</tr>
</tbody>
</table>
Posttest: Gender not ss in ANOVA

T-test: females ss ↑ empathy than males
Chapter 5: Discussion

This chapter discussed the results of the data analysis detailed in Chapter 4. Significant findings were asserted in light of the relevant research questions and hypotheses, and within the context of the insights and challenges described in the literature review, with a focus on how these findings supported, contradicted, or advanced the current body of research. Implications for practice, both in team-based learning and in healthcare education were explored. Finally, limitations of the study and areas of future research were proposed.

**Pretest Findings: H1, H3, H5, and H7**

In a pretest to posttest analysis of change, there is an assumption built into the design that each of the groups is similar at baseline (Muijs, 2011). The purpose of H1, H3, H5, and H7 was to test those assumptions regarding global trait emotional intelligence, emotional regulation, stress management, and empathy. Both groups of physician assistant students were selected for the study based on availability, physical proximity, academic programming, and especially, difference in educational pedagogy. The researcher was familiar with the TBL group but had no experience with the lecture group, so no assumptions could be made about demographics or similarity with the TBL group. At pretest, the TBL and lecture-based groups were found to be remarkably similar (e.g., sample size, gender, age, and pretest scores), all of which contributed to establishing a strong baseline for pretest to posttest change analysis. No statistically significant differences were found in any pretest TEIQue scores between the two groups.

Both schools were in the same geographic area, had similar academic reputations and rankings, and similar tuitions. Pretest analysis showed that students had no significant differences in age, thus suggesting that though their life experiences were likely different, their experience of life could be measured in similar years. Qualitative research would likely reveal
that many of the students in the sample had applied to both programs and their choice was made based on acceptance letters and levels of financial aid, rather than on a style of pedagogy.

Another reason for the similarity at pretest may be grounded in the timing of the study. Since both groups of students began the study at the start of the winter semester, all students were fresh from a holiday break: rested, back from time with friends and family, and away from the rigors of academics. In other words, these students were at their emotionally intelligent best. Very high response rates from both groups at pretest reflected that fresh enthusiasm and willingness to participate.

What is most alike about the two groups in the study, however, is the academic program. Both groups were studying to be physician assistants, healthcare providers caring for the sick and the dying. Previous research confirmed that those who are drawn to caring professions are likely more empathetic than other careers (Mayer et al., 1999). Research by Cook et al. (2016) and Grewal & Davidson (2008) established the connection between emotionally intelligent skills like empathy and healthcare practice. Vandewaa et al.’s (2016) research connected emotional regulation, another essential emotionally intelligent trait, with healthcare success, while Wagner et al. (2002) showed the connection between emotional intelligence and patient satisfaction. All these studies bear witness to the value that healthcare places on emotional intelligence, emotional regulation, stress management, and empathy. These findings clearly supported the confirmation of H1, H3, H5, and H7, that despite the pedagogical differences in the two study groups, they were similar because they were espousing the same career paths. These two groups of students, despite being in different schools using different pedagogies, were all preparing for careers as physician assistants, and had very similar emotional intelligence scores.
Posttest Findings

H2: Change in Global EI

The overarching question that guided this study was whether team-based learning influenced emotional intelligence. Posttest findings which confirmed H2 revealed a statistically significant change in global EI between the two groups, and post hoc testing revealed that the statistically significant interaction was a decrease in global EI among the lecture-based group, not the increase in global EI among the TBL-group for which this researcher had hoped.

The literature review exposed a real dearth of research in the relationship of emotional intelligence and team-based learning. There were only three studies found, and these findings directly contradicted all three. These findings do not concur with the first Borges study (Borges et al., 2012). In that study which lacked a comparison group, Borges et al. (2012) found that from pretest to posttest, there was a statistically significant improvement in emotional intelligence during a medical clerkship using TBL. The current findings do not support Borges et al. (2012), and instead, suggest that TBL serves to sustain EI, but not to increase it. There are several differences between the current study and the Borges et al. (2012) research however: the current study had a comparison group which is considered a stronger research design, and which lends greater reliability to the findings (Muijs, 2011; Trochim, 2006). The Borges et al. (2012) research used a different assessment instrument which was not within the parameters of this research’s literature review; however, this research’s reliance on the TEIQue is in part because of its strong psychometric properties and extensive reliability and generalizability (Petrides, 2009b).

Similarly, these findings contradict the subsequent research of Borges et al. (2015) which found that TBL evidenced a greater improvement in group EI than did the didactic approach,
though admittedly with this research, Borges et al.’s (2015) study results were strengthened by a large sample size \((n = 484)\) and a comparison group.

Finally, these findings contradict the research of Zgheib et al. (2016), who like Borges et al. (2012, 2015) showed an improvement in team performance, communication, and professionalism in the TBL group.

Despite contradicting the positive improvement in EI-related skills found in the research of Borges et al. (2012, 2015) and Zgheib et al. (2016), these results still advance knowledge in the fields of TBL, healthcare education, and EI because they lend credibility to TBL as an effective pedagogy in the development of emotional intelligence. After only 8 weeks of a more traditional, lecture-based approach, there was a statistically significant decrease in emotional intelligence among the lecture-based group, while the TBL group had no statistically significant change. Though there was no statistically significant increase in EI among the TBL group, there was no decrease in EI among the TBL-group at posttest. Sibley and Parmelee (2008) recognized that TBL cultivated important healthcare-related abilities like teamwork, communication, and social skills, while Seymour (2013) showed the ability of TBL to develop listening, patience, and diversity awareness, all essential to success in healthcare today. Janssen et al. (2008) showed the value of TBL in developing critical thinking, another key healthcare-related skill. Healthcare programs need to be developing emotionally intelligent clinicians, and finding ways to nurture those emotionally intelligent skills, not diminish them over the course of less than a semester.

These findings focus on the need for growth in EI, but lecture-based programs should see in these findings a challenge to pay closer attention to the emotional lives of its healthcare students, and arguably all lecture-based programs regardless of discipline, so that they are growing emotionally even during their lectures and exams. These results clearly suggest that
lecture-based programs do not develop emotional intelligence in today’s student. Are there programmatic or institutional stressors that adversely affect the emotional intelligence of its student population? Lectures, readings, and assignments in emotional intelligence, mindfulness, self-care, stress management, or empathy would help to mitigate the decline in global emotional intelligence revealed in these results.

These findings support and extend the work of Huggins and Stamatel (2015) who showed that TBL was thought by students to be more effective than lecture-based programs in improving verbal communication and critical thinking. These findings go further than Huggins and Stamatel (2015), however, in showing quantitatively that TBL not only is perceived to be better at developing skills like critical thinking and communication, but that TBL, in fact, nurtures emotional intelligence, while this research suggests that adversely, more traditional didactic approaches diminish emotional intelligence.

These initial findings are significant in that they provide some quantitative support for the role of TBL in cultivating and maintaining soft skills in future healthcare leaders (Ashbaugh, 2003). Research that supports TBL in healthcare education has several benefits: it can encourage programs to move from lecture-based to TBL, it provides a basis for funding and staffing needs in existing TBL programs, and it provides assurance of viability to new TBL programs. The findings from this research begin to do just that.

Several issues may temper these results, however. Although the findings suggested that TBL has a role in the development of EI, the results cannot be causal because this was a quasi-experimental study (Muijs, 2011). Any number of covariates may have influenced the results. Students may have chosen a program based on its pedagogical approach. Some students likely chose the TBL program specifically because they were attracted to that learning approach, while
other students intentionally migrated towards a more traditional, lecture-based pedagogy. Students more comfortable in group settings, confronting conflict, or negotiating differing personalities, all of which would require greater emotional intelligence, may have chosen the TBL-based program because of its opportunities to interact with others, to work in teams, to think critically, and to develop soft skills.

Similarly, each program’s admission process may have screened for the most appropriate candidates and screened out candidates who were the wrong “fit.” A TBL-based program may use a group exercise in its admissions process in addition to essays, interviews, and GPA, to screen for candidates based on their ability to work in teams. Such students would likely evidence higher emotional intelligence from the outset.

Yet, the findings mitigate these possible reasons, since the two groups were found to be similar in emotional intelligence at baseline. There were no statistically significant differences in emotional intelligence between the two groups at pretest.

Another possible explanation may be related to the timing of the study. The TBL-based program began the study with two semesters of completed academic work, while the lecture-based program only had completed one semester. Students in the TBL program had already completed courses like PA Profession, Patient Care I and II, the PA in Practice, and Interprofessional Practice, while the lecture-based program had only completed potentially EI-related courses like Health Care Delivery, Psychiatry, and Clinical Lab. A closer study of the respective curricula, course descriptions, assignments, textbooks, readings, and syllabi to identify emotionally intelligent modules would be required to understand any differences between the two programs and future research could provide that opportunity.

The fact remains that at baseline, both groups were not statistically different.
Both schools were in the same geographic area, known for its colleges, its quality of life for college students, its high tuition, housing, and living costs, and its stellar academic reputation. Both schools were similarly competitive and would attract similar students drawn to this area of the country and a certain style of living. Some of the students likely applied to both schools.

Other factors may have influenced the posttest results. Perhaps the TBL-based program’s institution places a greater emphasis on emotional intelligence throughout the organization: workshops on EI and healthcare, therapy dogs to manage stress and emotional regulation, counseling opportunities, mindfulness training, or coursework in empathy would all raise EI as an important domain that then affected the results. Perhaps the PA-TBL program itself, aware of its own participation in this study, unintentionally focused more on emotional intelligence in all its coursework (Muijs, 2011).

Yet still another explanation could be suggested: if didactic learning adversely affected emotional intelligence, then TBL did, in fact, influence emotional intelligence in healthcare education: in the TBL group, emotional intelligence did not decrease.

These findings contradict Petrides’ claim that trait EI is likely to remain stable over the lifespan (2009a). Although Petrides offered two ways in which changes could take place (e.g., major change in a person’s life or conscious efforts on the part of the individual), neither of those situations seemed appropriate to these findings. The lecture-based group had a statistically significant decrease in global EI over the course of just eight weeks. It is unlikely that a whole class, in the course of eight weeks, all had a major change in their lives, though a particularly trying professor or course might well have some hopefully short-term deleterious effects.
**A Caveat.** Significant to this question is the fact that the research questions implied improvement, but in fact did not explicitly state that. Only in data analysis did the researcher see the design flaw in all the hypotheses. For example, H2 stated: There is a statistically significant difference in the change score between pretest and posttest trait emotional intelligence in the TBL group of students as compared to the lecture-based group.

H2 was in fact confirmed: there was a statistically significant difference between the two groups in global EI. However, the question which the researcher wished to pursue was whether there would be a statistically significant *increase* in global EI, emotional regulation, stress management, or empathy in the TBL-based group as compared to the lecture-based group. Those questions will need to be left to future study.

**H4 & H6: Change in Emotional Regulation & Stress Management**

Pretest to posttest emotional regulation showed no statistically significant change, thus rejecting H4. Similarly, stress management showed no statistically significant change from pretest to posttest, thus rejecting H6.

The vital need to regulate emotions and manage stress in a healthcare setting should be obvious. Vandewaa et al. (2016) found a connection between emotional regulation and nursing success and desirable behaviors. Nespereira-Campuzano and Vázquez-Campo (2017) concluded that greater emotional intelligence resulted in better stress management skills, ultimately leading to better patient outcomes and improved patient satisfaction. The current study’s findings do not directly contradict Vandewaa et al. (2016) or Nespereira-Campuzano & Vázquez-Campo (2017): rather, these findings suggest neither the TBL nor the lecture-based group were able to achieve an increase in these important healthcare skills.
These results, therefore, are worth consideration. Healthcare education has already recognized the need for patient-centered care (Birks & Watt, 2007), and for providers who can regulate their emotions (Vandewaa et al., 2016) and manage their stress (Măirean, 2016). Regardless of the pedagogical approach, healthcare education needs to do better than just maintain already existing emotional intelligence skills and traits. Healthcare education needs to ensure that the next generation of healthcare providers, who are likely to face greater challenges and obstacles, have the skills and traits to navigate them effectively.

**H8: Change in Empathy**

Pretest to posttest trait empathy showed no statistically significant change, thus rejecting H8. No decrease, but more importantly, no increase. Perhaps no finding of this study is more important.

Atul Gawande, surgeon, public health researcher, and acclaimed author and speaker, gave the commencement address at UCLA Medical School in 2018, in which he urged those newly minted doctors to always remember the equal worth of every human person: “to see their humanity, you must put yourself in their shoes…Curiosity is the beginning of empathy” (Gawande, 2018). In an increasingly global healthcare community, clinicians, to provide patient-centered and compassionate care, need more than just hard skills. They need the ability to be curious, to walk in another’s shoes, to take a different perspective, to really listen to another’s pain or suffering.

Contrary to these findings and the rejection of H8, studies showed the need for empathy, and its real connection to EI (Austin et al., 2005; Bertram et al., 2016; Cook et al., 2016; Giménez-Espert & Prado-Gascó, 2018; Grewal & Davidson, 2008). Goleman (1995) claimed that caring for patients without a concern for their feelings was incompetent care. Anyone who
has ever spent a night in a hospital or visited a primary care office knows experientially the need for empathy and emotional intelligence as integral skills in a successful patient-provider encounter.

These findings should be a clarion call to healthcare educators and administrators: simply maintaining empathy in our next generation of clinicians is inadequate. We would never condone entry level hard skills, like the ability to diagnose the measles, in future providers. Why should entry level empathy be enough? Curiosity about the plight of the other and a desire to make a difference demands more.

**H4, H6, & H8: Conclusions**

There are several possible reasons for the lack of statistical change in H4, H6, and H8. One possible reason lies in the design of the TEIQue as a 15-4-1 instrument: fifteen facets, four factors, and one global score. Internal consistencies are satisfactory at the facet level, but at the global level, there is a very high alpha in samples (Petrides, 2009a). The statistically significant change is evidenced most clearly at the global level, but at the facet level of emotional regulation, stress management, or empathy, the change is likely spread out over the fifteen different facets.

Another possible reason for the lack of statistical change in H4, H6, and H8 is that since the focus of this study was on only three of the fifteen facets, the wrong facets may have been selected. Had analysis been done on all fifteen facets, results may have differed.

**Posttest Sampling**

Other posttest findings are worth consideration. Attrition by the lecture-based group was at a posttest rate of 12.2%, while there was no change in response from the TBL group. Often
referred to as experimental mortality (Portney & Watkins, 2009), the comparison group was likely less invested in TBL research and thus was less committed to completing the study.

Another possible reason for attrition could have been related to timing. In both groups at pretest, students were at the start of a semester. After eight weeks, in the middle of a New England winter, students may have been absent from the posttest assessment due to illness or preoccupied with preparing for an impending exam or upcoming weekend plans, or simply worn out by the semester’s rigors.

Also noteworthy is the fact that after the emotional intelligence reports were sent to the comparison group, some of that group’s participants only then completed the second assessment. Clearly students in the class had discussed the report when they received it, and non-participants decided then to respond. A better description of the process and the report would likely have generated stronger results from the lecture-based group.

Regardless of the reasons, even though 12.2% is an insignificant attrition rate, in a relatively small sample like this study, it can affect results adversely. A larger sample size, and more careful attention to scheduling may have provided even stronger results with lower attrition.

**Gender Differences**

Though gender was not the specific focus of this research, gender differences led to statistically significant results. At pretest and posttest, regardless of group, females scored statistically higher than men in empathy. These results confirmed findings of Petrides (2009a) in his normed sample for the TEIQue and confirmed previous research that showed that females in healthcare scored statistically higher in empathy than their male counterparts (Austin et al., 2005; Bertram et al., 2016; Doherty et al., 2013).
These results do not answer the causal question of the correlation between gender and empathy however: are women simply more empathetic by nature, or have women historically been enculturated to be more nurturing and caring than men? Are female engineers more empathetic than male engineers, but less empathetic than male counselors? Is empathy correlated to gender or experience?

Perhaps the correlation of empathy is not with gender, but rather, with difference or marginalization: perhaps the same findings would be replicated among people of color or LGBTQ+ persons. Does power and privilege mitigate against empathy or emotional intelligence, so that the privileged straight white male is least likely to develop emotionally?

Another significant pretest finding was that males scored statistically higher in stress management than females. This finding confirms the TEIQue normed sample that males evidenced statistically higher stress management scores than females (Petrides, 2009a). These findings also support the results of McKinley et al. (2014) that in surgical settings, like in the general population, stress management scores were higher among males than among females.

At posttest, however, this research showed no statistically significant difference between females and males in stress management.

Hartman & Grubb’s (2011) research in “faking” may provide a contradiction to these results, however, since they showed that stress management was one of the areas of emotional intelligence most susceptible to faking. Another challenge to this finding was the number of males in the study: with only 20 males participating, gender-related findings were not especially robust or reliable. A larger sample size, or a different PA program that had a larger male presence, may have provided more compelling results.
Gender differences in EI suggest that more targeted EI training in healthcare education is called for: male healthcare providers need improved empathy skills, while females need to develop greater stress management skills. Educators are tasked with finding ways to provide gender-specific EI training and opportunities for personal development and growth. These gender-related differences in emotional intelligence challenge healthcare educators to cultivate curricula that admit to gender differences to ensure that regardless of gender, healthcare providers are empathetic, can manage stressful situations, and are emotionally intelligent providers of compassionate, patient-centered care.

**Ethnicity/Race Non-Findings**

There are no findings to discuss regarding ethnicity/race, though that in itself is a significant finding. No findings could be reported because the TEIQue instrument did not provide useful data.

Though ethnicity/race were not the overarching questions in this study, the literature review nevertheless revealed some provocative results: Bertram et al. (2016) showed that Asian Americans had statistically lower empathy, while Chan et al. (2014) found that Caucasians (sic) had significantly higher EI scores. Both studies highlight the challenges of ethnicity/race findings, however. In the Bertram et al. (2016) study how were “Asian-Americans” defined? Which ethnicities were included? How did a study participant self-identify? How were multi-ethnic or multi-racial participants classified? In the Chan study, did the use of the racially-insensitive term “Caucasian” suggest a racial bias on the part of the researcher that would thus affect the findings or was the researcher simply limited by the instrument, as was this researcher (Chan et al., 2014)?
The TEIQue ethnicity/race categories and the researcher’s inability to alter them resulted in a lack of reliable data. Perhaps a different researcher may have been able to make sense of the various ethnic and racial categories; but this researcher was incapable of making sense of nine different categories and wondered if said confusion could have been shared by at least some of the participants. Since the instrument was developed outside of the US, perhaps part of the confusion lay in cultural or national differences. Demographics are admittedly complicated: thankfully, in an increasingly diverse culture, rigid categories are often found wanting. Gender, ethnicity, and race are all challenged today by traditional and outdated categories. The researcher would urge the developers of TEIQue, at least in the US, to find more inclusive, albeit clear, categories that would then provide clear data reflective of the reality of the participants’ lived experience.

**Implications for Practice**

These findings do have implications for healthcare education and practice. Despite imprecise language, questionable research, or confusion of terms, emotional intelligence has been recognized as an important field of study and focus in healthcare (Elam, 2000; Weng, 2008). Regardless of pedagogy, healthcare education has admitted to the need to focus not just on hard skills like taking blood pressure or treating the flu, but also to educate caregivers who understand the need for an empathetic bedside manner and a compassionate approach to patient care. Lecture-based and TBL-based programs alike need to ensure that future patients will be well heard and well treated (Goleman, 2017). These findings should challenge didactic healthcare education approaches: if a lecture-based program results in a decrease of emotional intelligence, then administrators should consider exploring other programming or approaches that instead, will cultivate stronger soft skills, and lead to more emotionally intelligent providers.
An opportunity exists in lecture-based programs to explore alternative approaches to clerkships, for example. The Borges et al. (2012, 2015) studies serve as exemplars of incorporation of TBL into clerkships that produced positive results and a way for even lecture-based programs to increase these essential emotional intelligence skills.

Furthermore, TBL programs should be challenged to do more: maintenance of emotional intelligence is not enough. The fact that the TBL group did not decrease in emotional intelligence is significant, but these results simply do not go far enough, in that they do not substantially support what the researcher had truly hoped for and what the field of medicine desperately needs: an increase of emotional intelligence.

Both TBL and more didactic approaches to healthcare education are challenged to find more innovative ways to inculcate soft skills amid already over-burdened curricula. Experiences with simulated patients that reflect cultural, racial, gender, or sexual diversity would lead to deeper self-awareness, emotional regulation, and empathy on the part of the caregiver. Modules on mindfulness and self-care could assist students in dealing with stress management and emotional health. Opportunities for social and professional gatherings would assist students in social awareness and relationship building. Cardiology is important. So is the heart.

Limitations of the Study

Several limitations challenged the findings of this research but also provided opportunities for future studies. First, the timing of this study was a challenge. In the current study, for the sake of expediency and convenience, students joined the study at the beginning of their respective winter terms, having finished either one or two semesters of academic work depending on the institution, and amid differing course loads. The difference in the amount and type of coursework and its effect on students could not be measured.
The time between the pretest and posttest assessments was not the same for both groups. Instead, the eight-week period of academic work between pretest and posttest required an adjustment during data collection because the eight-week mark for the TBL-based group was during a vacation week, preventing the opportunity for in-class time to take the assessment. The decision was made to move the date to an earlier one, resulting in a shorter period for the TBL group than the lecture-based group between pretest and posttest. Again, the effect of this design flaw could not be assessed.

Another limitation to the findings was due to the pre-existing nature of the TEIQe instrument, especially in its demographic section. Since the instrument was provided to the researcher free of charge through the generosity of Dr. Petrides and the staff of Thomas International, the researcher could not alter the instrument. The demographics section was a challenge to the study: first, it required an additional acceptance to proceed to that section. That additional acceptance may have been confusing and, based on the data, may have resulted in a higher rate of null responses, since all the null responses were in the demographics section. Secondly, ethnicity/race categories were confusing and resulted in unreliable data. Categories were not clearly defined and likely resulted in students not accurately self-identifying or skipping the question. Finally, many of the questions in the demographic section were not appropriate to the participants (e.g., “How happy in your job are you?”). A different approach would have been to create a separate study-specific demographics section, asking questions about date of birth, clearer categories of ethnicity/race, non-binary gender options, sexual orientation, birth order, number of siblings, etc. A more comprehensive and study-specific demographic section, without a need to accept the option to proceed, would have provided a richer source of potential covariates to explore.
Another limitation of a quantitative study like this one was sample size. Though the sample size met the G*3 Power analysis requirements, a larger sample size would have produced even more robust and more generalizable results.

The study was also limited by a lack of randomization, as is true in an experimental design. Though the chosen NEGD design was considered strong, in quantitative research that seeks to answer causal questions, an even better approach would have been two randomized groups, though, in social science and educational research, a randomized setting is difficult if not impossible to create.

The research questions proved imprecise: the researcher was looking for improvement in EI scores, but instead, asked research questions and proposed hypotheses that only looked for change. The questions did not affect the actual data; but they did affect whether a hypothesis was rejected or confirmed. Although the researcher had hoped for a statistically significant increase in EI, when the results showed a statistically significant decrease in EI among the lecture-based group, it did confirm H2, though certainly not the way the researcher had originally intended.

**Future Research**

The limitations of this study also reveal possibilities for future research opportunities. These early results suggest that it would be advantageous to engage in a longitudinal study that would explore similar research questions and use similar design, but rather than a pretest posttest model, the study would assess both groups at multiple points: upon admission prior to any academic work, at the end of the academic year, at the end of the clinical year, and finally, after a year of PA practice. Such a study would eliminate the differences in curricula and in the starting dates for the two cohorts, while providing opportunities to examine the changes that
occur in the clinical year experience, as well as any regression that might occur after being out in the field for some time. Other instruments could also be used as part of this same study, including empathy assessments or assessments that specifically target group emotional intelligence considering the focus on TBL (Borges et al., 2012, 2015).

A mixed methods study could explore not just these quantitative questions, but also qualitative questions concerning student and/or faculty perceptions of TBL. Whether TBL works is irrelevant if students and faculty do not perceive it as successful, able to be implemented, or an effective way to learn (Kazory & Zaidi, 2018; Luckey & McLaughlin, 2016). Palmer’s (2013) study of TBL perceptions and effectiveness could be replicated with a focus on physician assistant students.

Since this study affirmed the need for EI in healthcare, subsequent research could examine ways to strengthen or develop EI among healthcare students and clinicians. How might healthcare education incorporate into its already overburdened curricula methods of EI training and development to guarantee truly patient-centered care?

This study focused on trait emotional intelligence, but more research could still clarify categories and distinctions within the field. A study that compared the results of a self-reported assessment like the TEIQue, an ability-based model like the MSCEIT, and incoming and graduation GPA scores would provide more insights into the advantages and disadvantages of each model of EI in healthcare education.

Finally, generalizability of the results would be broadened by 1) duplicating the study but using different schools in different geographic regions of the country 2) duplicating the study but using different healthcare fields (e.g., occupational or physical therapy, genetic counseling, speech pathology), 3) using larger sample sizes, or 4) using completely different fields of
interest. Any of these variations would provide new information for the TBL-learning community and would advance the science of emotional intelligence.

**Conclusion**

To explore the impact of TBL on emotional intelligence in healthcare education, a quantitative, pretest-posttest study, using the TEIQue, an online trait emotional intelligence assessment, examined two groups of students: a TBL-based group and a lecture-based group. Initial findings showed that after 8 weeks, the lecture-based group realized a decrease in global emotional intelligence, while the TBL group showed no statistically significant change. Other findings confirmed results from previous research that women have higher empathy skills, while men have higher stress management skills. Although the study was limited by time constraints and research question design flaws, the results are promising and provide encouragement to future researchers to continue to explore these questions. Our future patients deserve nothing less.
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## Appendix A

### TEIQue Questions and Demographic Section

#### Instructions

- Please complete this questionnaire on your own and in quiet conditions.
- Please answer each statement below by putting a circle around the number that best reflects your degree of agreement or disagreement with that statement. **There are no right or wrong answers.**
- Work quickly, and don’t think too long about the exact meaning of the statements.
- Try to answer as accurately as possible.
- You have seven possible responses, ranging from 1=Completely Disagree to 7=Completely Agree
- Many thanks for your time and interest

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<th>Statement</th>
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<td>1. I’m usually able to control other people</td>
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<td>2. Generally, I don’t take notice of other people’s emotions</td>
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<td>3. When I receive wonderful news, I find it difficult to calm down quickly</td>
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<td>4. I tend to see difficulties in every opportunity rather than opportunities in every difficulty</td>
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<td>5. On the whole, I have a gloomy perspective on most things</td>
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<td>6. I don’t have a lot of happy memories</td>
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<td>7. Understanding the needs and desires of others is not a problem for me</td>
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<td>8. I generally believe that things will work out fine in my life</td>
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<td>9. I often find it difficult to recognise what emotion I’m feeling</td>
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<td>10. I’m not socially skilled</td>
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<td>11. I find it difficult to tell others that I love them even when I want to</td>
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<td>12. Others admire me for being relaxed</td>
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<td>13. I rarely think about old friends from the past</td>
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<td>14. Generally, I find it easy to tell others how much they really mean to me</td>
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<td>15. Generally, I must be under pressure to really work hard</td>
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<td>16. I tend to get involved in things I later wish I could get out of</td>
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<td>17. I’m able to “read” most people's feelings like an open book</td>
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<td>18. I’m usually able to influence the way other people feel</td>
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<td>19. I normally find it difficult to calm angry people down</td>
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<td>20. I find it difficult to take control of situations at home</td>
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<td>21. I generally hope for the best</td>
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<td>22. Others tell me that they admire me for my integrity</td>
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<td>23. I really don’t like listening to my friends’ problems</td>
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<td>24. I’m normally able to “get into someone’s shoes” and experience their emotions</td>
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<td>25. I believe I’m full of personal weaknesses</td>
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<td>26.</td>
<td>I find it difficult to give up things I know and like</td>
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<td>27.</td>
<td>I always find ways to express my affection to others when I want to</td>
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<td>28.</td>
<td>I feel that I have a number of good qualities</td>
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<td>29.</td>
<td>I tend to rush into things without much planning</td>
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<td>30.</td>
<td>I find it difficult to speak about my intimate feelings even to my closest friends</td>
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<td>31.</td>
<td>I’m not able to do things as well as most people</td>
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<td>32.</td>
<td>I’m never really sure what I’m feeling</td>
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<td>33.</td>
<td>I’m usually able to express my emotions when I want to</td>
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<td>34.</td>
<td>When I disagree with someone, I usually find it easy to say so</td>
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<td>35.</td>
<td>I normally find it difficult to keep myself motivated</td>
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<td>36.</td>
<td>I know how to snap out of my negative moods</td>
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<td>37.</td>
<td>On the whole, I find it difficult to describe my feelings</td>
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<td>38.</td>
<td>I find it difficult not to feel sad when someone tells me about something bad that happened to them</td>
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<td>39.</td>
<td>When something surprises me, I find it difficult to get it out of my mind</td>
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<td>40.</td>
<td>I often pause and think about my feelings</td>
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<td>41.</td>
<td>I tend to see the glass as half-empty rather than as half-full</td>
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<td>42.</td>
<td>I often find it difficult to see things from another person’s viewpoint</td>
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<tr>
<td>43.</td>
<td>I’m a follower, not a leader</td>
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<td>44.</td>
<td>Those close to me often complain that I don’t treat them right</td>
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<tr>
<td>45.</td>
<td>Many times, I can’t figure out what emotion I'm feeling</td>
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<tr>
<td>46.</td>
<td>I couldn’t affect other people’s feelings even if I wanted to</td>
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<td>47.</td>
<td>If I’m jealous of someone, I find it difficult not to behave badly towards them</td>
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<td>48.</td>
<td>I get stressed by situations that others find comfortable</td>
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<td>49.</td>
<td>I find it difficult to sympathize with other people’s plights</td>
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<td>50.</td>
<td>In the past, I have taken credit for someone else’s input</td>
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<tr>
<td>51.</td>
<td>On the whole, I can cope with change effectively</td>
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<tr>
<td>52.</td>
<td>I don’t seem to have any power at all over other people’s feelings</td>
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<tr>
<td>53.</td>
<td>I have many reasons for not giving up easily</td>
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<tr>
<td>54.</td>
<td>I like putting effort even into things that are not really important</td>
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<tr>
<td>55.</td>
<td>I always take responsibility when I do something wrong</td>
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<tr>
<td>56.</td>
<td>I tend to change my mind frequently</td>
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<td>57.</td>
<td>When I argue with someone, I can only see my point of view</td>
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<tr>
<td>58.</td>
<td>Things tend to turn out right in the end</td>
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<tr>
<td>59.</td>
<td>When I disagree with someone, I generally prefer to remain silent rather than make a scene</td>
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<tr>
<td>60.</td>
<td>If I wanted to, it would be easy for me to make someone feel bad</td>
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<tr>
<td>61.</td>
<td>I would describe myself as a calm person</td>
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<td>6</td>
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<tr>
<td>62.</td>
<td>I often find it difficult to show my affection to those close to me</td>
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<tr>
<td>63.</td>
<td>There are many reasons to expect the worst in life</td>
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<td>64.</td>
<td>I usually find it difficult to express myself clearly</td>
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<tr>
<td>65.</td>
<td>I don’t mind frequently changing my daily routine</td>
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<tr>
<td>66.</td>
<td>Most people are better liked than I am</td>
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<tr>
<td>67.</td>
<td>Those close to me rarely complain about how I behave toward them</td>
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<tr>
<td>68.</td>
<td>I usually find it difficult to express my emotions the way I would like to</td>
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<tr>
<td>69.</td>
<td>Generally, I’m able to adapt to new environments</td>
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<tr>
<td>70.</td>
<td>I often find it difficult to adjust my life according to the circumstances</td>
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<tr>
<td>71.</td>
<td>I would describe myself as a good negotiator</td>
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<tr>
<td>72.</td>
<td>I can deal effectively with people</td>
<td>1</td>
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<tr>
<td>73.</td>
<td>On the whole, I’m a highly motivated person</td>
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<tr>
<td>74.</td>
<td>I have stolen things as a child</td>
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<tr>
<td>75.</td>
<td>On the whole, I’m pleased with my life</td>
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<tr>
<td>76.</td>
<td>I find it difficult to control myself when I’m extremely happy</td>
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<tr>
<td>77.</td>
<td>Sometimes, it feels like I’m producing a lot of good work effortlessly</td>
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<td>2</td>
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<tr>
<td>78.</td>
<td>When I take a decision, I’m always sure it is the right one</td>
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<tr>
<td>79.</td>
<td>If I went on a blind date, the other person would be disappointed with my looks</td>
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<tr>
<td>80.</td>
<td>I normally find it difficult to adjust my behaviour according to the people I’m with</td>
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<td>2</td>
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<tr>
<td>81.</td>
<td>On the whole, I’m able to identify myself with others</td>
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<td>82.</td>
<td>I try to regulate pressures in order to control my stress levels</td>
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<td>83.</td>
<td>I don’t think I’m a useless person</td>
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<tr>
<td>84.</td>
<td>I usually find it difficult to regulate my emotions</td>
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<tr>
<td>85.</td>
<td>I can handle most difficulties in my life in a cool and composed manner</td>
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<tr>
<td>86.</td>
<td>If I wanted to, it would be easy for me to make someone angry</td>
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<tr>
<td>87.</td>
<td>On the whole, I like myself</td>
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<tr>
<td>88.</td>
<td>I believe I’m full of personal strengths</td>
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<tr>
<td>89.</td>
<td>I generally don’t find life enjoyable</td>
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<tr>
<td>90.</td>
<td>I’m usually able to calm down quickly after I’ve got mad at someone</td>
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<tr>
<td>91.</td>
<td>I can remain calm even when I’m extremely happy</td>
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<tr>
<td>92.</td>
<td>Generally, I’m not good at consoling others when they feel bad</td>
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<tr>
<td>93.</td>
<td>I’m usually able to settle disputes</td>
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<tr>
<td>94.</td>
<td>I never put pleasure before business</td>
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<tr>
<td>95.</td>
<td>Imagining myself in someone else’s position is not a problem for me</td>
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<tr>
<td>96.</td>
<td>I need a lot of self-control to keep myself out of trouble</td>
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<tr>
<td>97.</td>
<td>It is easy for me to find the right words to describe my feelings</td>
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<td>98.</td>
<td>I expect that most of my life will be enjoyable</td>
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<tr>
<td>99.</td>
<td>I am an ordinary person</td>
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<td>100.</td>
<td>I tend to get “carried away” easily</td>
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<td>101.</td>
<td>I usually try to resist negative thoughts and think of positive alternatives</td>
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<tr>
<td>102.</td>
<td>I don’t like planning ahead</td>
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<tr>
<td>103.</td>
<td>Just by looking at somebody, I can understand what he or she feels</td>
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<tr>
<td>104.</td>
<td>Life is beautiful</td>
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<td>105.</td>
<td>I normally find it easy to calm down after I have been scared</td>
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<tr>
<td>106.</td>
<td>I want to be in command of things</td>
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<tr>
<td>107.</td>
<td>I usually find it difficult to change other people’s opinions</td>
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<tr>
<td>108.</td>
<td>I’m generally good at social chit-chat</td>
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<tr>
<td>109.</td>
<td>Controlling my urges is not a big problem for me</td>
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<tr>
<td>110.</td>
<td>I really don’t like my physical appearance</td>
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<tr>
<td>111.</td>
<td>I tend to speak well and clearly</td>
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<tr>
<td>112.</td>
<td>On the whole, I’m not satisfied with how I tackle stress</td>
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<tr>
<td>113.</td>
<td>Most of the time, I know exactly why I feel the way I do</td>
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<td>114.</td>
<td>I find it difficult to calm down after I have been strongly surprised</td>
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<tr>
<td>115.</td>
<td>On the whole, I would describe myself as assertive</td>
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<tr>
<td>116.</td>
<td>On the whole, I’m not a happy person</td>
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<tr>
<td>117.</td>
<td>When someone offends me, I’m usually able to remain calm</td>
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<tr>
<td>118.</td>
<td>Most of the things I manage to do well seem to require a lot of effort</td>
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<tr>
<td>119.</td>
<td>I have never lied to spare someone else’s feelings</td>
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<td>6</td>
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<tr>
<td>120.</td>
<td>I find it difficult to bond well even with those close to me</td>
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<tr>
<td>121.</td>
<td>I consider all the advantages and disadvantages before making up my mind</td>
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<td>6</td>
</tr>
<tr>
<td>122.</td>
<td>I don’t know how to make others feel better when they need it</td>
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<td>2</td>
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<td>6</td>
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<tr>
<td>123.</td>
<td>I usually find it difficult to change my attitudes and views</td>
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<td>6</td>
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<tr>
<td>124.</td>
<td>Others tell me that I rarely speak about how I feel</td>
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<tr>
<td>125.</td>
<td>On the whole, I’m satisfied with my close relationships</td>
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<td>6</td>
</tr>
<tr>
<td>126.</td>
<td>I can identify an emotion from the moment it starts to develop in me</td>
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<td>2</td>
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<td>4</td>
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<td>6</td>
</tr>
<tr>
<td>127.</td>
<td>On the whole, I like to put other people’s interests above mine</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>128.</td>
<td>Most days, I feel great to be alive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>129.</td>
<td>I tend to get a lot of pleasure just from doing something well</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>130.</td>
<td>It is very important to me to get along with all my close friends and family</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>131.</td>
<td>I frequently have happy thoughts</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>132.</td>
<td>I have many fierce arguments with those close to me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>133.</td>
<td>Expressing my emotions with words is not a problem for me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>134.</td>
<td>I find it difficult to take pleasure in life</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>135.</td>
<td>I’m usually able to influence other people</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>136.</td>
<td>When I’m under pressure, I tend to lose my cool</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>137.</td>
<td>I usually find it difficult to change my behaviour</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>138.</td>
<td>Others look up to me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>139.</td>
<td>Others tell me that I get stressed very easily</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>140.</td>
<td>I’m usually able to find ways to control my emotions when I want to</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>141.</td>
<td>I believe that I would make a good salesperson</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>142.</td>
<td>I lose interest in what I do quite easily</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>143.</td>
<td>On the whole, I’m a creature of habit</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>144.</td>
<td>I would normally defend my opinions even if it meant arguing with important people</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>145.</td>
<td>I would describe myself as a flexible person</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>146.</td>
<td>Generally, I need a lot of incentives in order to do my best</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Even when I’m arguing with someone, I’m usually able to take their perspective</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>148.</td>
<td>On the whole, I’m able to deal with stress</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>149.</td>
<td>I try to avoid people who may stress me out</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>150.</td>
<td>I often indulge without considering all the consequences</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>151.</td>
<td>I tend to “back down” even if I know I’m right</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>152.</td>
<td>I find it difficult to take control of situations at work</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>153.</td>
<td>Some of my responses on this questionnaire are not 100% honest</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

**QUESTION SECTION 2**

Please note that in this section you are occasionally asked to write in your answer.

**About you**

<table>
<thead>
<tr>
<th>What is your gender?</th>
<th>☐ MALE ☐ FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is your natural hand for writing?</td>
<td>☐ RIGHT ☐ LEFT</td>
</tr>
<tr>
<td>Your marital status?</td>
<td>☐ Single ☐ Living together ☐ Married, no children in education ☐ Married with children in education ☐ Divorced/ Separated ☐ Widowed ☐ Other</td>
</tr>
<tr>
<td>What is your year of birth?</td>
<td>☒ 19…</td>
</tr>
<tr>
<td>Your birth order? (e.g. 1st, 2nd child)</td>
<td>☐ 1st ☐ 2nd ☐ 3rd ☐ 4th ☐ 5th ☐ 6th</td>
</tr>
<tr>
<td>Your current occupation?</td>
<td>☐ Private sector, manufacturer ☐ Private sector, service company ☐ Armed forces ☐ Health Service ☐ Other public sector ☐ Voluntary sector/charities ☐ Academic/teaching ☐ Self-employed ☐ Not employed ☐ Other</td>
</tr>
<tr>
<td>Was your upbringing mainly in</td>
<td>☐ Large City ☐ Town ☐ Village ☐ Other</td>
</tr>
<tr>
<td>How many children have you had?</td>
<td>☐ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 5+</td>
</tr>
<tr>
<td>Your highest educational qualification?</td>
<td>☐ GCSE/O Level or similar ☐ A Level or similar ☐ BA/BSc or similar ☐ MA/MSc or similar ☐ MBA ☐ PhD ☐ Other</td>
</tr>
<tr>
<td>If you are currently in higher education, what subject are you studying?</td>
<td>☐</td>
</tr>
</tbody>
</table>

| How would you describe yourself ethnically? | ☐ Asian-Hispanic or Latino ☐ Asian-not Hispanic or Latino ☐ Black or African American-not Hispanic or Latino ☐ Mixed ☐ Other-Hispanic or Latino ☐ Other-not Hispanic or Latino ☐ White-Hispanic or Latino ☐ White-not Hispanic or Latino |
| What sort of family religious background do you have? | ☐ Christian – Protestant ☐ Christian – Roman Catholic ☐ Christian – Other ☐ Muslim ☐ Hindu ☐ Jewish ☐ Buddhist ☐ Other belief system ☐ None at all |
| And with which religion would you say you most closely identify now? | ☐ Christian – Protestant ☐ Christian – Catholic ☐ Christian – Other ☐ Muslim ☐ Hindu ☐ Jewish ☐ Buddhist ☐ Other belief system ☐ None at all |
What is your total pre-tax annual income?
- Below £5000
- £5001-10000
- £10001-£15000
- £15001-£20,000
- £20001-£25000
- £25001-£30000
- £30001-£35000
- £35001-£40000
- £41001-£45000
- £45001-£50000
- Over £50000

How religious are you?
- On a scale of 1-7, where
  - 1=Not Religious At All
  - 4=Average
  - 7=Very Religious
- Please write in your score

What is your job title?

How many hours a month do you dedicate to voluntary public or civic work?

How happy in your job are you?
- On a scale of 1-7, where
  - 1=Not at All Happy
  - 4=Average
  - 7=Very Happy
- Please write in your score

How good are you at your line of work?
- On a scale of 1-7, where
  - 1=Poor
  - 4=Average
  - 7=Very Good
- Please write in your score

Is English your native language?
- YES
- NO

What are your political convictions?
- On a scale of 1-7, where
  - 1=Strongly Left Wing
  - 4=Neither
  - 7=Strongly Right wing
- Please write in your score

How good are you at your line of work?
**Appendix B**

Internal Consistencies for TEIQue Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>α</th>
<th>No. of Items</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptability</td>
<td>4.65</td>
<td>0.85</td>
<td>.75</td>
<td>9</td>
<td>-.227</td>
<td>.088</td>
</tr>
<tr>
<td>Assertiveness</td>
<td>4.89</td>
<td>0.93</td>
<td>.77</td>
<td>9</td>
<td>-.204</td>
<td>-.336</td>
</tr>
<tr>
<td>Emotion Expression</td>
<td>4.74</td>
<td>1.22</td>
<td>.89</td>
<td>10</td>
<td>-.329</td>
<td>-.523</td>
</tr>
<tr>
<td>Emotion Management</td>
<td>4.87</td>
<td>0.82</td>
<td>.70</td>
<td>9</td>
<td>-.206</td>
<td>-.151</td>
</tr>
<tr>
<td>Emotion Perception</td>
<td>4.84</td>
<td>0.81</td>
<td>.73</td>
<td>10</td>
<td>-.369</td>
<td>.258</td>
</tr>
<tr>
<td>Emotion Regulation</td>
<td>4.38</td>
<td>0.90</td>
<td>.81</td>
<td>12</td>
<td>.018</td>
<td>-.175</td>
</tr>
<tr>
<td>Impulsiveness (low)</td>
<td>4.54</td>
<td>0.93</td>
<td>.74</td>
<td>9</td>
<td>-.066</td>
<td>-.159</td>
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<tr>
<td>Relationships</td>
<td>5.48</td>
<td>0.79</td>
<td>.68</td>
<td>9</td>
<td>-.568</td>
<td>.264</td>
</tr>
<tr>
<td>Self-Esteem</td>
<td>4.92</td>
<td>0.89</td>
<td>.80</td>
<td>11</td>
<td>-.415</td>
<td>.225</td>
</tr>
<tr>
<td>Self-Motivation</td>
<td>4.74</td>
<td>0.81</td>
<td>.69</td>
<td>10</td>
<td>-.262</td>
<td>-.011</td>
</tr>
<tr>
<td>Social Awareness</td>
<td>5.01</td>
<td>0.89</td>
<td>.82</td>
<td>11</td>
<td>-.302</td>
<td>-.282</td>
</tr>
<tr>
<td>Stress Management</td>
<td>4.55</td>
<td>0.98</td>
<td>.80</td>
<td>10</td>
<td>-.282</td>
<td>-.106</td>
</tr>
<tr>
<td>Trait Empathy</td>
<td>5.12</td>
<td>0.77</td>
<td>.70</td>
<td>9</td>
<td>-.333</td>
<td>.010</td>
</tr>
<tr>
<td>Trait Happiness</td>
<td>5.55</td>
<td>1.01</td>
<td>.87</td>
<td>8</td>
<td>-.959</td>
<td>.929</td>
</tr>
<tr>
<td>Trait Optimism</td>
<td>5.26</td>
<td>0.97</td>
<td>.81</td>
<td>8</td>
<td>-.635</td>
<td>.259</td>
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<tr>
<td>Emotionality</td>
<td>5.05</td>
<td>0.71</td>
<td>.78</td>
<td>4 facets</td>
<td>-.271</td>
<td>-.158</td>
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<tr>
<td>Self-Control</td>
<td>4.49</td>
<td>0.79</td>
<td>.79</td>
<td>3 facets</td>
<td>-.007</td>
<td>-.038</td>
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<tr>
<td>Sociability</td>
<td>4.92</td>
<td>0.75</td>
<td>.82</td>
<td>3 facets</td>
<td>-.153</td>
<td>-.257</td>
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<tr>
<td>Well-Being</td>
<td>5.24</td>
<td>0.83</td>
<td>.83</td>
<td>3 facets</td>
<td>-.743</td>
<td>.661</td>
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<tr>
<td>Global Trait EI</td>
<td>4.90</td>
<td>0.59</td>
<td>.90</td>
<td>15 scales</td>
<td>-.114</td>
<td>-.170</td>
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</tbody>
</table>

Dear PA Student,

Happy New Year!

I am working on a doctoral dissertation in Education at Northeastern University, with a focus on the effect of team-based learning on trait emotional intelligence of physician assistant studies students. Emotional intelligence has been shown to contribute significantly to patient satisfaction and success in healthcare. I’d like to invite you to be a part of my research.

PA students are being invited from two different local graduate programs, one that is taught entirely using team-based learning, and another which uses a more traditional lecture and exam format. I have been in contact with the directors of each of the programs and have their support to reach out to you directly to invite you to participate.

To be a part of my research, you would need to complete a brief emotional intelligence self-assessment. It should take about 20 minutes to complete. Eight weeks later, you will be asked to take the same assessment again.

You are under no pressure to participate in this study. Your grades will not be impacted whether you participate, and future academic or clinical opportunities are not dependent on your participation. You can stop at any time in the process if you wish. Your participation, though greatly appreciated, is completely voluntary.

Anyone who agrees to participate in the study will have the opportunity to enroll in a raffle for a $50 Amazon gift card. Anyone who completes the study, after having completed the second iteration of the assessment, will receive a summary report of your emotional intelligence.

In order to participate in the study, you will receive an email from Thomas International with a subject line that reads: “Invitation to Complete a TEIQue Assessment.” The email will include a clickable link to the Thomas International TEIQue site, along with your unique username and password. You will need a laptop or smartphone to complete the assessment in class.

If you have questions about the study, feel free to reach out to me.

Thanks for taking the time to consider this research opportunity.

Emile "Mike" Boutin, Jr.

"Success is not final, failure is not fatal: it is the courage to continue that counts."

Winston Churchill
Appendix D

Thomas International Email with IRB-Approved Consent Form

Request to Participate in Research

Northeastern University, College of Professional Studies

Name of Investigator(s):

- Principal Investigator: Tracy Pascua Dea, Ph.D.,
- Student Researcher: Emile R. “Mike” Boutin, Jr., Ed. D. ABD

Title of Project: Mind Your Bedside Manners: The Effect of Team-Based Learning on the Emotional Intelligence of Physician Assistant Studies Students

We would like to invite you to participate in a web-based online survey. The survey is part of a research study whose purpose is examine the effect of team-based learning on the trait emotional intelligence of physician assistant studies students. This survey should take about 30 minutes to complete.

We are asking you to participate in this study because you are a first-year physician assistant student. You must be at least 18 years old to take this survey.

The decision to participate in this research project is voluntary. You do not have to participate, and you can refuse to answer any question. Even if you begin the web-based online survey, you can stop at any time.

The possible risks or discomforts of the study are minimal. Because this study deals with emotions, you may feel a little uncomfortable answering personal survey questions.

There are no direct benefits to you from participating in this study. However, your responses may help us learn more about the value of team-based learning in healthcare education.

You will not be paid for your participation in this study, however as a token of our appreciation for completing the survey, you will be enrolled in a drawing for a $50 Amazon gift card. In addition, anyone who completes both the pretest and posttest assessments will be provided a personalized emotional intelligence report, free of charge.

Your part in this study will be handled in a confidential manner. Any reports or publications based on this research will use only group data and will not identify you or any individual as being affiliated with this project.

If you have any questions regarding electronic privacy, please feel free to contact Mark Nardone, NU’s Director of Information Security via phone at 617-373-7901, or via email at privacy@neu.edu.
If you have any questions about this study, please feel free to contact Emile R. “Mike” Boutin, Jr., Ed.D. boutin.e@husky.neu.edu 617-726-8021, the person mainly responsible for the research. You can also contact Tracy Pascua Dea, Ph.D., t.pascuadea@northeastern.edu, the Principal Investigator.

If you have any questions regarding your rights as a research participant, please contact Nan C. Regina, Director, Human Subject Research Protection, 960 Renaissance Park, Northeastern University, Boston, MA 02115. Tel: 617.373.4588, Email: n.regina@neu.edu. You may call anonymously if you wish.

By clicking on the survey link below, you are indicating that you consent to participate in this study. Please print out a copy of this consent form for your records.

Click the link below, or copy and paste it into your browser to start the assessment:

You may then be asked to enter your username and password, which are shown below:

Login ID:

Password:

Visit the Thomas Candidate Area http://www.thomasinternational.net/Candidate/candidatehome.aspx to learn more about this assessment

This is an automated e-mail. We are unable to respond to any replies sent to this address. If you have any queries related to this email, please contact the originator at the Company from which the invitation was sent. This message is intended only for the use of the person(s) to whom it is addressed. Accordingly, the copying, dissemination, distribution, or use of this message to any other person may constitute a breach of Civil or Criminal Law.

View our privacy statement http://www.thomasus.com/privacy.html
Appendix E

Invitation Email from Researcher for Second Assessment

Dear PA Student,

Eight weeks ago, you were invited to participate in a research study. Today, I am inviting you to participate in the second part of that study by taking the same brief emotional intelligence self-assessment again. It should take about 20 minutes to complete.

I am working on a doctoral dissertation in Education at Northeastern University, with a focus on the effect of team-based learning on trait emotional intelligence of physician assistant studies students. Emotional intelligence has been shown to contribute significantly to patient satisfaction and success in healthcare.

PA students were invited from two different local graduate programs, one that is taught entirely using team-based learning, and another which uses a more traditional lecture and exam format. I was in contact with the directors of each of the programs and had their support to reach out to you directly to invite you to participate.

You are under no pressure to participate in this study. Your grades will not be impacted whether you participate, and future academic or clinical opportunities are not dependent on your participation. You can stop at any time in the process if you wish. Your participation, though greatly appreciated, is completely voluntary.

Anyone who agrees to participate in the study will have the opportunity to enroll in a raffle for a $50 Amazon gift card. Anyone who completes the study, after having completed the second iteration of the assessment, will receive a summary report of your emotional intelligence.

On Friday, March 1st, I have been invited by Dr. Baginski to return to your class to complete the study. For you to take the assessment, you will receive an email from Thomas International with a subject line that reads: “Invitation to Complete a TEIQue Assessment.” The email will include a clickable link to the Thomas International TEIQue site, along with your unique username and password. You will need a laptop or smartphone to complete the assessment in class.

If you have questions about the study, feel free to reach out to me.

Thanks for taking the time to consider this research opportunity.

Sincerely,

Emile R. Boutin, Jr., Ed.D. cand.
### Appendix F

Comparison of Lecture-Based and TBL Curricula

<table>
<thead>
<tr>
<th>Semester</th>
<th>Lecture-Based Program</th>
<th>TBL Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer 2018</td>
<td></td>
<td>Foundations of Medicine&lt;br&gt;The PA Profession&lt;br&gt;Essentials of Dermatology&lt;br&gt;Essentials of Musculoskeletal Disease and Injury&lt;br&gt;Essentials of Hematology &amp; Oncology&lt;br&gt;Essentials of Neurology&lt;br&gt;Patient Care I</td>
</tr>
<tr>
<td></td>
<td>Anatomy and Physiology 1&lt;br&gt;Physical Diagnosis and Patient Evaluation 1&lt;br&gt;Pharmacology 1&lt;br&gt;Professional Issues for Physician Assistants&lt;br&gt;Principles of Medicine 1&lt;br&gt;Principles of Psychiatry&lt;br&gt;Health Care Delivery</td>
<td>The PA in Practice&lt;br&gt;Essentials of Pulmonary Medicine&lt;br&gt;Principles of Behavioral Medicine&lt;br&gt;Essentials of Cardiovascular Disease&lt;br&gt;Essentials of Otolaryngology &amp; Ophthalmology&lt;br&gt;Patient Care II&lt;br&gt;IMPACT 1: Interprofessional Practice</td>
</tr>
<tr>
<td>Fall 2018</td>
<td>Anatomy and Physiology 2&lt;br&gt;Physical Diagnosis and Patient Evaluation 2&lt;br&gt;Pharmacology 2&lt;br&gt;Clinical Lab and Diagnostic Methods&lt;br&gt;Principles of Medicine 2&lt;br&gt;Clinical Neurology&lt;br&gt;Principles of Pediatrics</td>
<td>The PA in the Community&lt;br&gt;Essentials of Gastroenterology&lt;br&gt;Essentials of Endocrinology&lt;br&gt;Essentials of Nephrology &amp; Urology&lt;br&gt;Principles of Reproductive Medicine&lt;br&gt;Patient Care III&lt;br&gt;Special Populations&lt;br&gt;Principles of Surgery, Emergency, &amp; Inpatient Care&lt;br&gt;IMPACT 2: Interprofessional Project</td>
</tr>
<tr>
<td>Spring 2019</td>
<td>Principles of Medicine 3&lt;br&gt;Principles of Obstetrics and Gynecology&lt;br&gt;Principles of Orthopedics</td>
<td></td>
</tr>
<tr>
<td>Summer 2019</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Appendix G

Ethnicity by School

<table>
<thead>
<tr>
<th>Ethnicity:</th>
<th>School</th>
<th>Lecture-Based</th>
<th>TBL</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
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