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Can Trait Emotional Intelligence Variables of Well-Being, Self-Control, Emotionality, and Sociability Individually or Collectively Predict a Software Development Engineer's Creativity?

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Dedication

This dissertation is dedicated to my parents, Taylor John Chatsauka and Norah Mvududu who imparted in me the virtuous work ethic of perseverance and courage to dream big. I will always strive to make you proud Mom and Dad.

Acknowledgement

While I cannot name every single person that made it possible for me to embark on this study, it is my humble wish to acknowledge the inspirational support that shaped my dissertation research. First, I would like to thank my wife Nyaradzo Hope Mvududu who was a constant source of wisdom-filled encouragement. I would also like to thank my sons Fungai, Tomudashe, Lemai, and Tino for their patience and accommodation of my absence while I worked on this study. Special thanks go to my grandson Quincy-Tafara Mvududu who at age five, had complete confidence in me even when I doubted myself. Well, Quincy you were right that I could pull this off!

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Abstract

This quantitative research study was carried out as a partial requirement for earning a Doctor of Business Administration degree from George Fox University. The main goal of the research study was to investigate whether trait emotional intelligence variables of well-being, self-control, emotionality, and sociability can individually or collectively predict a software development engineer's creativity or creativeness potential. Employee innovativeness is the primary focus of many organizations in today's turbulent business environment whereby employees are increasingly gaining autonomy in self-managed teams. The study discusses the theoretical frameworks of creativity and trait emotional intelligence (Trait EI), an extension of the emotional intelligence (EI) construct that focuses on personality behaviors and abilities. Trait EI attributes such as well-being, self-control, emotionality, and sociability are growing in importance given the trend towards self-managed teams, especially in high-tech firms that rely on agility for creative innovation. Participants in the study were drawn from software engineers in the greater Seattle region in Washington state, USA. The Trait Emotional Intelligence Questionnaire-Short Form (TEIque-SF) was used to measure Trait EI perception of participants and the Kaufman Domain of Creativity Scale (K-DOCS) was used to measure creativity perception of participants. Data analysis procedures are highlighted and include use of multiple regression to investigate the predictability of an engineer's creativity using trait emotional intelligence variables of well-being, self-control, emotionality, and sociability. Central to this study was the desire to add empirical understanding of the relationship of trait emotional intelligence influence on creativity.

Keywords: Trait emotional intelligence, Emotional intelligence, Employee engagement, and Creativity

Chapter 1 – Introduction

Statement of the research problem. People who possess emotional intelligence can understand emotions of other people and such competency enhances productive engagement at work (Goleman, 1997). The fast-paced business environment in the high-tech industry has tipped organizations towards agility to stay ahead of competition. According to Hern (2018), Amazon's success in the cloud business via its Amazon Web Services (AWS) division is credited to their agility approach to innovation. Self-managed teams should be lean under the Amazon two-pizza rule that subscribes to the notion that teams should not be too big to be fed from more than two pizzas.

Since taking over as the chief executive officer in 2014, Satya Nadella's secret of the positive transformation at Microsoft is credited to his cultivation of agility. Agility requires heightened employee autonomy and, according to Satya Nadella, agile teams thrive when team members are emotionally intelligent to build consensus and cooperative creativity. According to writer Chris Matyszczyk (2019), "Microsoft was a nasty company in the past. Externally, it bullied businesses into buying its software, and internally, employees would ceaselessly work against each other to get ahead" (p. 1). The realization and acceptance of the importance of trait emotional intelligence (Trait EI) at workplaces in building agile teams, especially among software development engineers, motivated this research. Trait emotional intelligence refers to a group of emotion-related self-perceptions that share common attributes with lower level personality attributes. Trait EI involves one's well-being, self-control, emotionality, and sociability in a social environment. In this regard, trait emotional intelligence is not distinct to the personality construct as it is part of the personality traits.

Of primary interest to this study is the emotional connection construct and how trait emotional intelligence is related to the outcome variable of creativity. This study investigated the predictability of a software engineer's creativity from an analysis of one's trait emotional intelligence variables of well-being, self-control, emotionality, and sociability within the Seattle, Washington region of the United States. Trait EI refers to a group of emotion-related self-perceptions that share common attributes with lower level personality attributes. Trait EI measures personality-based behaviors that influence one's creativity process construct (Cropley, 2015). Employee creativity, defined as the generation of novel and useful ideas (Amabile, 1988; Zhou & Shalley, 2003), is critical to organizational survival and effectiveness. Research to date has mostly focused on the assumption that an employee's creative effectiveness is thought to be related to the development of conducive climate factors that boost employee engagement (Macey & Schneider, 2008; Saks, 2006). As such, employee creativity has traditionally been linked to climate factors, such as the leadership style, organizational structure, and organizational culture.

Prior to 1987, research on emotional intelligence concentrated on emotions and behavior or emotions and thought. Ever since John Mayer and Peter Salovey defined and developed the theory of emotional intelligence as a stand-alone intelligence 25 years ago, emotional intelligence has evolved to be pivotal factor to human capital development (Boyatzis, 2018). Organizations, in response to increasing competition, are focusing on employee engagement as a strategy to increase retention and improve productivity via the enhancement of soft skills (Lockwood, 2007). Emotional intelligence is the lens employees use to understand their emotions and draw meaning relative to soft skills required to enhance creativity. (O'Neil & Arendt, 2008). This research is in response to the growing need for empirical evidence that back up Goleman's (1995) claims on the importance of emotional intelligence when it comes to

assessing one's productivity potential. According to the leadership coach Hill (2015), emotional intelligence is key to the success of engineering creativity. The fundamental criticism of the emotional intelligence construct is that its definition is too broad and that its measurement is too fuzzy to be conclusive (Matthews, Zeidner, & Roberts, 2007).

Need for significance of the study. The purpose of this study was to investigate the hypothesized predictability of creativeness of software development engineers from their individual or collective Trait EI variable scores of well-being, self-control, emotionality, and sociability. The employee engagement theory has gained considerable popularity in the last 25 years (Macey & Schneider, 2008; Schneider, Yost, Kropp, Kind, & Lam, 2018) but its linkage to emotional intelligence remains in need of more empirical research (Saks, 2006; Ackley, 2016; Bliese, Edwards, & Sonnentag, 2017). The study resides on content theories of trait emotional intelligence (Petrides, 2000), theories of emotional intelligence (Goleman, 1997; Ackley, 2016 & Byrne, 2014), and theories of creativity (Federman, 2009; Kaufman, & Baer, 2012;Truss, Delbridge, & Soane, 2013; Hicks, & Knies, 2015 & Schneider, Yost, Kropp, Kind, & Lam, 2018) with a goal of examining the link of trait emotional intelligence to creativity for software development engineers. While, "there is no one consensual definition of what EI is and what it should encompass" (Murphy, 2006, p6), this study finds the trait emotional intelligence focus on personality traits ripe with opportunities to demonstrate within the self-efficacy theory framework the link of emotional intelligence traits to creativity. More evidence of the impact of emotional intelligence on outcome variables like creativity is needed within the business world given the growing reliance on agile teams. Traditionally, organizations have relied on testing the big five personality traits in selecting engineering teams that fit to external factors like leadership style and organizational structures. Building agile teams requires team members who are

emotionally intelligent to create as a team with little or no supervision. Central to this study was the issue of whether a software engineer's perception of their Trait EI correlates to their perception of their creativity potential. For good reasons, the maturity of any science is gauged by predictive power, not just explanatory utility, hence the motivation in this research study to demonstrate the link of trait emotional intelligence to creativity. Silvia, Wigert, Reiter-Palmon, Kaufman, Smith, and Smith's (2012) study demonstrates the strength of measuring creativity from self-reports. Brackett, Rivers, and Salovey's (2011) study concluded that emotions are functional in how one processes information and uses that information in critical thinking that can lead to creative thinking. Beghetto, and Corazza, (2019) most recently analyzed the link of emotions to the creative process and they advanced the notion that emotions are indeed the spinal cord of creative thinking. The emotional phenomena are usually intended as strong (intrinsic or extrinsic) forces able to influence the creative thinking process, which leads to idea generation. Creativity is one of the psychological constructs most highly valued in social terms, as it is the basis of technological and social innovation (Amabile, 1988). Joseph, Jin, Newman, and O'Boyle (2015) looked at the predictability of job performance from Trait EI and EI and they concluded that EI can robustly predict job performance. Their study however focused on job performance of both subjective and objective ratings such as sales increases or number of products produced. Such broad definitions of job performance come with contaminated factors external to the individual. This research strived to focus on emotional factors that are individual-focused in relation to the creativity outcome variable of software development engineers. The research focus was to measure the intrinsic attributes of one's well-being, self-control, emotionality, and sociability as it relates to one's creativity potential.

Research question. Can trait emotional intelligence variables of well-being, self-control, emotionality, and sociability individually or collectively predict a software development engineer's creativity?

The research hypotheses.

Ho1: Well-being is not a significant predictor of software development engineers' creativeness or innovativeness.

Ha1: Well-being is a significant predictor of software development engineers' creativeness or innovativeness.

Ho2: Self-control is not a significant predictor of software development engineers' creativeness or innovativeness.

Ha2: Self-control is a significant predictor of software development engineers' creativeness or innovativeness.

Ho3: Emotionality is not a significant predictor of software development engineers' creativeness or innovativeness.

Ha3: Emotionality is a significant predictor of software development engineers' creativeness or innovativeness.

Ha4: Sociability is a significant predictor of software development engineers' creativeness or innovativeness.

Ho4: Sociability is not a significant predictor of software development engineers' creativeness or innovativeness.

Ho5: Trait EI variables of well-being, self-control, emotionality, and sociability collectively cannot predict a software development engineer's creativeness.

Ha5: Trait EI variables of well-being, self-control, emotionality, and sociability collectively can predict a software development engineer's creativeness.

Definitions of the terms.

Emotional intelligence (EI refers to an individual's ability or capacity to be self-aware, to self-manage, self-motivate, and be socially aware of the emotions of others as well. EQ reflects one's ability to manage emotions, navigate responsibly in consideration of other people's emotions, and one's ability to adapt to the environment. Briefly, EQ refers to the ability to acknowledge one's emotions, recognize others' emotions, understand, and utilize, emotions effectively (Goleman, 1997).

Trait emotional intelligence refers to a group of emotion-related self-perceptions that share common attributes with lower level personality attributes. In this regard, trait emotional intelligence is not distinct to the personality construct as it is part of the personality traits (Zampetakis, 2011). The growth of trait emotional intelligence came out of the assumption that emotional intelligence falls outside of the cognitive ability.

Employee creativity is defined as the generation of novel and useful ideas (Amabile, 1988; Zhou & Shalley, 2003)

Employee creativeness is defined as having the quality or power to create viable business solutions (Byrne, 2014). In this study creativity or creativeness refer to the potential of software engineers' ability to create novel viable solutions.

Well-being is defined as one's self-esteem or self-confidence that is accompanied with cheerfulness and trait optimism of focusing on the bright side of life (Gökçen, Petrides, Hudry, Frederickson, & Smillie, 2014).

Self-control is defined as a deep-rooted and internalized ability to control one's emotions in ways that equip one to withstand pressure and manage stress, as well as refrain from impulsiveness (Gökçen et al, 2014).

Emotionality is defined as the competence to accurately perceive self and others' feelings, ability to communicate one's feelings to others, ability to empathize other people's feelings, and ability to have fulfilling personal relationships (Gökçen et al, 2014).

Sociability is defined as the ability to recognize, acknowledge, and understand the viewpoints or emotional expressions of others, ability to influence other people's feelings, and assertiveness in being forthright and frank, and willingness to stand up for what is right (Gökçen et al, 2014).

A software development engineer is a person concerned with all or any of the facets of software development for use according to Stack Overflow (2019) the largest organization of software developers.

Empathy is defined as "an observer's emotional response to the affective state of another." (Baron-Cohen, & Wheelwright, 2004, p164).

The high-tech firms refer to firms that engage in software development operating within the greater Seattle, Washington region of the United States.

Delimitations. The major delimitation was the challenge of collecting a large enough sample to be representative of the population of the software developing engineers in Washington state. According to the Washington Technology Industry Association there were 90,000 software engineers in 2015 in the Seattle area (Stewart, 2015). The other significant delimitation was the fact that this research had no control over other climate factors such as organizational structure, culture, leadership, and resource allocation that can enhance or distract

from creativity. Also, personality-related variables can come into play in how the target sample may perceive creativity. Personality-related variables such as self-efficacy or self-esteem can influence the responses of participants. The use of the trait emotional intelligence instrument, instead of the standard emotional intelligence questionnaires that are silent on personality traits, aimed at mitigation against personality-related bias. (Macey & Schneider, 2008; Saks, 2006)

Assumptions. The major underlying assumption in this study is that personality traits are relatively stable. Damian, Spengler, Sutu, and Roberts (2018) looked at a large sample that tracked changes in personality trait changes of participants over a 50-year span from 16 to 66 years and they observed that the change in personality trait was more malleable over shorter spans and generally stable over longer spans. The issue of whether personality traits are stable or malleable as acknowledged in the US Fed News (2018) remains open to empirical theoretical resolution. The academic jury is still in session on the issue of personality trait stability or malleability, just like with the issue of the link of genius to madness per Kaufman and Silva (2010) or Kaufman (2014) observations. Damian, and Simonton (2015), in their study that accessed the psychopathology impact of adversity and personality traits of African Americans on creativity, observed that the introvert personality trait is a defensive learned trait that is stable among African Americans. Proponents of the argument that personality traits are malleable tend to emphasize the impact of mood swings in relation to one's perception on self-esteem or self-confidence. The Harris, Brett, Johnson, and Deary (2016) study on self-confidence, perseverance, stability of moods, conscientiousness, originality, and desire to excel observed that personality traits show little to no stability over extended periods of time. However, as Damian et al (2018) observed, such malleability does not impede an individual to establish one's conscientiousness, agreeableness, openness to experiences, extraversion, and emotional stability.

The Anusic and Schimmack (2016) study that looked at factors that influence personality traits such as extraversion and neuroticism noted that while these factors influence an individual's mood, such influence stabilizes with age. " Specifically, personality traits in adulthood appear to be highly stable" (Anusic & Schimmack, 2016, p775).

The use of the Trait EI construct that focuses on traits located at the lower levels of the personality hierarchies limits the impact of the malleability of personality traits. Petrides (2011) in a study that looked at the impact of mood with regards to trait emotional intelligence from the belief-importance theory perspective, observed the general understanding that view "personality traits as deterministic due to their high temporal stabilities after 30" (p166). This study therefore assumes that personality traits are stable and that from self-reporting one can observe personality traits as stable. The weakness of the stable construct of personality traits emanates from the fact that the longitudinal studies done to date are plagued with methodological drawbacks driven by the reliance on self-reporting measuring. While the primary limitation in the use of self-report measures is real, this study subscribes to the major assumption that (a) every individual is capable of perceiving one's personality traits; (b) people gravitate towards positive experiences at work or life in general and that emotional intelligence drives the perception of such positive experiences that can lead to creativity; (c) that emotions can be managed; (d) that employee creativity is a personal experience; and (e) that where emotional intelligence is perceived to exist, employees exhibit creativeness.. While self-report scales are cost-effective, they come with potential errors of inflated correlations especially if the sample pulled lacks heterogeneity (Crampton & Wagner, 1994). Collecting large enough and complete data using large scales also comes with limitations.

Researcher's perspective. The credo "follow your heart" is propagated on the belief that the truth lies in the property of one's feelings and intuition and less so on one's reasoning or cognitive orientation (Reddy, 2001). My name—Mwoyondishe—literally translates to the "follow your heart" credo whereby your heart is your conscience. Conscience here is taken to be the inner feeling or voice that guides one's moral judgement of what is right or wrong behavior. Conscience is the manifestation of one's emotional intelligence competence. As posited by Kahn (1990), employee engagement manifests the expression of one's preferred self and the quest to connect to others at work or teams. I believe that in today's business world, especially within the high-tech industry, selecting team members of the growing self-managed teams requires going beyond personality traits testing. I grew up in a communal-based culture that is anchored on consensus building. Emotional intelligence is centered on one's ability to be self-aware, self-regulating, self-motivating, empathetic, and socially aware. Trait emotional intelligence is particularly interesting to me given the focus on emotional intelligence traits in relation to personality trait behaviors. I believe that emotional intelligence can be taught to anyone regardless of one's personality traits. I believe that a deeper understanding of one's trait emotional intelligence can lead to shaping one's Trait EI training.

While environmental factors such as structure, leadership style, resource allocation, and so forth play a critical role in shaping one's creativity, I find emotional intelligence competency to be the driving force in one's creativity realization. In line with the Zimbabwean culture that values recognition of every member of the society, I approached this research with the bias that heightened emotional intelligence can lead to enhanced creativity when team members feel valued. Self-awareness, self-motivation, self-regulation. empathy, and social awareness enhance one's ability to work with others in ways that maximize productivity for all team members.

Kahn, (1990/92) advanced the notion that individuals are more effective when they are fully present emotionally. Kakar (2017) further reinforced that organizations that cultivate self-organization (agility) achieve higher employee creativity and productivity of quality solutions. Agility stimulates greater team member involvement and participation, resulting in higher commitment and motivation. “Team members of self-organizing groups demonstrate greater creativity and problem-solving skills.” (Kakar, 2017, p1). Chiang, Hsu, and Shih’s (2017) study found that openness to experience ($p=.38$, $p<.01$) and general self-efficacy ($p=41$, $p<.01$) are significantly related to creative performance.

Chapter 2 – Literature review

Introduction. This chapter covers in detail the three main theoretical constructs of Trait EI, Emotional Intelligence and Creativity.

Emotional Intelligence. Darwin (1872/1965) is regarded as the founding father of the research on emotional intelligence, but it was Thorndike (1931) who started to expand on what he called social intelligence in the 1920s. Social intelligence was summarized as the skill to understand and manage others. Gardner (2006) around 1983 introduced the concept of multiple intelligence, broken down into interpersonal intelligence (ability to understand the motivations, desires, and intentions of others) and intrapersonal intelligence (ability to understand one's feelings, and express and manage those feelings). Leuner (1966) is credited for the first use of the term emotional intelligence followed by Payne (1984) and Greenspan (1992) around 1989. The effort to define and develop the measurement of emotional intelligence is credited to Salovey and Mayer (1990) but it was Goleman (1995) who popularized the interest on emotional intelligence within the business world given his claim that abilities such as being able to motivate oneself, to control impulse and delay gratification, to empathize and hope mattered most in workplace productivity.

According to the Encyclopedia of Applied Psychology (Spielberger, 2004), there are three major emotional intelligence models: (a) the Mayer and Salovey model (1997); (b) the Goleman model (1998) that evolved into the Goleman-Boyatzis model (Goleman, Boyatzis, & McKee, 2013); and (c) the Bar-On model (1997a).

"Emotional intelligence concerns the ability to carry out accurate reasoning about emotions and the ability to use emotions and emotional knowledge to enhance thought" (Mayer, Roberts, & Barsade, 2008, p510). According to Low, Lomax, Jackson, and Nelson (2004),

emotional intelligence (EI) is “a learned ability to identify experience, understand, and express human emotions in healthy and productive ways” (p. 9). Emotional intelligence in general falls into two major theories: (a) ability emotional intelligence construct, that includes the integrative emotional intelligence construct; and (b) the mixed-model construct. The ability construct as first conceptualized by Mayer, Salovey, and Caruso (2000) assumes that emotional intelligence is an intelligence or aptitude that overlaps with the cognitive intelligence in the drawing of meaning from the perceived emotions.

This construct focuses on one’s capacity to perceive emotions, interpret the perceived emotions and the utilization of the perception in decision making (Joseph & Newman, 2010). This ability-based construct assumes one has capacity to accurately perceive one’s emotions. This assumption is open-ended especially from the accuracy perspective orientation, and critics of this model like Murphy (2006) point to the challenge of measuring the ability-based models. The second critical attribute of the ability-based construct is the assumption that one has the capacity to use emotions to promote thinking. Using emotions to promote thinking is the central element of the overlap of emotional intelligence with cognitive intelligence (Conte, 2005). The third attribute of the ability-based construct is the assumption that one has the capacity to understand emotions. The fourth attribute of the ability-based construct involves one’s ability to manage one’s emotions and emotions of others (Mayer, Roberts, & Barsade, 2008). To this regard emotional intelligence is viewed as a broad global ability that integrates the emotional and cognitive intelligence.

While the definitions of emotional intelligence are multiple, the common theme in these definitions is that the ability to regulate and manage emotions makes people more emotionally intelligent (Brackett, Rivers, & Salovey, 2011). Mayer, Salovey, Caruso, and Sitarenios (2001)

advanced the foundational viewpoint that emotions reflect the mental responses to experienced events. The mental responses manifest into one's emotional perception driven by one's emotional reasoning and emotion management (Mayer et al., 2008). This common attribute in the current definitions of emotional intelligence links the ability construct to one's abilities to problem-solve, manage stress, and develop productive relationships (Bar-On, 2006). Sternberg (1997) further refined his definition of intelligence as a deliberate development of mental road maps that guide one's interaction with the real world in ways that make sense.

With regards to emotional intelligence, this leads to what Izard (1997) coined as the development of emotional knowledge. Emotional knowledge reflects one's ability to understand, label, and express emotions. Emotional motivation and arousal, according to the emotional knowledge construct, can shape one's ability to adapt to the environment. Izard (1997) further posits that the perception of emotions is a cognitive function that gains relevance when one can use that cognitive function to label and make meaning of the emotions within the social context. This underlying assumption forms the basis of the primary emotional intelligence assumption that a person with high emotional knowledge would be able to accurately perceive, label, and utilize the emotions of himself/herself and others (Izard, 1997). Kong (2014) looked at the assumption that emotional knowledge of verbal or non-verbal components is correlated to the labeling and reasoning of emotions.

The other integrative emotional intelligence model is the four-branch ability construct that was developed around 2001 by Mayer, Salovey, and Caruso (2008). This model focuses on emotions and how one can utilize one's emotional understanding and ability in dealing with other people. The first level of the four-branch model is the ability to perceive emotions and express emotions accurately from observing verbal and non-verbal cues. The second level

involves the process of utilizing the emotional knowledge gathered during level one (Mayer, Salovey, Caruso, & Sitarenios, 2003). This level-based hierarchical growth and utilization of emotional knowledge leads to the level three, where one can not only understand one's emotions but emotions of other people. The ability to understand emotions facilitates ability to empathize with others (Mayer, Salovey, & Caruso, 2008). The final level in the four-branch model involves the development of competency to manage emotions. This involves the ability to control one's emotions and ability to interpret others' emotions in ways that facilitates positive group interaction. Such high emotional management competency enables one to perceive, facilitate, and understand the emotions within oneself and within the group, without letting those emotions control the situation (Mayer et al., 2008).

Wang, Young, Wilhite, and Marczyk (2011) consolidated the convergence of the integrative emotional intelligence construct into the four emotional intelligence variables of self-awareness, empathy, self-management, and interpersonal relationship skills. The starting point of these variables is the development of self-awareness: the ability to observe one's own behavior and be aware of how one's emotions influence one's behavior. Growth in self-awareness leads to competency in empathy, the ability to understand another's emotions. The third level is self-management, where the abilities of self-awareness and empathy are used collectively to actively manage one's emotions both personally and in social interactions. This allows one to develop interpersonal relationship skills as an extension to the self-management competency. Schutte, et al (1998) supported this general view that emotional intelligence involves the competence to understand and regulate emotions. The implication here is that an emotionally competent person can have productive relationships and interactions within the social context of one's

environment. This ability to manage emotions constitutes the final level of the integrative emotional intelligence construct.

Schutte et al (1998) developed the Emotional Intelligence Scale (EIS) to validate their assumption that emotional intelligence can be measured as a personality trait and this gave birth to the mixed-model emotional intelligence construct. The mixed model construct broadened the definition of emotional intelligence by including social behavior and aspects of the personality theory (Mayer et al, 2008). Petrides and Furnham (2001) followed up on Schutte et al's (1998) categorization of emotional intelligence into (a) the ability-based information processing, and (b) trait influenced behaviors such as empathy, assertiveness, and optimism. Bar-On (2004) consolidated this viewpoint in his expanded definition of emotional intelligence as an inter-related cross-section of emotional and social intelligence that equips individuals with the ability to not just effectively understand and express one's emotions but also the emotions of others. Bar-On (2004) argues that one's emotional intelligence score should incorporate the five competencies of intrapersonal, interpersonal, adaptability, general mood, and stress management.

The intrapersonal competency involves one's ability to understand oneself within the context of strengths and weaknesses as well as one's ability to effectively express such emotions accurately. The interpersonal competency involves one's ability to understand others' emotions and work cooperatively in a group. The third competency is the ability to manage one's stress level in ways that do not allow emotions to influence decisions and relationships. The fourth competency of adaptability involves the ability to adapt to each situation and social group. "The first major concern raised by critics of emotional intelligence is that the definition of EI is too broad and too fuzzy to be useful" (Murphy, 2006, p1). The second major criticism is that the emotional intelligence instruments developed—for example the Multifactor Emotional

Intelligence Scale (MEIS) by Mayer, Caruso, and Salovey (2000); the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) by Salovey, Mayer, Caruso, and Lopes (2003); the Emotional Competence Inventory (ECI) by Boyatzis, Goleman, and Rhee (2002); the Bar-On Emotional Quotient Inventory (EQ-i) by Bar-On (2004); The Wong and Law Emotional Intelligence Scale (WLEIS) by Law, Wong, and Song (2004); and the Emotional Intelligence Scale (EIS) by Schutte (1998)—all rely on self-reporting of broad range individual differences that are mostly personality-based or a combination of the cognitive and personality dimensions.

According to Barchard and Hakstian (2004), self-report emotional intelligence measures correlate with personality dimensions and less so with cognitive ability. The MEIS and the MSCEIT are the only emotional intelligence scales that are more distinct from the big five personality dimensions (Murphy, 2006). Mayer, Caruso, and Salovey's (1998) ability-based four branch model clearly distinguish emotional intelligence from other types of intelligence such as IQ (Murphy, 2006). Murphy (2006) further argues that the Goleman (1995) model or the Bar-On (1997) models "are not strictly speaking, just types of intelligence, but rather are a mix of abilities, interests, and personality characteristics." (p329). The Mayer-Caruso-Salovey abilities-based model is foundational to the integrative emotional intelligence construct (Boyatzis & Sala, 2004). The Goleman (1995) and the Bar-On (1997) models launched the mixed-model of the emotional intelligence construct (Conte, 2005).The recognition that self-report emotional intelligence measures are more about the measures of self-perception of one's emotional abilities than about the measures of one's actual emotional intelligence abilities led to the growth of trait emotional intelligence.

Trait emotional intelligence. "People strive to exercise control over events that affect their lives" (Bandura, 1995, p1). Grounded on Bandura's (1995) social cognitive theory that

defines self-efficacy as the belief in one's ability to control one's behavior, emotions, and motivations, the trait emotional intelligence (Trait EI) construct grew as an offshoot of the mixed model emotional intelligence construct. The focus of the trait emotional intelligence on one's perceptions of one's personality world makes it distinct from the ability-based emotional intelligence constructs. Trait emotional intelligence lies wholly outside the realm of cognitive ability (Petrides, 2011). Also known as the trait emotional self-efficacy, trait EI is both interrelated and integrated to the big five hierarchical personality models. The broad big five personality attributes are (a) *conscientiousness*: high levels of thoughtfulness, and goal-directed behavior; (b) *agreeableness*: trust, kindness, and affection; (c) *neuroticism*: negative emotions such as anger, anxiety, or depression; (d) *openness*: being creative, curious, insightful, and informed; and (e) *extraversion*: positive energy and emotions, excitability, sociability, and assertiveness (Raad, 2000).

The Trait EI was first developed by Konstantin Vasily Petrides as a departure from the earlier ability-based emotional intelligence models. Petrides and Furnham (2000) expanded on Mayer-Salovey's (1990) four branch model by advancing the argument that emotional intelligence involves two categories of (a) ability-based cognitive information processing and (b) trait-based emotional ability. Trait EI is concerned with the development of emotional behaviors such as empathy, assertiveness, and optimism, that are related to the big five personality factors. Trait EI considers emotional intelligence as a personality trait that fits within the Five-Factor Model of Personality (Petrides, 2011). Some of the personality traits that are directly related to emotional intelligence include adaptability, assertiveness, emotional appraisal and expression, self-esteem, and stress management. Petrides and Furnham (2001) place emotional intelligence as a trait within personality as opposed to a separate construct. While the Ability Model is highly

pragmatic and focuses on outward results, the Trait Model is geared more toward emotional self-perception. Specifically, Trait EI evaluates how one perceives one's emotional abilities. The emotional abilities that grow out of one's perception affect one's behaviors and personality traits. Given the consensus that Trait EI resides wholly in the perceptions of the individual, it aligns better with self-reporting measurement instruments (Petrides, 2007).

This heavy reliance of the Trait EI construct on the big five personality factors creates challenges on its validity as a measurement of emotional intelligence especially among ability-based theorists like Mayer, Salovey, and Caruso (2008) or Boyatzis (2008). However, this criticism constitutes the very incentive that motivated Petrides(2000) to develop the Trait EI theory. Theorists of the Trait EI argue that one cannot fully measure one's emotional intelligence without simultaneously evaluating one's personality. Measuring one's EI solely within the framework of cognitive-emotional ability negates personality characteristics that are at play in the molding of one's emotional intelligence. Facets of personalities that relate directly to emotional intelligence are adaptability, assertiveness, emotion expression-emotion management of others, emotion perception of self and others, emotion regulation, impulsiveness, self-esteem, trait empathy, trait happiness, and trait optimism. Petrides (2000) argues that the trait model of emotional intelligence should be conducted within a framework of understanding an individual's personality. Petrides (2000) advanced Goleman's (1995) thinking that EI measurement should incorporate one's moral qualities. Gardner and Qualter (2009) concluded that the Trait Emotional Intelligence Questionnaire (TEIQue) has been shown to have sound predictive validity and sound psychometric properties that reflect one's perception of one's emotional intelligence.

Martins, Ramalho, and Morin (2010) also observed and further advanced the notion that considering emotional intelligence outside the realm of personality traits misses critical factors that mold one's emotional intelligence. They found the TEIque to have stronger significant association to one's well-being compared to the ability-based measures of EI like the MSCEIT for example. Van Der Linden and Petrides (2012) concluded that high trait EI individuals tend to describe themselves as empathetic, optimistic, and well-adapted in general. They also further found that the overlap between Trait EI and the big five personality factors to be significantly strong. Catalino, Arenander, Epel, and Puterman, (2017) observed in their research that individuals with high well-being defined as being receptive to one's emotions and personality traits tend to express little negative emotions. According to Sinclair and Feigenbaum (2012) Trait EI is related to life satisfaction, happiness, well-being, and positive mental health. Further, Trait EI is useful in understanding the multiple factors that shape emotional information processing, a key attribute of the Trait EI theory. The link of emotional intelligence to creativity, according to Beghetto and Corazza (2019), is "that emotional phenomena are not simple influencers of the process, but that they are the spinal cord of the creative thinking process" (p48).

Creativity theory. While Darwin (1860/1952) planted the seeds of psychology focused on creativity in his theories of evolution, it was Galton (1869) who used his mathematics skills to bring science into the study of human behavioral differences. Terman (1925) refined Galton's 1869/83) assessment tool by introducing the psychometric analysis of one's natural ability. This gave birth to the intelligence (IQ) assessment that mostly focused on the cognitive natural ability that drives creativity. Freud (1908/1959) felt and believed that creativity involves more than just the cognitive element and he introduced the argument that equates creativity to daydreaming. Creativity under Freud (1908/1959) was viewed as a process whereby individuals dream out loud

their creative genius. Skinner's (1956) earlier works at the start of the 20th century brought in the behavioral approach to the psychology of creativity. Skinner's works on behavioral attributes ushered in the emphasis on behavior as an indicator of competency (García, Ferrando, Soto, & Sainz, 2017). The growth in appreciation of creativity is credited to the incorporation of the systems theory approach in the evaluation of factors that contribute and drive creativity (Csikszentmihalyi, 2014). Beghetto (2016) concurred that "as our understanding of the phenomenon of creativity continues to grow, it is becoming more and more evident that researchers need new ways of conceptualizing, identifying and studying creativity in the midst of social practices" (p. 270). This realization—that to understand creativity requires evaluating a person's behavior—gave rise to the focus on personality trait assessment, especially after the second world war (Amabile, 1996).

After the second world war the focus on human creativity in psychology emerged again under the leadership of Joy Paul Guilford, who is regarded as the founder of the modern-day psychology of creativity (Hunt, 1992). Guilford (1967) introduced the link of divergent thinking to creativity. "Creativity is one of the psychological constructs most highly valued in social terms, as it is considered to be the basis of technological and social innovation" (García, Ferrando, Soto, & Sainz, 2017, p40). Creativity can be defined as an idea or product that is original, valued, and implemented. Traditionally, creativity has been viewed as a mental process that sheds light on one's genius. "The location of genius is not in any particular individual's mind, but in a virtual space, or system, where an individual interacts with a cultural domain and with a social field" (Csikszentmihalyi, 2014, p100). Creativity therefore does not only reside in the cognitive realm.

The creativity construct has three main branches of (a) creativity cognition, (b) creativity traits, and (c) creativity behavior (Kaufman, Cole, & Baer, 2009). The creativity construct is hard to measure given that it is more about a way of thinking than about a quantifiable disposition of the created outcome. Guilford (1967) expanded on Henri Poincare's earlier works that brought about the understanding that the human mind problem solves issues on either divergent or convergent thinking. Convergent thinking is premised on the reductionistic approach of focusing a solution to one specific problem. Divergent thinking on the other hand is the process of generating multiple solutions from diverse perspectives. "Divergent thinking is the ability to elaborate and to think of novel and diverse ideas. Ideation or idea generation is an example of divergent thinking" (Harris, 2014, Chapter 7, p1). Montag-Smit and Maertz (2017) most recently also supported the notion that "idea generation is the process in which individuals use divergent thinking to develop ideas intended to solve non-algorithmic problems" (p2). While the debate of whether creativity is specific or general remains center stage to researchers, there is consensus that creativity "encompasses multiple factors internal and external to the individual" (García, Ferrando, Soto, & Sainz, 2017, p40). Navarrete's (2013) case study revealed that an individual's creative thinking process is interdependent to divergent thinking and emotional well-being and that such everyday domain skills are central to creativity enhancement.

Guilford (1950), using the systems approach theory, argued that creativity involves both cognitive and non-cognitive processes. While he appreciated the importance of the cognitive processes such as comprehension, memory, knowledge, and assessment, Guilford (1950) ushered the notion that the main feature of creative thinking is the ability to do so differently and originally (divergent thinking). Csikszentmihalyi and Sawyer (1995) and later Csikszentmihalyi (2014) expanded the systems theory approach by adding the importance of one's cultural domain

and social aspect. “Creativity is a process that can be observed only at the intersection where individuals, domains, and field’s interact” (Csikszentmihalyi, 2014, p103). Based on this approach, one cannot be a genius in the absence of a symbolic system nor can an idea be original in a vacuum. Creativity occurs when one makes a change in a domain within acceptable rules, norms and values of the field’s culture. Kaufman, Pumaccahua, and Holt (2013) in their study further reinforce the importance of going beyond the domain level in understanding individual differences in creativity. Most self-reporting-based creativity scales do not focus on single specific domains but take a generalist perspective that emphasize personality traits and creative activities (Silvia, Wigert, Reiter-Palmon, Kaufman, Smith, Jeffrey, & Smith, 2012). Schaefer’s (1969) behavior-based scale for creativity prediction marked the movement to develop general domain focused measurement tools.

The Creative Behavior Inventory (CBI) developed by Dennis Hocevar around 1979 focused on six domains for measuring creativity. Carson, Peterson, and Higgins’ (2005) Creativity Achievement Questionnaire (CAQ) expanded measures to ten domains. Batey’s (2007) Biographical Inventory of Creative Behaviors (BICB) expanded on Schaefer’s (1969) initiative (Batey, Furnham, & Safiullina, 2010). Kaufman, Cole, and Baer (2009) developed the Creativity Domain Questionnaire (CDQ), which consisted of 56 different creative domains. Earlier, Kaufman and Baer (2005) had developed the Creativity Scale for Diverse Domains (CSDD) that found openness to experience significant to creativity. The Kaufman Domains of Creativity Scale (K-DOCS) is a recent development in the creation of a self-report, behavior-based creativity rating scale that reflects a domain-specific perspective of everyday creativity (Kaufman, & Baer, 2012). The K-DOCS measures five factors of self-assessed creative behaviors: self/everyday creativity, scholarly creativity, performance creativity (encompassing

writing and music), mechanical/scientific creativity, and artistic creativity domains. The K-DOSC past research revealed correlations between the five creativity domains and the five personality traits (Kaufman, Pumaccahua, & Holt, 2013). For this reason, the K-DOSC is found to be more appropriate for this research.

Chapter 3- Methods

Introduction. This chapter outlines the research aims and methodology, the hypotheses tested, the sample investigated, the description of the instruments used to measure Trait EI and Creativity, and how the data was collected and analyzed.

Aims and Methodology. The overall purpose of this study was to investigate the predictability of a software engineer's creativity from an analysis of one's trait emotional intelligence variables of well-being, self-control, emotionality, and sociability within the Seattle, Washington region of the United States**.** The study addressed hypotheses that relate to the individual and collective relationship among variables, hence the correlational approach.

Research Hypotheses. Hypothesis one evaluated whether the Trait EI variable of well-being is statistically significant in predicting creativity of software engineers. To establish the well-being variable scores of participants, the actual scores of the TEIque responses to questions 5, 9, 12, 20, 24, and 27 were used. Hypothesis two extended the investigation to examine if the Trait EI variable of self-control is statistically significant in the prediction of creativity for software engineers. For the self-control variable, actual response scores to questions 4, 7, 15, 19, 22, and 30 were used.

Hypothesis three examined if the Trait EI variable of emotionality is statistically significant in predicting the creativity of software engineers. For the emotionality variable, actual responses to questions 1, 2, 8, 13, 16, 17, 23, and 28 were used. Hypothesis four investigated whether sociability is a statistically significant predictor of creativity in software engineers. For the sociability variable, the actual response scores of questions 6, 10, 11, 21, 25, and 26 were used. The hypothesis five examined whether the collective variables that constitute Trait EI can

predict the creativity of software engineers. For the Trait EI variable all response scores of the 30 TEIque questions (Petrides, 2009) were used collectively to establish the Trait EI variable scores for each participant. The independent variable of creativity was taken to be the sum of the K-DOCS subscales.

Participants. Participants in the study met all the following criteria: (1) software engineers; (2) current involvement in software design development, software coding, or software analysis; and (3) at least one year of working experience in software engineering. The target region was software engineers working in the greater Seattle region of Washington state. The greater Seattle region includes cities such as Renton, Issaquah, Redmond, Bellevue, Woodinville, Everett, Bothell, Lynnwood, Shoreline, and Edmonds. Posters inviting participation in this research study were displayed at restaurants, coffee shops, and bars in these cities at facilities that approved such a display. The selection of the facilities was random and subject to approval and willingness of the owners of these facilities. All in all, 150 posters were displayed in the greater Seattle area of Washington state as defined above.

The random selection of the participants was further extended via the outreach efforts of the researcher at meetups. The researcher joined software engineering meetup groups around greater Seattle. The researcher would then attend the events organized to pitch the participation of software development engineers in this research study. At the meetup meetings, the researcher distributed invitation business cards or flyers. The most successful meetups were held at libraries whereby participants would complete surveys right away. The other primary outreach method to invite survey completion was via Lyft rides. The Lyft rides the researcher gave to participants to or from the target high-tech hubs within greater Seattle area generated not just immediate responses but also led to local meetup groups of software development engineers. The

participation was also dependent on the willingness of the software engineers to participate, as well as other factors like the duration of the Lyft rides and convenience to take the survey on a smartphone or personal computer.

Measuring participant demographics. Through business cards distributed at meetups; or posters left at coffee shops, bars, restaurants; and Lyft rides, participants received the SurveyMonkey link address or QR code with the link to the survey questions. The first seven questions addressed the characteristics of the participants in terms of their age range, tenure range, race, gender, software engineering category, the high-tech industry category, and how long the company they worked for has been in business. Participants first completed these demographic questions, then the 30 questions on Trait EI and 50 questions on K-DOCS creativity scale. All 294 participants completed the first seven demographics questions, and 279 out of 294 of the participants completed all seven demographics questions and all 30 Trait EI questions. 260 out of 294 respondents completed all 87 questions hence the sample size of 260 that was used for the data analysis.

Table 1 (Age demographics)

Age range	Number	Percentage of Sample total
21-25-year-old	76	29%
26-30-year-old	80	31%
31-35-year-old	73	28%
Over 36-year-old	31	12%

Of the 260 participants that completed all 87 survey questions, 29% of the sample were software engineers within the 21 to 25 year age group, 31% of the software engineers were within the 26 to 30 year age group, 28% of the software engineers were within the 31 to 35 year age group and 12% of the software engineers were within the over 36 year age group.

Table 2 (Software category)

Engineering Category	Number	Percentage of sample total
Software developing	125	48%
Software coder	120	46%
Software analyst	15	6%

48% of the 260-sample respondents identified themselves as design software developing engineers. 46% identified themselves as software developing coders, and 6% identified themselves as software systems analysts.

Table 3 (Software tenure)

Software tenure	Number	Percentage of sample total
1-5 years	122	47%
6-10 years	86	33%
Over 11 years	52	20%

47% of the 260-sample had worked as software engineers for 1 to 5 years. 33% had worked as software engineers for 6 to 10 years, and 20% had worked for over 11 years.

Table 4 (Software gender)

Gender	Number	Percentage of sample total
Female	83	32%
Male	161	62%
Other	16	6%

32% of the 260-sample identified as females. 62% of the sample identified as males, and 16 or 6% of the sample identified as other which represented gay, lesbian, or transgender identification.

Table 5 (High-tech category)

Industry category	Number	Percentage of sample total
Service	169	65%
Retailing	60	23%
Manufacturing	31	12%

65% of the 260-sample worked in the high-tech service industry. 23% worked in the high-tech retailing industry, and 12% worked in the high-tech manufacturing industry.

Table 6 (Race identity)

Race identity	Number	Percentage of sample total
Asian	130	50%
White	86	33%
Black/African American	23	9%
Hispanic/Latino	18	7%
Native Hawaiian/PI	1	0.05%
American Indian/Alaska N	1	0.05%

50% of the 260- sample identified as Asian, 33% identified as White, 9% identified as Black/African American, 7% identified as Hispanic/Latino, 0.05% identified as Native Hawaiian or Pacific Islander, and 0.05% identified as American Indian or Alaska Native.

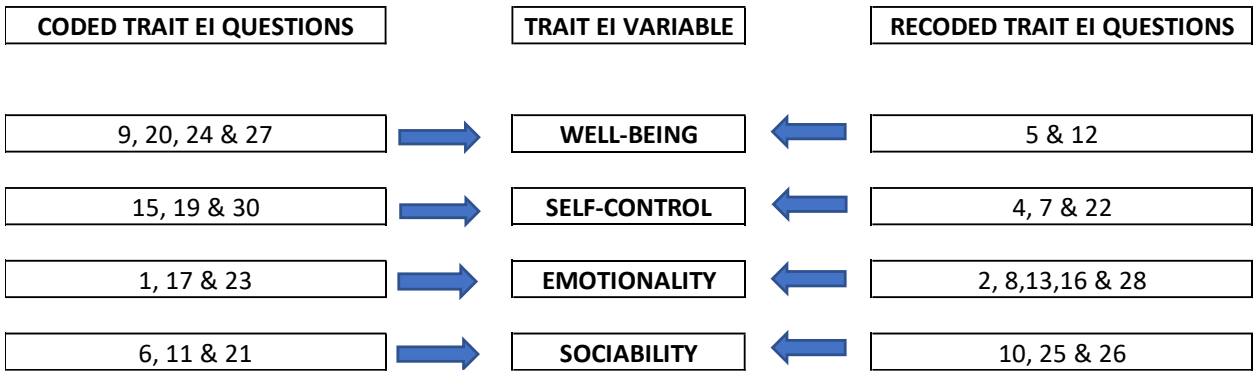
Table 7 (Years in business)

Years in business	Number	Percentage of sample total
1-5 years	44	17%
6-10 years	39	15%
11-15 years	39	15%

53% of the 260-sample worked in high-tech firms that have been in business for more than 16 years, 17% worked in high-tech firms that have been in business for 1 to 5 years, 15% worked in firms that have been in business for 6 to 10 years, and 15% worked in firms that have been in business for 11 to 15 years.

Measuring instruments. The instruments used in the study were the Trait Emotional Intelligence Questionnaire-Short-Form (TEIque-SF) for Trait EI assessment, and the Kaufman Domains of Creativity Scale (K-DOCS) for creativity. The TEIque-SF has 30 questions that measure the 15 facets of a person's perception of their trait emotional intelligence. The 15 facets are (1) *adaptability*: flexibility and willingness to adapt to new conditions; (2) *assertiveness*: forthrightness, frankness, and willingness to stand up for one's rights; (3) *emotion perception:* (self and others) clarity about one's own and other people's feelings; (4) *emotion expression:* capability to communicate one's feelings to others; (5) *emotion management* (others): capability to influence other people's feelings; (6) *emotion regulation*: capability to control one's emotions; (7) *impulsiveness* (low): reflective and less likely to give in to one's urges; (8) *relationships*: capable of having fulfilling personal relationships; (9) *self-esteem:* successful and self-confident; (10) *self-motivation*: driven and unlikely to give up in the face of adversity; (11) *social awareness*: accomplished networkers with excellent social skills; (12) *stress management*: capable of withstanding pressure and regulating stress; (13) *trait empathy:* capable of taking someone else's perspective; (14) *trait happiness*: cheerful and satisfied with their lives; and (15) *trait optimism*: confident and likely to look on the bright side of life (Cooper, & Petrides, 2010). The 15 facets measured by two questions each aggregate to the four primary variables of trait emotional intelligence: (a) well-being, (b) self-control, (c) emotionality, and (d) sociability. The following diagram summarizes how the key Trait EI variables are built from the above 15 facets as well as how the TEIque is scored to assess one's Trait EI.

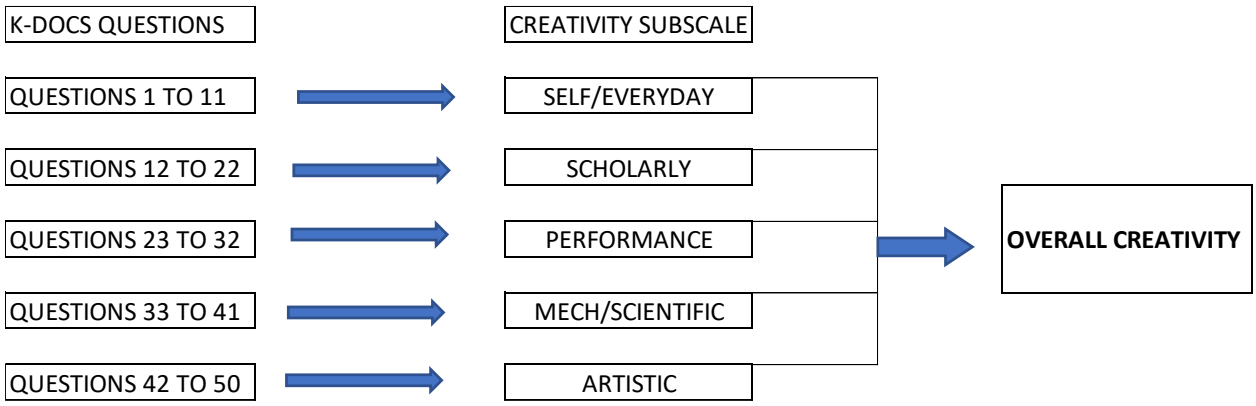
Diagram 1 (Developed from Petrides (2009) scoring instructions)



Using a Likert scale of 1 to 7, participants indicated how they perceived themselves in relation to the above Trait EI variables measured out of the 26 questions.

The K-DOCS has 50 questions that measure one's perception of their creativity within the primary domains of (a) self/everyday creativity (questions 1 to 11), (b) scholarly creativity (questions 12-22), (c) performance creativity (questions 23-32), (d) mechanical/scientific creativity (questions 33 to 41), and artistic creativity, (questions 42 to 50).

Diagram 2 (Developed from Kaufman, Reiter-Palmon and Tinio (2012) scoring)



Using a Likert scale of 1 to 5, participants indicated their perceptions of how creative they regard themselves in relation to the above creative subscales constructed out of the 50 questions.

Data collection. All the data was collected via the SurveyMonkey platform that had easy-to-follow instructions. First, the respondents had to give consent for the data collection and then they had to complete the seven demographic questions before moving on to the 30 questions on the Trait EI questionnaire and the 50 K-DOCS questions. Upon completing all the 87 questions, the SurveyMonkey platform would then offer the "done" button to indicate survey completion and submission.

One hundred and fifty posters inviting software engineers to complete the survey were posted at coffee shops, restaurants, bars, and workout gyms around the main high-tech hubs in Seattle, Renton, Issaquah, Redmond, Bellevue, Woodinville, Bothell, Lynnwood, Everett, Edmonds, and Shoreline in Washington state. The posters, like the business cards distributed to software engineers that took Lyft rides from the researcher or attended the meetup sessions at libraries, had the SurveyMonkey website link address and a QR code of the survey link. The Lyft rides did not only offer opportunities to capture data real time but also led to most of the meetup leads. The Lyft rides option also allowed random selection of participants. The 88% success rate of getting 260 out of 294 fully completed surveys is mainly attributed to the Lyft rides strategy that allowed the researcher to introduce himself to participants before they completed the surveys. The researcher gave 720 Lyft rides to software engineers during the six weeks of data collection as well as attended more than eight meetups per week during the same period. This attracted 294 software engineers to respond and 260 of the 294 respondents completed all 87 questions on the survey monkey platform. Participants during Lyft rides or at library meetups appreciated the QR code for easy access to the survey link. The average time it took participants to complete the entire 87-question survey was eight minutes.

Statistical design. The goal of the study was not to establish causation; the focus was to explore the correlational prediction of the dependent variable of creativity from the Trait EI variables. The research design had several underlying assumptions. The eight assumptions are (a) the dependent variable must be measured on continuous scales which the K-DOCS did on creativity; (b) two or more independent variables must be under review and such independent variables must be either continuous or categorical-attributes the trait emotional intelligence variables demonstrated to have; (c) independence of observation must be achievable; (d) linear relationship between the dependent variable and each of the independent variables or independent variables collectively must be established using scatterplots to establish creativity relationship to well-being, self-control, emotionality, and sociability; (e) the collected data using the scales must show homoscedasticity such that the variances along the line of best fit remain similar as you move along the line which turned out to be the case; (f) the data collected must not show multicollinearity caused by independent variables that are highly correlated (the trait emotional intelligence independent variable of emotionality turned to be highly correlated to the other Trait EI variables hence the SPSS analysis excluded it); (g) the collected data must not have significant outliers or high leverage points that might skew the regression line (the box plot analysis found no outliers); and finally, (h) the residuals (errors) must normally distribute as was demonstrated in the analysis.

Given the above satisfaction of the critical assumptions and the intention of exploring correlational relationships between the dependent variable of creativity and multiple predictor independent variables of Trait EI, this study found the multiple regression statistical process more conducive to estimate the relationships among the independent variables to the dependent variable. Multiple regression is an extension of simple linear regression. For this study, the

greatest advantage of using the multiple regression analysis was that it allowed the testing of the influence of well-being, self-control, emotionality, and sociability on the dependent (outcome) variable of creativity individually and collectively as the Trait EI variable. Questions from the TEIque instrument such as “I often find it difficult to see things from another person’s viewpoint or on the whole, I’m able to deal with stress” exemplify how this instrument mitigates against malleability of personality traits perception. The 30 questions in the TEIque instrument draw out one’s perceptions on the four Trait EI variables to be used as the independent variables in this study.

Multiple regression allows for an assessment of the unique contribution of each independent variable in predicting the stated outcome thus providing a means to determine the relative importance of each predictor. Simple linear regression would miss potential blind spots of how the multiple independent variables of trait emotional intelligence collectively influence creativity. The K-DOCS scale has 50 questions such as “maintaining a good balance between my work and personal life” or “figuring out how to integrate critiques and suggestions while revising a work,” for example, focus on the individual perception of the outcome variable of creativity. The K-DOCS instrument measures five subscales of (a) self/everyday creativity, (b) scholarly creativity, (c) performance creativity, (d) mechanical/scientific creativity, and (e) artistic creativity.

The TEIque short form Cronbach’s alpha score from the sample of 260 was .96 and this was higher than the .86 previously recorded (Petrides, & Furnham, 2003). The K-DOSC Cronbach alpha score from the sample of 260 was .98 and it was higher than the .74 (Batey, Furnham, & Safiullina, 2010) recorded. The reliability of the TEIque-SF and the K-DOCS instruments was acceptable, and it allowed reasonable collection of data. As previously observed,

such self-reporting instruments come with the primary disadvantage of social desirability bias. Social desirability bias is the tendency of respondents wanting to seem good. However, the instruments allowed the capturing of direct responses of what respondents think and the closed questions format was easily quantifiable. Large amounts of data can be easily captured using surveys (Cooper, & Schindler, 2014). The use of fixed closed questions however comes with the disadvantage of forcing respondents to choose from limited set options. Regardless of good Cronbach alpha reliability scores, survey questions may still be misunderstood (Leedy, & Ormrod, 2016).

Summary. Prior to the data analysis, the sample data of the 260 respondents was tested for normal distribution and linearity from the TEIque-SF and the K-DOCS scores. The Trait EI independent variable was calculated from the sum of the well-being, self-control, emotionality, and sociability scores from the TEIque-SF. The dependent variable of creativity was calculated from the sum of the K-DOCS scores of self/everyday, scholarly, performance, artistic, and mechanical/scientific subscales. The descriptive statistics in Table 8 below reflected normal distribution. . Since the data was parametric, they were first analyzed for normality using skewness and kurtosis. A skewness value that is greater than 1 indicates positive distribution from normal and the skewness below 1 indicates negative normal distribution (see Table 8). The standardized kurtosis values indicated the pointedness of the normal distribution.

Table 8 (Normal distribution)

	N	Minimum Statistic	Maximum Statistic	Mean Statistic	Standard Deviation Statistic	Skew Statistic	Skew Std. Error	Kurtosis Statistic	Kur Std. Error
Well Being	260	2.50	7.00	5.3038	1.10466	-.188	.151	-.818	.301
Self-Control	260	2.17	6.17	4.2897	.82851	-.068	.151	-.182	.301
Emotionality	260	1.13	7.00	4.7337	1.34686	-.353	.151	-.377	.301
Sociability	260	1.17	7.00	4.4724	1.22202	.110	.151	-.018	.301
Trait EI	260	7.58	27.00	18.7997	4.13802	-.087	.151	-.296	.301
Creativity	260	83.00	250.00	175.8538	42.17432	-.267	.151	-.858	.301
Valid N	260								

The test for linearity was conducted in relation of the independent variables of well-being, self-control, emotionality, sociability, and overall Trait EI to creativity. Diagram 2 indicated linear relationship.

Diagram 3 (Linearity test of independent variables to the dependent variable)

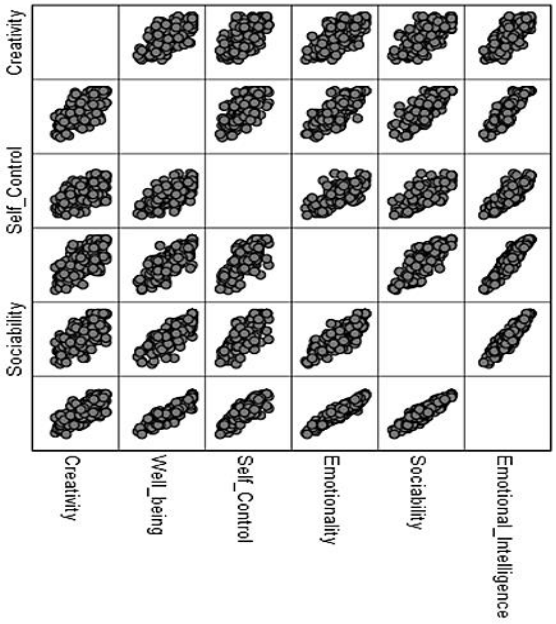
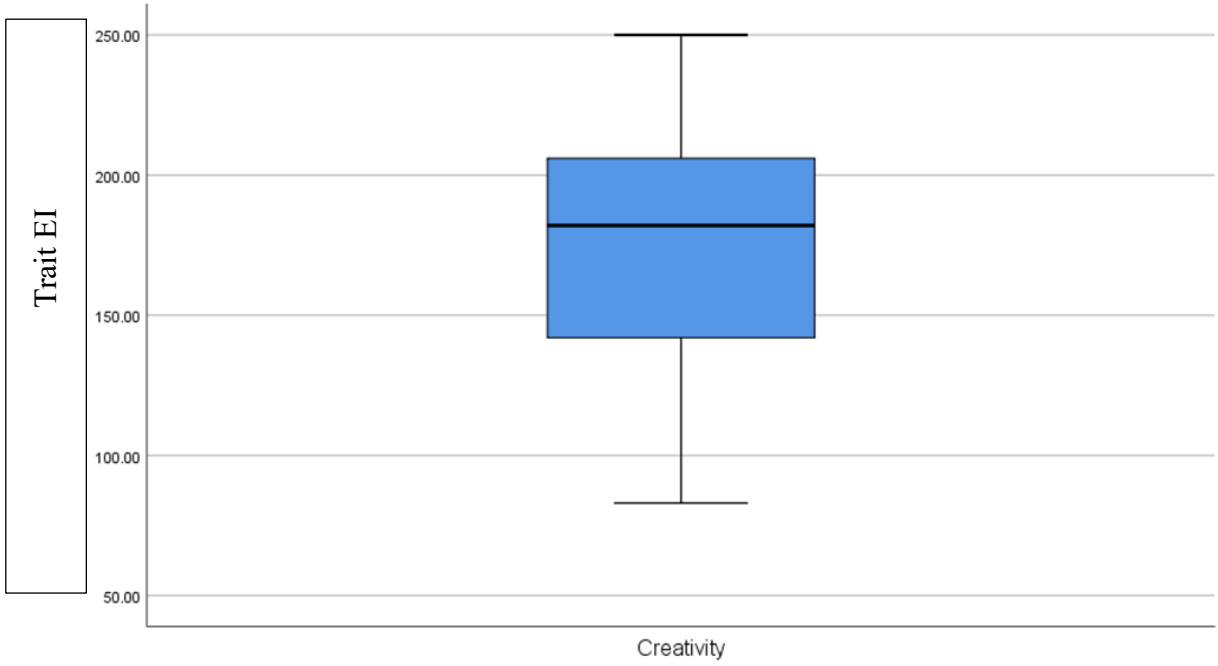
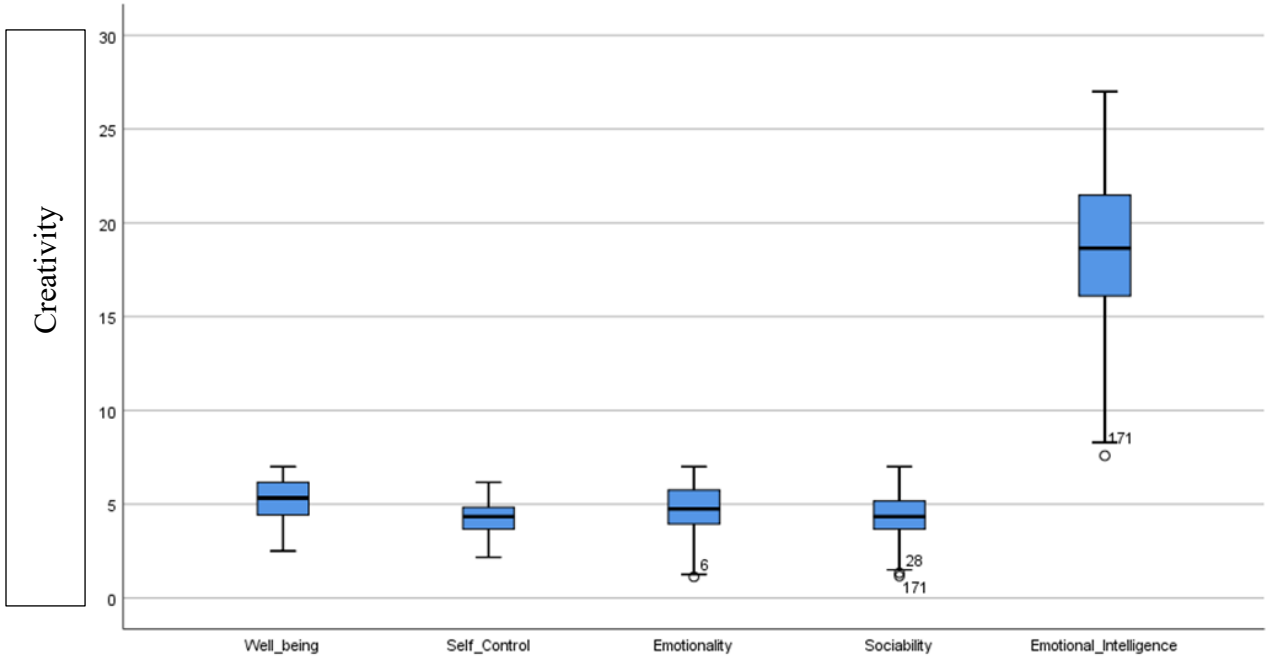


Diagram 4 (Outliers test on the dependent variable of creativity)



As indicated in the boxplot (Diagram 4) above, no outliers were found on the dependent variable of creativity in relation to the Trait EI median score.

Diagram 5 (Outliers test on the independent variables



While outliers for emotionality, sociability, and trait emotional intelligence were dictated, as indicated in (Diagram 5) above, such indication shows low significance of the outliers in relation to the creativity median score.

Chapter 4- Results

Introduction. This chapter covers the findings of the statistical analyses. First, I discuss the psychometric properties of the TEIque-SF and the K-DOCS instruments and then the statistical procedures used and report on the findings for each of the hypothesis examined. To further understand the descriptive statistics, the Pearson correlation and multiple regression analysis were repeated to observe between the effects of the demographic's categories of race, gender, tenure, and age groups.

The reliability statistics for the TEIque-SF was rounded to 97% (see Table 9).

Table 9 (TEIque Cronbach' Alpha)

Cronbach's Alpha	N of Items
.966	30

The reliability statistics for the K-DOCS was rounded to 99% (see Table 10).

Table 10 (K-DOCS Cronbach's Alpha)

Cronbach's Alpha	N of Items
.987	50

The Pearson correlation analysis. Prior to conducting the multiple regression analysis of the predictability of the dependent variable of creativity from the independent variables of well-being, self-control, emotionality, sociability, (individually) and Trait EI variables (collectively), the Pearson correlation analysis was conducted and the correlation of the independent variables to the dependent variable of creativity ranged from .62 to .75 as indicated in Table 11. The results indicate that the Trait EI perception scores of 260 software engineers measured in this study correlate to the scores of the perception of creativity for the software engineers who participated.

Table 11 (Pearson correlation)

Independent Variable	Pearson Correlation on Creativity	Sig	N
Well-being	.733	.000	260
Self-control	.615	.000	260
Emotionality	.707	.000	260
Sociability	.666	.000	260
Trait EI	.746	.000	260

The Pearson correlation model summary

Table 12 (Correlation summary)

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.756[a]	.572	.565	27.81625	.572	85.097	4	255	.000

a. Predictors: (Constant), Trait EI, Self-control, Well-being, Sociability

With an R square value of .572, the sample of 260 participants data reflected a 57% strength of explaining the variance (see Table 12).

Table 13 (Coefficients)

Coefficients									
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	25.120	10.190		2.465	.014			
	Well-being	8.674	5.047	.227	1.719	.087	.733	.107	.070
	Self-control	-1.849	4.705	-.036	-.393	.695	.615	-.025	-.016
	Sociability	-5.706	4.783	-.165	-1.193	.234	.666	-.074	-.049
	Trait EI	7.350	2.774	.721	2.649	.009	.746	.164	.109

a. Dependent Variable: Creativity

Multiple regression. Having determined that parametric procedures were appropriate, five principal hypotheses were investigated. Using SPSS, the correlation (Pearson r) and multiple regression analyses were used. The multiple regression analysis was conducted to identify the predictability of the dependent variable of creativity from the individual independent variable as well as the collective Trait EI independent variable. The first hypothesis examined whether the Trait EI independent variable of well-being can significantly predict creativity for software developing engineers.

Ho1: Well-being is not a significant predictor of software development engineers' creativeness or innovativeness.

Ha1: Well-being is a significant predictor of software development engineers' creativeness or innovativeness.

From the sample of 260, the p-value of the well-being independent variable was .087 (see Table 13). The p< .087 result indicated weak evidence against the rejection of the null hypothesis that well-being is not a significant predictor of software engineers' creativeness. Therefore, the Ho1 was not rejected in this study.

The second hypothesis examined whether the Trait EI independent variable of self-control can predict software engineers' creativity.

Ho2: Self-control is not a significant predictor of software development engineers' creativeness or innovativeness.

Ha2: Self-control is a significant predictor of software development engineers' creativeness or innovativeness.

For the sample of 260, the p-value of the self-control independent variable was .659 (see Table 13). The p< .659 result indicated weak evidence against the rejection of the null hypothesis that self-control is not a significant predictor of software development engineers' creativity. Therefore, the Ho2 was not rejected in this study.

The third hypothesis examined whether the Trait EI independent variable of emotionality can predict software engineers' creativity.

Ho3: Emotionality is not a significant predictor of software development engineers' creativeness or innovativeness.

Ha3: Emotionality is a significant predictor of software development engineers' creativeness or innovativeness.

Table 14 (Excluded independent variable)

Model		Excluded Variables				
		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Emotionality	.[b]	.	.	.	.000

a. Dependent Variable: Creativity

b. Predictors in the Model: Trait EI, Self-control, Well-being, Sociability

From the data of the 260 participants, the multiple regression analysis excluded the emotionality variable as indicated in Table 14. Per Table 14, the tolerance being = 0 suggests that the variance in the predictor variable of emotionality is already contained in, or is redundant with, the other independent predictor variables of well-being, self-control, sociability, or the collective Trait EI. This multicollinearity made it impossible to determine whether the null hypothesis should be rejected.

The fourth hypothesis examined whether the Trait EI variable of sociability can predict software engineers' creativity.

Ha4: Sociability is a significant predictor of software development engineers' creativeness or innovativeness.

Ho4: Sociability is not a significant predictor of software development engineers' creativeness or innovativeness.

For the sample of 260, the p-value of the sociability independent variable was .234 (see Table 9). The p<.234 result indicated weak evidence against the rejection of the null hypothesis

that sociability is not a significant predictor of the software engineers' creativity. Therefore, the Ho4 was not rejected in this study.

The fifth hypothesis examined the collective impact of all Trait EI variables on the prediction of creativity for software engineers.

Ho5: Trait EI variables of well-being, self-control, emotionality, and sociability collectively cannot predict an engineer's creativeness.

Ha5: Trait EI variables of well-being, self-control, emotionality, and sociability collectively can predict an engineer's creativeness.

For the sample of 260, the p-value of the Trait EI variables collectively was .009 (see Table 9). The p> .009 result indicated strong evidence for the rejection of the null hypothesis that Trait EI variables collectively cannot predict software engineer's creativity perception. Therefore, the Ho5 was rejected in this study.

Demographics analysis of race, gender, age, and tenure effect. Multiple regression analysis was further done for each demographic category and the p-values listed in Table 11 detail the results for the race and gender categories. The p-values of age and tenure are listed in

Table 15 (Race and gender P-values measured in relation to the prediction of creativity)

	Race P-values				Gender P-values		
Independent Variables	White	Asian	Hispanic	A/Black	Female	Male	Other
Well-being	0.151	0.080	0.014	0.116	0.004	0.027	
Self-control	0.666	0.691	0.100	0.061	0.156	0.252	0.075
Emotionality				0.011	0.004		0.528
Sociability	0.903	0.377	0.313			0.606	0.994
Trait EI	0.422	0.113	0.016	0.033	0.127	0.546	0.264

Notable results in Table 15 indicated that on the race basis, the White and Asian group from the participants sampled posted p-values greater than .05 making either the individual or collective Trait variables statistically insignificant in the prediction of creativity. For the Hispanic group, well-being at p> .014 and collective Trait EI at p> .016 are statistically significant independent variables for software engineers' creativity prediction. For the African American/Black group, emotionality at p> .011 and the collective Trait EI at p> .033 are statistically significant independent variables for software engineers' creativity prediction. Also notable was the observation that emotionality as an individual independent variable was not excluded in the multiple regression model for the African American/Black group.

In the gender multiple regression analysis for the female group, emotionality was also not excluded. Emotionality and well-being independent variables for the female gender group both at p> .004 are statistically significant predictors of software engineers' creativity. On the other gender category for participants that neither identified themselves as male or female, well-being was excluded and none of the individual independent variables or the collective Trait EI turned out statistically significant in the prediction of software engineers' creativity. Sociability was excluded for the African American/Black and female groups.

Table 16 (Age and tenure P-values measured in relation to the prediction of creativity)

	Age P-values				Tenure P-values		
Independent Variables	21-25	26-30	31-35	Over 36	1-5 yrs.	6-10 yrs.	Over 11
Well-being	0.739	0.194	0.930	0.100	0.126	0.034	0.076
Self-control	0.874	0.867	0.641	0.669	0.191	0.367	0.711
Emotionality							
Sociability	0.362	0.395	0.929	0.274	0.015	0.994	0.772
Trait EI	0.052	0.434	0.103	0.325	0.000	0.590	0.674

As indicated in Table 16, emotionality was excluded in the multiple regression model of the age and tenure demographics analysis. While none of the p-values of the age groups were lower than the .05, the 21-25 group at p< .052 for the collective Trait EI could be taken as statistically significant in the prediction of software engineers' creativity. On the tenure analysis, the 6-10 experience group at p> .034 was statistically significant for the well-being independent variable in the prediction of software engineers' creativity. Sociability at p> .015 and Trait EI at p> .000 for the 1-5 years' experience group demonstrated statistical significance in the prediction of software engineers' creativity.

Summary of results. Looked at in totality, the Trait EI variables of well-being, self-control, emotionality, and sociability collectively can predict the outcome dependent variable of creativity. Looked at individually, the Trait EI variables of well-being, self-control, emotionality, and sociability are not statistically significant predictors of creativity of the sampled 260 software engineers. The creativity dependent variable was the sum of the self/everyday, scholarly, performance, mechanical/scientific, and artistic subscales of creativity. Further analysis of the predictability of the creativity subscales was conducted from the Trait EI variables of well-being, self-control, emotionality, and sociability individually as well as collectively. Table 17 below details the findings of the p-values that were recorded from the 260 sample participants.

Table 17 (Independent variables in relation to creativity subscales)

Independent Variables	Self/Everyday P-value	Scholarly P-value	Performance P-value	Artistic P-value	Mech/Scientific P-value	Overall Creativity P-value
Well-being	.574	.309	.628	.108	.000	.087
Self-control	.840	.660	.481	.654	.686	.695
Sociability	.239	.159	.164	.726	.700	.234
Trait EI	.000	.006	.006	.182	.868	.009

Notable on the mechanic/scientific subscale of creativity was that well-being at p> .000 indicated statistical significance in the prediction of that subscale. Self-control and sociability independent variables scored p-values greater than the set .05 p-value across all creativity subscales including overall creativity. The p-values of self-control and sociability as indicated in Table 17 reflected strong evidence not to reject the null hypotheses in relation to the subscales of creativity or overall creativity. The Trait EI independent variable (being the collective impact of well-being, self-control, and sociability) posted p-values higher than the set .05 value on the artistic and mechanic/scientific subscales of creativity.

The p-values of the Trait EI independent variable as indicated in Table 13 presented strong evidence not to reject the Trait EI null hypothesis on the subscales of creativity (self/everyday, scholarly, and performance) or the overall creativity dependent variable. At p> .009 the p-value score of the collective assessment of Trait EI variables indicated statistical significance of Trait EI in the prediction of the overall dependent variable of creativity. The multiple regression analysis identified the collective influence of Trait EI variables as the most important factor in predicting software engineers' creativity (R= .75, p < .009). Collectively, the Trait EI variables explained 57% of the variance in software engineers' creativity (see Table 12).

It was interesting to note that although the p-value of well-being indicated that well-being as an independent variable individually is not a predictor of overall creativity, the p> .000 for the mechanic/scientific subscale of creativity is statistically significant in the prediction of the subscale of the mechanic/scientific creativity for software engineers' sample of 260. The demographics multiple regression models on race and gender excluded sociability for the African American/Black race and the female gender groups. In the same analysis, emotionality at p> .011 and p> .004 respectively offered strong evidence to reject the null hypothesis that emotionality

for the African American/Black race group or gender female group is not a statistically significant predictor of creativity for the sampled 260 software engineers in greater Seattle, Washington. Given the small sample size of these demographics, caution is recommended not to translate these findings as representative of the population.

Chapter 5-Discussion

Summary and Discussion. This chapter summarizes the study's purposes and methodology. The results are interpreted in the light of the implications for theory and practice. Finally, the research limitations and suggestions for future investigations are presented.

Summary of Research Purposes and Methodology. The central focus of this study was threefold. First, the investigation explored the relationship of the Trait EI and Creativity perception of software engineers. The second purpose was to explore the individual influence of Trait EI variables of well-being, self-control, emotionality, and sociability on the prediction of software engineers' perception of creativity. The third purpose was to explore the collective influence of Trait EI variables of well-being, self-control, emotionality, and sociability on the prediction of software engineers' perception of creativity.

The participants in the study were software engineers with at least one-year work experience in greater Seattle, Washington, USA. The participants were randomly selected from meetups, Lyft rides, and flyer invitations based on convenience and willingness to participate. The surveys were administered on an individual basis via the SurveyMonkey platform. The meetups and Lyft rides were helpful in the high survey completion rate of 89% fully completed surveys from the invited sample. The survey had 87 questions rendering it long, but 260 participants completed all questions out of the 294 respondents.

To assess the internal consistency of the TEIque-SF and K-DOCS instruments, the Cronbach alphas were calculated. Normality and linearity of the 260-sample data was conducted before the computation of descriptive statistics. Analysis of outliers was also conducted prior to the Pearson correlation analysis to determine if there were significant relationships among TEIque-SF scores and the K-DOCS scores. Finally, the multiple regression analysis was used to

determine the predictability of creativity from Trait EI variables individually and collectively. Furthermore, the predictability of the creativity subscales of self/everyday, scholarly, performance, artistic, and mechanic/scientific was conducted, as well as the demographics of race, gender, age, and tenure.

Discussion of the Results. This section of the study covers the study's findings starting with the psychometric properties of the TEIque-SF and the K-DOCS. Each of the five hypotheses is then discussed within the framework of the study findings as well as previous research overviews. This section concludes with the discussion on the study findings' implications on practice, the study's limitations, and suggestions for further research opportunities. The high Cronbach's Alpha scores of .966 for the TEIque-SF and .987 for the K-DOCS indicate strong reliability of these two instruments on the assessment of Trait EI and Creativity respectively. The mean score of 175.8538 was recorded on the data collected by the K-DOCS from the 260 sample. The mean score of 18.7997 was recorded on the data collected by the TEIque-SF from the 260 sample. The analysis of normality and linearity of the 260-sample indicated that the data had normal distribution and was linear.

The Pearson correlation of the independent variables of Trait EI and the dependent variable of creativity indicated that well-being, self-control, emotionality, sociability, and Trait EI individually and collectively correlated to creativity (see Table 11). The multiple regression analysis of Trait EI variables of well-being, self-control, emotionality, and sociability individually and collectively (Trait EI) indicated that individually well-being, self-control, emotionality, and sociability were not statistically significant to the prediction of creativity among the 260-sample of software engineers (see Table 13). Collectively (indicated as the Trait EI independent variable in Table 13), the Trait EI were statistically significant in the prediction

of creativity among the sampled 260 software engineers. Further analysis of the predictability of the subscales of creativity indicated that well-being was statistically significant to the prediction of the mechanic/scientific subscale of creativity for the 260-sample software engineers (see Table 17). Other interesting observations were made on the demographic's analysis particularly the emergence of emotionality as a statistically significant predictor of creativity for the African American/Black and female sample of the software engineers (see Table 17).

Implications of the findings. The link of emotional intelligence to creativity according to Beghetto and Corazza (2019) is "that emotional phenomena are not simple influencers of the process, but that they are the spinal cord of the creative thinking process." (p. 48). The findings in this study indicated that Trait EI variables collectively are statistically significant in the prediction of creativity. This study offers empirical evidence that Trait EI variables of well-being, self-control, emotionality, and sociability correlate to creativity. While the emotionality variable was excluded in most of the multiple regression models applied except in the race and gender effect analysis, such exclusion as eluded earlier was due to the multicollinearity of this variable in relation to other Trait EI independent variables. Its significance on the African American/Black race group or the female gender group underscores the fact that emotionality as an attribute of Trait EI should not be overlooked. However, the small sample size of these demographic groups demand caution in generalizations.

Well-being in this study was measured by the TEIque-SF questions of (1) "I feel that I have a number of good qualities," (2) " I generally don't find life enjoyable," (3) "On the whole, I have a gloomy perspective on most things," (4) "On the whole, I'm pleased with my life," (5) "I believe I'm full of personal strength," and (6) "I generally believe that things will work out fine in my life." Scores from questions 2 and 3 above had to be recoded per instructions of

Petrides (2010) scoring guidelines. The observation of this study that well-being at p> .000 is significant in relation to the creativity subscale of mechanic/scientific for software engineers who engage in scientific creativity is relevant in expanding the importance of Trait EI in building agile teams among software engineering teams. Bar-On (2004) argued that one's intrapersonal competency is embedded in one's perception of one's well-being. While the study's well-being score of p< .087 in relation to Kaufman's domains of creativity scale suggests that well-being individually is not statistically significant in the prediction of overall software engineers' creativity, the in-depth analysis in relation to the creativity subscale of mechanic/scientific indicated that well-being is significant at p> .000. The fact that the K-DOCS scale measures other domains like self/everyday, performance, scholarly, or artistic creativity that fall outside the primary creativity function of software engineers could explain the p< .087 overall score of well-being in relation to the overall creativity outcome variable.

This study offered empirical evidence that leaders in software engineering agile teams should pay attention to the Trait EI well-being variable. The collective Trait EI score at p> .009 further supports the importance of emotional intelligence in developing high performing software engineering agile teams. Martins, Ramalho, and Morin (2010) advanced the notion that one's well-being is a critical factor that molds one's emotional intelligence. According to Sinclair and Feigenbaum (2012), Trait EI is related to life satisfaction, happiness, well-being, and positive mental health.

Self-control in this study was measured by TEIque-SF questions of (7) "I usually find it difficult to regulate my emotions," (8) "I tend to change my mind frequently," (9) "On the whole, I'm able to deal with stress," (10) "I'm usually able to find ways to control my emotions when I want to," (11) "I tend to get involved in things I later wish I could get out of," and (12) "Others

admire me for being relaxed." Scores of questions from 7, 8, and 11 had to be recoded per Petrides (2010) scoring instructions. This study offered empirical evidence that self-control individually is not statistically significant in the prediction of creativity. Even the multiple regression analysis of the self-control in relation to creativity's subscales or the demographics effects showed strong evidence not to reject the hypothesis that self-control individually cannot predict creativity. Taken collectively with other Trait EI variables, self-control contributes to the significance of Trait EI in predicting creativity. Bar-On (2004) found that the third competency in emotional intelligence is the ability to manage one's stress level in ways that does not allow emotions to influence decisions and relationships. This study's results underscore the importance of the collective influence of self-control in the prediction of creativity.

Emotionality in this study was measured by the TEIque-SF questions of (13) "Expressing my emotions with words is not a problem for me," (14) "I often find it difficult to see things from another person's viewpoint," (15) "Many times, I can't figure out what emotions I'm feeling," (16) "Those close to me often complain that I don't treat them right," (17) "I often find it difficult to show my affection to those close to me," (18) "I'm normally able to get into someone's shoes and experience their emotions," (19) "I often pause and think about my feelings," and (20) "I find it difficult to bond well even with those close to me." Scores of questions 14, 15, 16, 17, and 20 had to be recoded per Petrides (2010) scoring instructions. Emotionality in this study was excluded in the overall multiple regression model. However, on the demographics effect model analysis of the race and gender categories it was included. The results for the African American/Black group and the female gender group indicated that it is statistically significant in the prediction of creativity. This observation supports Joseph and

Newman's (2010) assertion that one's capacity to perceive emotions, interpret the perceived emotions and the utilization of the perception in decision making is important.

Sociability in this study was measured from the TEIque-SF questions of 21) "I can deal effectively with people," (22) "I often find it difficult to stand up for my rights," (23) "I'm usually able to influence the way other people feel," (24) "I would describe myself as a good negotiator," (25) "I tend to back down even if I know I'm right," and (26) "I don't seem to have any power at all over other people's feelings." Scores from questions 22, 25, and 26 had to be recoded per Petrides (2010) scoring guidelines for the TEIque-SF scoring. The social cognitive theory advanced by Bandura (1995) asserts that people strive to exercise control on social factors that affect their lives. Sociability as an independent variable of Trait EI measures people's perceptions of their ability to read their social environment. According to this study, sociability individually is not a statistically significant predictor of creativity. However, taken together with other Trait EI variables such as emotionality, self-control, and well-being, it contributes in the significance of Trait EI in the prediction of creativity.

The systems theory approach to understanding creativity as consolidated by Csikszentmihalyi (2014) and concurred to by Beghetto (2016), called for empirical evidence that can shed more light in the conceptualizing of creativity within the systems theory framework. This study's results offered such advancement. Taking each of the Trait EI variables as individual units of the Trait EI system showed that each of the variables separately cannot predict creativity but collectively the Trait EI variables can predict creativity. Creativity is the spinal cord that drives innovation in high-tech organizations that rely on software engineering. Guilford (1950), using the systems approach theory, argued that creativity involves both cognitive and non-cognitive processes. Beghetto, and Corazza (2019) most recently analyzed the link of emotions

to the creative process and they advanced the notion that emotions are indeed integral to creative thinking. Trait EI constitutes the critical attributes of the non-cognitive process that Guilford (1950) recognized. Goleman (1998) is credited for popularizing the need to pay attention to emotional intelligence within the business management world. Joseph, Jin, Newman, and O'Boyle (2015) looked at the predictability of job performance from Trait EI and EI and they concluded that EI can robustly predict job performance.

The results of this study add empirical evidence to the power of Trait EI in the prediction of outcome dependent variables like creativity. The effects multiple regression of the demographics in terms of race, age, gender, and tenure further shed light on the power of even some of the Trait EI variables individually. Shahid, Stirling, and Adams (2018) looked at whether emotional intelligence training for doctors could improve the emotional intelligence of the doctors and their findings were that emotional intelligence training improved the emotional intelligence of the doctors. Their study reinforced earlier observations that emotional intelligence can be learned. From this perspective, the results of this study that demonstrated the significance of Trait EI in the prediction of creativity add empirical evidence that can be used in the development of emotional intelligence training for software engineers. Specifically, this study results suggests that one's creative thinking process is interdependent to emotional intelligence as Navarrete (2013) observed in his case study of the link of divergent creative thinking to emotional intelligence.

The collective Trait EI variables result in this study add empirical evidence of the significance of Trait EI on the creativity traits and creativity behavior branches of creativity Kaufman, Cole, and Baer (2009) identified as separate from the traditional creativity cognition branch. Traditionally, organizations relied on the IQ assessment to measure one's creativity

cognition potential. The results of this study support the notion that the assessment of non-cognitive elements is not only possible but also useful in assessing one's creative potential. Hill (2015) concluded that emotional intelligence is key to an engineer's success. The major implication of the result of this study is that organizations can go one step further than personality traits assessment in measuring software engineers' creative potential. However, such recruitment assessment should not be done in ways that violate laws that protect against discrimination. The Trait EI assessment resides in internal attributes that drive one's creativity traits and behavior and alluded earlier this could be very helpful in identifying soft skills development.

Limitations of the study. The major limitation of this study was the reliance on self-reporting of the participants' perceptions on both the independent and dependent variables. It is possible that self-efficacy influenced how the software engineers responded to the Trait EI and Creativity questions. Further, the use of the TEIque-SF instrument limited the incorporation of other Trait EI variables such as self-motivation and adaptability. Using the full TEIque full instruments with 153 questions might have been more effective in measuring the software engineers' perceptions of their Trait EI, but that would have made the survey too long considering that the creativity K-DOCS scale has 50 questions.

Getting participants to complete the short version with 30 questions, the K-DOCS with 50 questions, plus seven demographics questions proved cumbersome as evidenced by 34 participants out of 294 who failed to complete all 87 questions. While the 260-sample size represented about 0.0029% of the estimated software engineer's population in greater Seattle as of 2015 according to Stewart (2015), it was substantial and way above the G-power estimate of 98 that would allow predictive observations. Also, while the Lyft ride invitation method offered

random collection of data, this method should be tried and tested for validity. Finally, the K-DOCS measures the perception of one's creative potential and not ability. Therefore, the predictive significance of creativity from the Trait EI in this study should not be equated to prediction of one's creativity ability. Although the correlations were largely significant, Type I errors may have been committed, given the relatively large sample size (N = 260). Also notable is the fact that 229 of the 260-sample size were respondents 36 years or younger. This represents an 88% bias age-wise but such bias is indicative of the recent survey conducted by Stark Overflow (2015) that concluded that the average age of software engineers in USA then was 28.9 years.

Future direction. Since the sample size was small in relation to the target population, future studies should attempt to collect larger sample sizes. Also, studies should look at other professions. Studies should also measure other business outcome variables. The use of profession specific creativity measurement instruments might offer more insight. Finally, opportunities exist in the application of qualitative studies that can reveal the why. The current study revealed the potential of what is possible.

Conclusion. The current study examined the prediction of creativity from Trait EI variables individually and collectively. The analysis revealed the potential role of noncognitive interpersonal variables of Trait EI in generating new insights into attributes that drive one's creativity potential. Specifically, in the future, assessment of one's creative potential could be done using the Trait EI instruments instead of personality traits measuring instruments. Trait EI assessment can reveal areas of focus in emotional intelligence enhancement training. While other climate factors play a role in building agile teams, the role of individuals who are emotionally engaged, as Kahn (1990) advanced, is critical. The success of agility depends on cooperative

group interactions that strive to solve problems from real-world challenges. Creativity drives innovation and the results of this study indicated statistical significance of the prediction of creativity from analyzing one's Trait EI.

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Appendix

Trait Emotional Intelligence Questionnaire-Short Form (TEIQue-SF)

Instructions: Please answer each statement below by putting a circle around the number that best reflects your degree of agreement or disagreement with that statement. Do not think too long about the exact meaning of the statements. Work quickly and try to answer as accurately as possible. There are no right or wrong answers. There are seven possible responses to each statement ranging from 'Completely Disagree' (number 1) to 'Completely Agree' (number 7).

1 . . . . . 2 . . . . . 3 . . . . . 4 . . . . . 5 . . . . . 6 . . . . . .….7

Completely Disagree Completely Agree

1. Expressing my emotions with words is not a problem for me.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
2. I often find it difficult to see things from another person's viewpoint.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
3. On the whole, I'm a highly motivated person.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
4. I usually find it difficult to regulate my emotions.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
5. I generally don't find life enjoyable.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
6. I can deal effectively with people.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
7. I tend to change my mind frequently.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
8. Many times, I can't figure out what emotion I'm feeling.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
9. I feel that I have a number of good qualities.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
10. I often find it difficult to stand up for my rights.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
11. I'm usually able to influence the way other people feel.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
12. On the whole, I have a gloomy perspective on most things.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
13. Those close to me often complain that I don't treat them right.	**1**	**2**	**3**	**4**	**5**	**6**	**7**

14. I often find it difficult to adjust my life according to the circumstances	**1**	**2**	**3**	**4**	**5**	**6**	**7**
15. On the whole, I'm able to deal with stress.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
16. I often find it difficult to show my affection to those close to me.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
17. I'm normally able to "get into someone's shoes" and experience their emotions.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
18. I normally find it difficult to keep myself motivated.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
19. I'm usually able to find ways to control my emotions when I want to.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
20. On the whole, I'm pleased with my life.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
21. I would describe myself as a good negotiator.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
22. I tend to get involved in things I later wish I could get out of.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
23. I often pause and think about my feelings.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
24. I believe I'm full of personal strengths.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
25. I tend to "back down" even if I know I'm right.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
26. I don't seem to have any power at all over other people's feelings.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
27. I generally believe that things will work out fine in my life.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
28. I find it difficult to bond well even with those close to me.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
29. Generally, I'm able to adapt to new environments.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
30. Others admire me for being relaxed.	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Adopted from: Petrides, K. V. (2009). *Psychometric properties of the Trait Emotional Intelligence Questionnaire. In C. Stough, D. H. Saklofske, and J. D. Parker, Advances in the assessment of emotional intelligence.* New York: Springer. Permission to use the TEIque form was granted by Dr. K. V. Petrides in February 2019.

The Kaufman Domains of Creativity Scale (K-DOCS)

On a scale of 1 to 5, compared to people of approximately your age and life experience, how creative would you rate yourself for each of the following acts? For acts that you have not specifically done, estimate your creative potential based on your performance on similar tasks. 1- being much less creative, 2- being less creative, 3- being neither more or less creative, 4- being more creative, and 5- being much more creative. Scoring of all items should be randomized. Items 1–11 comprise domain 1, Items 12–22 comprise domain 2, Items 23–32 comprise domain 3, Items 33–41 comprise domain,4 Items 42–50 comprise domain 5.

1. Finding something fun to do when I have no money _____
2. Helping other people cope with a difficult situation _____
3. Teaching someone how to do something _____
4. Maintaining a good balance between my work and my personal life _____
5. Understanding how to make myself happy _____
6. Being able to work through my personal problems in a healthy way _____
7. Thinking of new ways to help people _____
8. Choosing the best solution to a problem _____
9. Planning a trip or event with friends that meets everyone's needs _____
10. Mediating a dispute or argument between two friends _____
11. Getting people to feel relaxed and at ease _____
12. Writing a nonfiction article for a newspaper, newsletter, or magazine _____
13. Writing a letter to the editor _____

14. Researching a topic using many different types of sources that may not be readily apparent _____

15. Debating a controversial topic from my own perspective _____

16. Responding to an issue in a context-appropriate way _____

17. Gathering the best possible assortment of articles or papers to support a specific point of view _____

18. Arguing a side in a debate that I do not personally agree with _____

19. Analyzing the themes in a good book _____

20. Figuring out how to integrate critiques and suggestions while revising a work _____

21. Being able to offer constructive feedback based on my own reading of a paper _____

22. Coming up with a new way to think about an old debate _____

23. Writing a poem _____

24. Making up lyrics to a funny song _____

25. Making up rhymes _____

26. Composing an original song _____

27. Learning how to play a musical instrument _____

28. Shooting a fun video to air on YouTube _____

29. Singing in harmony _____

30. Spontaneously creating lyrics to a rap song _____

31. Playing music in public _____

32. Acting in a play _____

33. Carving something out of wood or similar material _____

34. Figuring out how to fix a frozen or buggy computer _____

35. Writing a computer program _____

36. Solving math puzzles_____

37. Taking apart machines and figuring out how they work _____

38. Building something mechanical (like a robot) _____

39. Helping to carry out or design a scientific experiment_____

40. Solving an algebraic or geometric proof _____

41. Constructing something out of metal, stone, or similar material _____

42. Drawing a picture of something I've never actually seen (like an alien) _____

43. Sketching a person or object _____

44. Doodling/drawing random or geometric designs _____

45. Making a scrapbook page out of my photographs _____

46. Taking a well-composed photograph using an interesting angle or approach _____

47. Making a sculpture or piece of pottery _____

48. Appreciating a beautiful painting _____

49. Coming up with my own interpretation of a classic work of art _____

50. Enjoying an art museum _____

Adopted from Kaufman, J.C., Reiter-Palmon, R., & Tinio, P. (2012). Counting the Muses: Development of the Kaufman Domains of Creativity Scale (K-DOCS). *Psychology of Aesthetics, Creativity, and the Arts,* 6(4), 298-308.

Permission for the TEIque-SF

Petrides, Konstantinos k.petrides@ucl.ac.uk via liveuclac.onmicrosoft.com Tue, Feb 19, 1:04 PM

Dear Mwoyondishe,

Thank you for your email. You do not need special permission to use any TEIQue form in your research. Please see our FAQ at http://psychometriclab.com/faq/

You can download the various TEIQue forms from the same website (see menu on the left), which also incorporates an automated on-line scoring system for the TEIQue and TEIQue-SF. The scoring key for the TEIQue-SF and TEIQue-ASF is exactly the same and both forms can be scored via the online scoring engine that is available on the website (www.psychometriclab.com). Please note that the scoring engine is currently not working, so you can also download the scoring key from http://psychometriclab.com/scoring-the-teique/ Also note that we cannot provide any additional support beyond what is already on the website.

I hope this helps,

Dino

Permission for the K-DOCS

Kaufman, James <james.kaufman@uconn.edu> Wed, Feb 13, 1:39 PM

Hello,

I am happy to give permission – good luck with your work!

Best,

James C. Kaufman, Ph.D.

Professor of Educational Psychology

Neag School of Education

University of Connecticut

2131 Hillside Road

Unit 3007

Storrs, CT 06269-3007

Informed consent survey monkey form

Research invitation statement. Thank you for agreeing to participate in my academic research. My study strives to investigate the link of trait emotional intelligence to creativity. I consent and commit that your personal information such as names or emails shall never be used in the data analysis or research summary results. The survey monkey platform will assign a number code to your responses such that when I transfer the data to my local personal computer or external drive, no names or emails shall accompany the raw data. No open source platforms shall be used to store or archive the raw coded data. The data is being collected for my academic dissertation research.

1	I have read and understood the information about this academic research project provided in the information invitation email or broadcast board	
2	I voluntarily consent and agree to participate in this academic research project	
3	I am satisfied with the privacy and confidentiality procedure outlined in the invitation statement (e.g. no use of my name or email or personal information).	
4	I consent and I am satisfied with the security of the coded data on the local platform of the researcher. I understand no open source platform shall be used for the data storage	
5	I consent to the use of my anonymous data in the research, publication and secured archiving	
6	I understand other researchers may have access to my anonymous data only if they agree to preserve the confidentiality of the data as set out in this confirmed consent form	
7	I consent to give my demographics data of age, gender, race, tenure of software development engineering, the size of my firm (start-up less than 5yrs or established over 5yrs) and the type of industry I work.	
8	By selecting this final box, I hereby affirm my consent as specified above	

Demographics

Age: _____

Gender: _____

Race: _____

Tenure as a software engineer: _____

Invitation to participate poster