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Am I a Good Leader?

How Variations in Introversion/Extraversion Impact Leaders' Core Self-Evaluations

Marisa N. Bossen

A dissertation submitted in partial fulfillment

of the requirements for the degree of

Doctor of Philosophy

In

Industrial/Organizational Psychology

Seattle Pacific University

July 2016

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Marisa N. Bossen retains the copyright to the research and material herein.

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**Dedication**

To E.B., W.B., B.C., J.C.:  
I couldn't have done this without your love and support.

**TABLE OF CONTENTS**

<b>ACKNOWLEDGEMENTS .....</b>	<b>III</b>
<b>DEDICATION .....</b>	<b>IV</b>
<b>ABSTRACT .....</b>	<b>IX</b>
<b>CHAPTER I .....</b>	<b>1</b>
<b>INTRODUCTION AND LITERATURE REVIEW .....</b>	<b>1</b>
EXTRAVERSION: NATURE BEFORE NURTURE .....	3
CORE SELF-EVALUATION: TRAIT AND STATE .....	9
RELATIONSHIPS WITH DIRECT REPORTS AND IMPLICIT LEADERSHIP THEORY .....	12
LEARNING GOAL ORIENTATION .....	13
PRACTICAL IMPLICATIONS FOR LEADER CORE SELF-EVALUATIONS .....	14
PUTTING IT ALL TOGETHER: GOAL ORIENTATION, DIRECT REPORTS, AND PERSONALITY .....	15
RESEARCH HYPOTHESES .....	16
<b>CHAPTER II .....</b>	<b>18</b>
<b>METHOD .....</b>	<b>18</b>
PARTICIPANTS .....	18
MEASURES .....	19
DESIGN AND PROCEDURE .....	22
DATA ANALYSES .....	23
<b>CHAPTER III .....</b>	<b>25</b>
<b>RESULTS .....</b>	<b>25</b>
DATA PREPARATION .....	25
STATISTICAL ASSUMPTIONS .....	27
DESCRIPTIVE STATISTICS .....	28
HYPOTHESIS ONE: THE EFFECT OF I/E TYPOLOGY AND NoDR ON CSE .....	29
HYPOTHESIS TWO: THE EFFECT OF I/E TYPOLOGY, NoDR, AND LGO ON CSE .....	30
<b>CHAPTER IV .....</b>	<b>33</b>
<b>DISCUSSION .....</b>	<b>33</b>
SUMMARY OF KEY FINDINGS .....	33
THEORETICAL IMPLICATIONS .....	33
PRACTICAL IMPLICATIONS .....	43
STRENGTHS AND LIMITATIONS OF THIS STUDY .....	46
FUTURE RESEARCH SUGGESTIONS .....	50
CONCLUSION .....	51
<b>REFERENCES .....</b>	<b>53</b>

<b>LIST OF FIGURES .....</b>	<b>63</b>
<i>FIGURE 1.</i> Graphical representation of hypothesis 1b.....	63
<i>FIGURE 2.</i> Graphical representation of proposed relationship between variables for introverted leaders in hypothesis 2b. ....	64
<i>FIGURE 3.</i> Graphical representation of proposed relationship between variables for extraverted leaders in hypothesis 2b. ....	65
<i>FIGURE 4.</i> Histogram depicting normality of the standardized residuals.....	66
<i>FIGURE 5.</i> CSE linearly regressed on NoDR and I/E (hypothesis 1a). ....	67
<i>FIGURE 6.</i> CSE linearly regressed on NoDR and I/E at weak levels (-1 SD) of LGO (hypothesis 2a). ....	68
<i>FIGURE 7.</i> CSE linearly regressed on NoDR and I/E at average (mean) levels of LGO (hypothesis 2a). ....	69
<i>FIGURE 8.</i> CSE linearly regressed on NoDR and I/E at strong levels (+1 SD) of LGO (hypothesis 2a). ....	70
<i>FIGURE 9.</i> CSE curvilinearly regressed on NoDR and I/E at weak levels (-1 SD) of LGO (hypothesis 2b). ....	71
<i>FIGURE 10.</i> CSE curvilinearly regressed on NoDR and I/E at average levels (mean) of LGO (hypothesis 2b). ....	72
<i>FIGURE 11.</i> CSE curvilinearly regressed on NoDR and I/E at strong levels (+1 SD) of LGO (hypothesis 2b). ....	73

<b>LIST OF TABLES</b> .....	<b>74</b>
TABLE 1. <i>Eysenck Personality Inventory (Eysenck &amp; Eysenck, 1964)</i> .....	74
TABLE 2. <i>Scoring for Form A of the EPI</i> .....	75
TABLE 3. <i>Learning Goal Orientation Scale (Button, Mathieu, &amp; Zajac, 1996)</i> .....	76
TABLE 4. <i>Core Self-Evaluation Scale (Judge et al., 2003)</i> .....	77
TABLE 5. <i>Demographic Items</i> .....	78
TABLE 6. <i>Outlier Analysis Formulas</i> .....	79
TABLE 7. <i>Means, Standard Deviations, Correlations, and Scale Reliabilities</i> .....	80
TABLE 8. <i>Comparison of Descriptive Statistics of Introverted and Extraverted Participants</i> . 81	
TABLE 9. <i>Linear Regression Analysis Estimates for CSE Regressed on NoDR and I/E</i> .....	82
TABLE 10. <i>Quadratic Regression Analysis Estimates for CSE Regressed on NoDR and I/E</i> ..	83
TABLE 11. <i>Linear Regression Analysis Estimates for CSE Regressed on</i> .....	
<i>NoDR, I/E, and LGO</i> .....	84
TABLE 12. <i>Quadratic Regression Analysis Estimates for CSE Regressed on</i> .....	
<i>NoDR, I/E, and LGO</i> .....	85
TABLE 13. <i>Frequency Table Depicting Number of Cases per NoDR</i> .....	86



**LIST OF APPENDICES**

<b>APPENDIX A .....</b>	<b>63</b>
<b>LIST OF FIGURES AND TABLES .....</b>	<b>63</b>

Marisa N. Bossen  
WORD COUNT: 350

### ABSTRACT

Leaders across the introversion/extraversion (I/E) spectrum may comparatively view themselves at a disadvantage when it comes to developing effective developmental relationships with their direct reports. This study investigated how a leader's I/E typology, the number of direct reports (NoDR), and learning goal orientation (LGO) were related to their core self-evaluation (CSE) rating of their talent development role, through the lens of implicit leadership theory. An online survey was administered to 146 U.S. leaders (50% female) with an average age of 40 ( $SD = 11.5$ ) who self-reported they had at least one direct report. The first hypothesis, that leaders would report higher CSE at low NoDR if introverted, and at high levels if extraverted, with a curvilinear effect at the highest levels, was not supported in either the linear analysis [ $R^2 = .06$ ,  $\Delta F(1,142) = 1.97$ ,  $p = .16$ ] or the curvilinear analysis [ $R^2 = .07$ ,  $\Delta F(1,140) = 1.37$ ,  $p = .25$ ]. The second hypothesis posited that learning goal orientation (LGO) would buffer the proposed interaction between I/E and NoDR, such that stronger LGO would result in elevated CSE ratings across all levels of NoDR; again, a curvilinear effect was expected. Hypothesis two was partially supported. Results indicated that LGO significantly moderated this relationship [ $R^2 = .15$ ,  $\Delta F(1,138) = 7.36$ ,  $p = .008$ ], but a curvilinear relationship was not sufficiently detected [ $R^2 = .18$ ,  $\Delta F(1,134) = 3.79$ ,  $p = .054$ ]. Introverts reported higher mean CSE scores than extraverts when LGO was weak, while the reverse relationship was found when LGO was strong, suggesting that both typologies interact with their environments in different ways. The approach/avoidance framework was suggested as a possible theoretical framework to explain these variations in motivation that leaders

experience when developing their direct reports. Results indicated that extraverts tend to report higher CSE across most LGO scores, which may influence practical implications for organizational outcomes for which CSE is an antecedent. Future research might examine how leadership positions (e.g., senior, mid-level, first level) impact CSE within this same context.

*Keywords:* introversion, extraversion, leadership, direct reports, implicit leadership theory, behavioral approach system, learning goal orientation, core self-evaluation, talent development

## CHAPTER I

### Introduction and Literature Review

A vast majority of organizational psychology personality research has indicated that extraversion is a significant antecedent to a host of desirable outcomes (e.g., subjective well-being, job satisfaction, networking behaviors for career self-management, work performance, career success; Barrick & Mount, 2005; DeNeve & Cooper, 1998; Judge, Heller, & Mount, 2002; Ng, Eby, Sorenson, & Feldman, 2005; Wolff & Kim, 2012). Additionally, where implied leadership potential (emergence) and effectiveness are concerned, extraverted individuals are widely viewed to have an advantage over their more introverted colleagues (Barrick & Mount, 1991; Bono & Judge, 2004; Cain, 2012; Grant, Gino, Hofmann, 2010; Watson & Clark, 1997). In their article on reversing the “extraverted leadership advantage,” Grant, Gino, and Hofmann (2011) reference an online survey (Jones, 2006) of senior leaders earning at least six-figure salaries, which found that 65% viewed introversion as a barrier to leadership. Furthermore, six percent believed that introverts made better leaders than extraverts, where 47% thought extraverts made better leaders. Judge, Bono, Ilies, and Gerhardt’s (2002) meta-analysis lends empirical support to the idea that extraversion—out of all Big Five personality factors—is the most predictive of both leadership emergence ( $\rho = .33$ ; i.e., these people are chosen more often as leaders) and leadership effectiveness ( $\rho = .24$ ; i.e., they tend to be more effective in leadership roles), albeit the proportion of variance predicted by extraversion accounts for a relatively small percent (6%) of the variance.

Why do extraverts seem to do better in relation to workplace outcomes? One underlying explanation involves implicit leadership theory (ILT), which suggests that as

they are perceived through the media and culture, certain traits are deemed more salient or important in “great” or “effective” leaders (Hogan, Curphy, & Hogan, 1994, pp. 13-14; Hollander & Julian, 1969; Junker & van Dick, 2014; Keller, 1999; Lord, De Vader, & Alliger, 1986; Lord, Foti, & De Vader, 1984; Pfeffer, 1977). People who have these traits (e.g., extraverted, male, white; Junker & van Dick, 2014) are more likely to emerge, and/or be perceived, as leaders by their followers, because “followers would tend to allow others to lead when those others matched followers’ ideas of what good leaders should be” [Lord et al., 1986, p. 403 -- paraphrasing Hollander and Julian’s (1969) explanation of ILT]. However, in spite of implicit leadership heuristics that favor extraverts rising through the organizational leadership ranks, it is estimated that approximately 40% of top leaders are introverts (Jones, 2006).

In recent years, introversion in the workplace has become a more prevalent popular culture topic, as a result of several popular press publications (Cain, 2012; Kahnweiler, 2009, 2013). Perhaps most notably, Cain’s *New York Times* best-selling book, *Quiet: The Power of Introverts in a World That Can’t Stop Talking* (2012) has increased general awareness of the strengths of introverts in the workplace.

If introversion/extraversion is an attribute that could be easily modified, then changing how one approaches situations would not be problematic. However, research suggests that a person’s personality type is strongly dependent on genetics and biology and is therefore difficult to change (Costa & McCrae, 1997; Eaves & Eysenck, 1975; Eysenck & Eysenck, 1985), which taken together, begs the question: How do these introverted leaders assess their leadership capability in light of all the advantages their extraverted peers experience?

The purpose of the current investigation was to better understand the conditions under which introverts—and extraverts—can best thrive in the workplace while being true to their personality. In other words, how can leaders thrive and be true to their innate dispositions? This study explored the interaction between a leader's extraversion level, number of direct reports, and learning goal orientation on his or her core self-evaluation of their leadership capability. In the following pages, the theoretical and research-based foundation for the current research study will be discussed. To begin, the biological and environmental foundations of extraversion expression is discussed including neuroscience findings that corroborate the psychological research of the past century. Second, the construct of core self-evaluations is explored including whether core self-evaluations should be considered a state or a trait. Next, the definitions and theorized relationship of direct reports and implicit leadership biases, as they are used within this investigation, are reviewed. Following this, the proposed theory of how learning goal orientation was hypothesized to impact a leader's core self-evaluation (CSE) is discussed. Finally, the practical importance of a leader's core self-evaluation is examined, and how introversion/extraversion, learning goal orientation, and number of direct reports are hypothesized to interact to affect a leader's CSE score as it evaluates their direct report development capability (i.e., talent management role).

### **Extraversion: Nature Before Nurture**

**Construct etymology.** There has been a surge in research on the Five Factor Model (FFM) of personality—also known as the Big 5—since the 1960s (Costa & McCrae, 1985; Digman, 1990; Norman, 1963). In particular, there has been an emergence of meta-analyses suggesting that extraversion is a correlate or predictor for a

host of desirable organizational and personal outcomes (Barrick & Mount, 1991; Judge et al., 2002). Consequently, the research spotlight has moved away from the places where introversion may be advantageous. Generalizations about the characteristics of introverts and extraverts have become common in the general culture. For example, many believe that introverts are socially awkward, socially averse, or shy, while extraverts love being the center of attention and socializing at all times (Cain, 2012). Many personality inventory items measure the extraversion spectrum in this way (Cattell, Eber, & Tatsuoka, 1980; Costa & McCrae, 1992; Goldberg, 1992; Hogan & Hogan, 2007; John, Donahue, & Kentle, 1991; Saucier, 1994; Tellegen, 1982). Yet as originally proposed by Carl Jung (1971) in the early 20<sup>th</sup> century, the introversion/extraversion construct was operationalized differently in important ways. When Jung coined the terms *introvert* and *extravert*, he focused on from where people get their energy (i.e., internally, *intro-*, or externally, *extra-*).

Decades later, Hans Eysenck proposed that the difference between introverts and extraverts was due to the amount of stimulation in a person's ascending reticular activating system (ARAS; 1967). His research indicated that introverts' energy levels are depleted over time when interfacing with other people and high levels of environmental stimulation due to a baseline level of stimulation that is naturally higher than that of extraverts (Matthews & Gilliland, 1999). Introverts therefore recharge their energy levels in solitude or less stimulating environments (e.g., which can include smaller numbers of people; Eysenck, 1967; Feiler & Kleinbaum, 2015). Conversely, extraverts' energy levels are depleted over time when spent in solitude or less stimulating environments, and they recharge their energy levels when interfacing with people and high levels of

environmental stimulation (Eysenck, 1967; Feiler & Kleinbaum, 2015). The key distinction between Eysenck's conceptualization and those adopted by others is that Jung and Eysenck proposed that any interaction with one's environment (e.g., visual or audio stimuli; Matthews & Gilliland, 1999), and not exclusively interaction with other people in one's environment, is what is most important.

**Shyness and social anxiety.** It should be noted that many researchers have determined that social anxiety and shyness are separate primary constructs from the higher-order personality traits of introversion/extraversion. Henderson, Zimbardo, and Carducci (2010) note, "The experience of shyness can occur at any or all of the following levels: cognitive (e.g., excessive negative self-evaluation), affective (e.g., heightened negative emotion), physiological (e.g., racing heart), and behavioral (e.g., failure to respond appropriately). It may be triggered by a wide variety of situational cues" (p. 1). Therefore, shyness and social anxiety can afflict both introverts and extraverts, and are therefore moot when discussing this personality spectrum, as these behavioral manifestations are more highly correlated with the neuroticism spectrum (Briggs, 1988; Eysenck, 1990). The more commonly supported dimensions of the extraversion construct include variability in both sociability and impulsivity (Revelle, 1997), which can be explained and observed in cognitive neuroscience research.

**Neurobiological explanations for personality and affect.** Personality and neurobiology researchers have long believed that personality factors, namely extraversion and neuroticism, are largely biologically derived (Depue & Collins, 1999; Eaves & Eysenck, 1975; Gray, 1970). Crucial to the argument is the idea that one's individual neurobiological makeup predicates one's behavioral tendencies. For example, extraverts



tend to consistently exhibit more social and impulsive behavior, while introverts tend to be more circumspect and prudent (Gray, 1970; Revelle, 1997; Tran, Craig, & McIsaac, 2001). These behavioral patterns suggest that high or low levels of stimulation are inherently biological (Depue & Collins, 1999; Depue & Fu, 2013; Tran et al., 2001), and this is what Eysenck (1967) was postulating with his ARAS theory of stimulation and correlating personality.

More specifically, researchers have found that individual differences exist in: (a) levels of neurotransmitters such as dopamine and glutamate, the neurotransmitters most widely studied and believed to be strongly correlated with extraversion (Depue & Collins, 1999; Depue & Fu, 2013; Tran et al., 2001), (b) brain structure (e.g., differing size of regions such as the prefrontal cortex which allow for a varying number of neurotransmitter reception sites; Arrias-Carrion & Poppel, 2007; Cremers, van Tol, Roelofs, Aleman, Zitman, et al., 2011; Depue & Collins, 1999; Depue & Fu, 2013; Grimm, Schubert, Jaedke, Gallinat, & Bajbouj, 2012; Holmes, Lee, Hollinshead, Bakst, Roffman, Smoller, & Buckner, 2012; Johnson, Wiebe, Gold, Andreasen, Hichwa, Watkins, & Boles Ponto, 1999; Stahl & Rammseyer, 2008), and (c) cortical arousal levels (Eysenck & Eysenck, 1967; Gale, Edwards, Morris, Moore, & Forrester, 2001; Gray, 1970; Tran et al., 2001). These collective findings suggest that the two personality types are biologically programmed to react to and interpret the same situation with different responses.

**Psychophysiological theory of motivation.** Though Hans Eysenck was an early advocate for the role biology and neuroscience played in personality formation, his student, Jeffrey Gray, put forth an equally compelling theory and research agenda, which

have continued to direct research in subsequent years. Gray's (1970) psychophysiological theory of motivation posits that there is a neurological system in place that can predict behavior based on predispositions due to personality type. Two orthogonal systems control behavior in his model: a behavioral inhibition system (BIS) thought to correlate with sensitivity to punishment and avoidance motivation more frequently associated with neuroticism, and a behavioral activation system (BAS) thought to correlate with sensitivity to reward and approach motivation more frequently associated with extraversion (Gray, 1981, 1990). Studies have confirmed that high DA levels correlate with reward-seeking incentive, which results in reward-seeking behavior, indicating that extraverts are more likely to be motivated by cues that result in rewarding stimuli (Depue & Collins, 1999; Depue & Fu, 2013). This explains how the extraversion sub-facets of sociability and impulsivity (sensation-seeking) can affect behavior (Cattell et al., 1980; Depue & Collins, 1999; Eysenck & Eysenck, 1964; Jackson, 1984; Jung, 1971), as well as the correlation between an approach motivation system (BAS) and extraversion (Gray, 1970, 1990).

**Personality-driven behaviors and practical implications.** The two different models proposed by Depue and Collins (1999) and Gray (1970) both explain individual differences in levels of extraversion (e.g., high or low) as it pertains to motivation, and subsequently, behavior. Eysenck and Eysenck (1985) found a strong correlation ( $r = .66$ ) between positive affect (PA) and extraversion; in turn, positive affect is believed to be related to an underlying motivational system (Depue & Collins, 1999; Gray, 1970). These behavioral systems rely on the strength of the incentive, or desire, for reward. Positive reward incentive is correlated with extraversion, indicating that extraverts are

more prone to be motivated toward a goal through positive reward stimuli (Grimm et al., 2012). In other words, introverts are less motivated toward goals through positive reward stimuli, because they already operate at a higher arousal baseline level.

Examples of how neurobiological motivation systems equate to personality in action (i.e., behaviorally) are: (a) the introvert's desire to avoid negative judgment by others, so he or she avoids socializing in rooms full of people he or she does not know and learns over time to keep to himself or herself; and (b) the extravert's desire to seek out rewarding stimuli, which propels him or her to receive the social interaction and acceptance he or she craves. The practical implications indicated by the body of neurobiology literature referenced above explain why extraverts tend to be more impulsive, sensation-seeking, and risk-taking, and why their introverted counterparts tend to be more engaged in risk-averse (i.e., "punishment-averse") and solitary cognitive processes such as planning and problem solving.

In sum, extraverts are strongly psycho-physiologically predisposed to reward sensitivity while introverts are less motivated by rewards and would rather avoid additional stimulation (Depue & Collins, 1999; Gray, 1970; Revelle, 1997). These predispositions manifest as behaviors and preferences that ultimately get correlated to personality types. These behaviors and preferences may also be correlated to how leaders of each personality type behaviorally interact with direct reports and, ultimately, evaluate their own leadership capability compared to others'. Given the different sensitivities to social dynamics, introversion/extraversion tendencies should impact how people (e.g., leaders) evaluate themselves.

**Core Self-Evaluation: Trait and State**

**CSE as trait.** Core self-evaluation (CSE) is a person's subconscious, fundamental (positive or negative) appraisal of their confidence level and ability for coping and thriving across various situations, which impacts how they interact with their environment (Judge, Locke, & Durham, 1997). CSE is the result of two simultaneous cognitive processes (Judge et al., 1997). In relation to leadership, the first process is external in nature: comparing one's leadership capability with that of those seen in one's environment based on implicit leadership biases—which will be discussed more in depth below. The other is internal in nature: determining how one's own self-esteem, self-efficacy, locus of control, and emotional stability (neuroticism) are affected by one's current leadership ability independent of external cues. These four constructs—self-esteem, self-efficacy, locus of control, and emotional stability (neuroticism)—are the dimensions which form a person's overall core self-evaluation rating (CSE; Bono & Judge, 2003; Judge & Bono, 2001a; Judge, Erez, Bono, & Thoresen, 2003). CSE ratings are: (a) *evaluative* (vs. descriptive) of one's nature, (b) *fundamental* (i.e., central to one's self-concept, or source traits vs. surface traits; Cattell, 1965), and (c) *cardinal attributes* (vs. secondary) such that they are more likely to reflect general self-based behaviors, attitudes, and thoughts rather than specific situational evaluations. According to Judge et al. (1997), these three components are what qualify the higher order construct of CSE to exist as a single construct, rather than simply measuring the four dimensions separately. Judge and Bono (2001a) describe CSE as a latent (vs. aggregate) variable, such that the higher order construct causes the four dimensions to be inter-correlated, and not the other

way around—where the four dimensions multiplicatively or additively cause CSE to fluctuate, let alone exist.

**Trait vs. state.** Evidence suggests that the four individual dimensions have attributes that are both trait- and state-driven. The sub-dimensions can fluctuate based on varying situations, as described below. Donnellan, Kenny, Trzesniewski, Lucas, and Conger (2012) explained that the difference between trait and state levels of a construct is, “the extent to which people maintain their relative ordering over time” (p. 2) such that constructs with a high degree of rank-order consistency are traits, where those that do not, and are usually based on differing reactions to environmental cues and situations, are considered states. They go on to say, “A given attribute might increase or decrease in terms of absolute levels with age and development but the central issue for making trait designations is whether the relative ordering of individuals on that dimension remains consistent over time” (p. 2). In other words, how an individual compares to their peers on the same factor at varying time points determines whether the construct is a trait or state. If over time, the absolute differences between scores is the same, it is a trait; whereas, if the absolute scores vary (e.g., person A’s score is lower at Time 1 but higher than person B’s score at Time 2) it has state-like qualities.

**Critique of trait theory.** Eysenck and Eysenck (1985) described a major criticism of trait psychology using the trait of (observed) sociability as an illustration. As the example goes, we see people displaying social behaviors and, as scientists, need a means for describing what is happening. Thus, we set out to determine a causal analysis by means of factor analysis. In order to do a factor analysis, we must correlate the behaviors to the construct; however, in doing so, we are risking putting our own bias into

the analysis and this, therefore, is what we typically get out of it. In cases where a factor analysis does not support one's hypotheses, it is usually because one did not enter what one thought they did. Their point being, "we cannot even begin to undertake a causal analysis until we have settled, at least in a preliminary manner, the problem of description" (p. 24).

**CSE as state.** Several longitudinal studies have demonstrated that sub-dimensions of CSE—self-esteem, self-efficacy, locus of control, and neuroticism (measured as negative affect)—are fluid over time, both based on individual behavioral performances and human developmental life stages (Chen, Gully, & Eden, 2001; Cheng, Cheung, Chio, & Chan, 2013; Cobb-Clark & Schurer, 2011; Donnellan et al., 2012; Kuster & Orth, 2013; Orth & Robins, 2014; Wagner, Hoppman, Ram, & Gerstorf, 2015; Schinkel, van Dierendonck, & Anderson, 2004; Watson & Tellegen, 1985; Watson, Clark, & Tellegen, 1988) and therefore have both state and trait characteristics. Furthermore, research across a wide variety of domains suggests that interventions can increase individuals' self-esteem (Donnellan et al., 2012; Kuster & Orth, 2013; Orth & Robins, 2014; Wagner et al., 2015), self-efficacy (Chen et al., 2001), locus of control (Cheng et al., 2013; Cobb-Clark & Schurer, 2011), and neuroticism (e.g., operationalized as negative affect; Watson & Tellegen, 1985; Watson et al., 1988). If leaders' CSE ratings can fluctuate over time, it follows that their implicit leadership biases and self-comparisons with other leaders in their external environment could impact their CSE ratings.

### **Relationships with Direct Reports and Implicit Leadership Theory**

**Direct reports.** As previously noted, the two personality types are different in how they approach socialization (i.e., environmental stimulation)—and by extension—leadership roles that require them to not only delegate tasks, but to mentor and develop direct reports. Bosses build relationships with their direct reports using behaviors based on “personological predispositions” (Diener, Larsen, & Emmons, 1984; Hollander, 1992; Judge, Bono, & Locke, 2000, p. 238); for example, introverts are energized by deeper conversations with fewer people, whereas talking to a large group energizes extraverts (Eysenck & Eysenck, 1985). However, external pressures, such as annual performance appraisals and quarterly performance metrics, may force leaders to alter their behavior to act more in alignment with the behaviors that typically describe the opposite end of the personality spectrum from where they currently see themselves in order to be perceived as a good leader. For example, introverts may find themselves making more rushed decisions to meet deadlines, or an extravert may have to work in a more socially isolated role with a single direct report.

**Implicit leadership theory.** Individuals’ cognitive perceptions of particular traits and behaviors exhibited by leaders, drawn from their immediate social environments and media portrayals, are likely to impact what people believe constitute a *good* leader. As mentioned earlier, this has been discussed in the literature as *implicit leadership biases* and is rooted in implicit leadership theory (Hogan et al., 1994; Hollander & Julian, 1969; Keller, 1999; Lord et al., 1984). When a leader believes his or her personality type conflicts with his or her personal implicit leadership biases of what a good leader would do in a particular situation (e.g., what would an extraverted leader do?), this cognitive

dissonance may negatively impact their self-esteem, self-efficacy, and/or locus of control and may result in a prevalence of neurotic thinking patterns. Given the cultural preference for extraverted leaders in the United States (Boudreau, Boswell, & Judge, 2001; Hogan et al., 1994; Mann, 1959; Silverthorne, 2001; Stogdill, 1948), introverts are more likely to experience this cognitive dissonance resulting in wavering CSE ratings. Conversely, if introverted leaders feel their personality type matches their implicit theories of what a good leader is like, they may have a more constant, positive CSE rating, as would be expected more often—but not always—in extraverts. This investigation seeks to determine whether this American predilection for extraverted leaders does in fact affect introverts' CSE ratings practically (compared to their extraverted peers' ratings)—beyond the theory.

### **Learning Goal Orientation**

**Construct definition.** There are at least two motivational mindsets for working toward goals: learning and performance goal orientations (Button, Mathieu, & Zajac, 1996; Dweck, 1986; VandeWalle, 1997). A person with a learning goal orientation (LGO) persists in the face of challenge and adversity, seeking to glean lessons from setbacks and successes in order to excel in successive performances of that or similar tasks (Dweck, 1986; VandeWalle, 1997). A person with a performance goal orientation is more prone to give up when faced with setbacks or failure, seeking to avoid negative judgments of their competence (Dweck, 1986).

**LGO in the current study.** Learning and performance goal orientations are not mutually exclusive to a person's disposition (Button et al., 1996). However, in this study, the focus will be on situational learning goal orientation only, because a leader's



propensity toward adopting a learning goal orientation in this scenario is likely more predictive of his or her ability to adapt to typically uncomfortable numbers of direct reports (i.e., introverted leaders with high numbers of direct reports and extraverted leaders with low numbers of direct reports). As noted above, Dweck's (1986) work would suggest that those adopting a learning goal orientation would be more likely to adapt over time by learning what worked and what did not from one's successes and failures. Furthermore, one would continue to persevere toward one's goal(s) in spite of any series of failures.

This ability to adapt (i.e., the learning that either does or does not take place) will likely impact the leader's core self-evaluation (CSE) of his or her leadership capability where developing direct reports is concerned, particularly within the self-efficacy and locus of control dimensions. In turn, these two dimensions of CSE could influence the other two dimensions of CSE: self-esteem and emotional stability (the latter manifested as neurotic/emotionally stable thought patterns). In short, leaders who adopt a (strong) learning goal orientation are more likely to successfully develop any number of direct reports, and consequently rate themselves as having higher self-efficacy and self-esteem, an internal locus of control, and less neurotic thinking patterns—a recipe for higher core self-evaluation ratings.

### **Practical Implications for Leader Core Self-Evaluations**

Why do leader CSE ratings matter so much? Judge and Bono (1999) found empirical support indicating that people who have high CSE ratings experience positive organizational outcomes such as job satisfaction and job performance. Erez and Judge (2001) conducted research indicating that people with high CSE ratings have higher task

motivation and have better task performance outcomes. Moreover, Bono and Judge (2003) report that individuals with high self-evaluations may be “more effective in positions requiring positive interpersonal relations or stress tolerance” (p. S10)—arguably two desirable—and oftentimes necessary—qualities in today’s leaders as they professionally develop direct reports and interact with peers to accomplish goals and weather constant organizational change. The current investigation seeks to advance research on whether leaders can adaptively approach situations when they do not have characteristics that match one’s implicit leadership theory archetype for good leaders.

### **Putting it All Together: Goal Orientation, Direct Reports, and Personality**

When integrated, the above discussion suggests that the number of direct reports will impact a leader’s CSE depending on the leader’s personality type and the leader’s LGO. Furthermore, it is proposed that the relationship will be non-linear and diminish when the leader’s job task responsibility (number of direct reports) outpaces his or her psychological or physical (e.g., time) resources. Conversely, leaders of differing personality types who adopt a weak learning goal orientation, whether they are introverts or extraverts, will likely struggle to maintain authenticity to their “personological predispositions” (i.e., personal behavioral preferences; Diener et al., 1984; Judge et al., 2000, p. 238).

This investigation seeks to determine whether the number of direct reports impacts the CSE ratings of leaders taking personality type and learning goal orientation into consideration. Provided that introverts are naturally over-stimulated by environmental and social interactions compared to their extraverted counterparts, it is hypothesized that introverts would likely have higher CSE ratings with fewer direct

reports. In other words, when comparing their leadership performance to their implicit leadership biases, introverts would likely have a higher sense of personal control, self-efficacy, self-esteem, and emotional stability with fewer direct reports to interact with on a daily basis. Conversely, extraverted leaders would likely crave interaction with more direct reports to stimulate their dopamine levels as part of their natural sensation-seeking tendency. Extraverts might be more likely to feel in control and self-efficacious as leaders with more direct reports to lead. As previously noted, extraverts have a natural proclivity toward positive affective, emotionally stable thinking patterns, which helps boost self-esteem ratings (Eysenck & Eysenck, 1985; Grimm et al., 2012; Judge & Bono, 2001b).

More specifically, this study will explore: (a) whether there is a consistent relationship between the leader's number of direct reports he or she is responsible for and his or her core self-evaluation as moderated by his or her extraversion-introversion typology, and (b) whether learning goal orientation moderates the relationship between the leader's number of direct reports and core self-evaluation rating based on his or her personality typology.

### **Research Hypotheses**

Three independent variables will be investigated in this study: number of direct reports in the leader participant's purview, leader personality typology (introversion/extraversion spectrum), and leader learning goal orientation (strong vs. weak) in a between-subjects research design to assess their relationship on core self-evaluation. See Figures 1-3 for graphical depictions of the following hypotheses.

**Hypothesis 1:** The relationship between the number of direct reports and core self-evaluation will be curvilinear and moderated by personality type such that

extraverts will report higher CSE than introverts do as the number of direct reports increases and vice versa at low numbers of direct reports [see Figure 1]. The hypothesis will be tested in two steps: Hypothesis 1a will test for a linear interaction (the simplest explanation) and Hypothesis 1b will test for a non-linear interaction.

**Hypothesis 2:** Learning goal orientation will buffer the relationship between number of direct reports and core self-evaluation rating for each personality typology such that in the presence of stronger levels of LGO, leaders will report higher CSE ratings across all levels of direct reports, particularly the ranges where they are predicted to be least comfortable (per hypothesis 1), and this relationship will be curvilinear as numbers of direct reports increases [see Figures 2 and 3]. The hypothesis will be tested in two steps: Hypothesis 2a will test for a linear interaction (the simplest explanation) and Hypothesis 2b will test for a non-linear interaction.

## CHAPTER II

### Method

#### Participants

**Conditions for participation.** Leaders (defined as any level manager or executive with at least one direct report whose professional development and/or annual performance appraisal is their responsibility;  $N = 150$ ) comprised the participants in this study. Conditions of entry into this study included: (a) being 18 years of age or older, (b) a U.S.-based employee, and (c) was currently employed 30+ hours/week as a leader with at least one direct report.

**Power analysis.** A power analysis indicated that for a medium effect size ( $f^2 = .15$ ) at  $\alpha = .013$  (i.e.,  $.05/4$  analyses =  $.013$  per the Bonferroni correction; Field, 2009), 151 leaders were necessary for my sample (Faul, Erdfelder, Buchner, & Lang, 2009; Maxwell, 2000). This is close to what Cohen (1992) indicated the sample size should be for three predictors and a medium effect (i.e., 76 participants per group; e.g., introversion and extraversion). Cohen, Cohen, West, and Aiken (2003) state, “Large effect size interactions are rarely found in observational studies in social science...; small to moderate effect size interactions predominate” (p. 297). Therefore, this was why a moderate effect size was used to compute the power analysis. They also note that, “When each predictor ( $X, Z$ ) has reliability  $.88$ , the required sample size for power  $.80$  to detect an interaction ranges from 100 to 150..., depending on the amount of variance accounted for by the main effects of  $X$  and  $Z$ ” (p. 297). This suggested that the final goal of 151 cases was sufficient, though the aim of this study was to acquire a minimum of

175 cases, taking into consideration the possibility of having to drop cases for various reasons.

**Sampling method and compensation.** Leaders were sourced via emails sent from people within the author's professional and personal networks in a snowball, convenience-sampling process, where participants were requested to forward the survey link to their networks. There was no compensation for taking this survey, but participants were offered the opportunity to receive a summary of the final manuscript and the study's findings if participants contacted the primary investigator and provided their email address. The entire survey should not have taken more than 15 minutes on average to take, though participants were allowed to start and finish it within a two week window as long as they continued the survey from the same IP address as where they originally started it.

## **Measures**

**Introversion/Extraversion (I/E).** To assess whether the participant was more introverted or more extraverted, the Eysenck Personality Inventory (EPI; Eysenck & Eysenck, 1964) was administered. The EPI consists of extraversion, neuroticism, and lie scales comprised of 57 items. Extraversion was measured as a continuous variable on a scale of 0-24 points, with introversion indicated by lower scores and extraversion by higher scores. The neuroticism and lie scales were not scored or used in this study. Sample items, altered to protect copyrighted material, include, "Do you...think things over before acting?" and "Do you like going out...?"

The EPI (Eysenck & Eysenck, 1964) was used because the Eysencks' overall theoretical underpinnings correlated most closely with the theoretical underpinnings of

this study. Namely, that extraversion is comprised of two factors: sociability and impulsivity. Later versions of their personality assessments (e.g., EPQ) refined the extraversion scale so that it mainly measured sociability. However, this resulted in an inability to adequately measure the arousal theory of extraversion that was key to the current investigation (Rocklin & Revelle, 1981); so the earlier version of the scale was used. Additional support for selection of this measure was based on Pace and Brannick's (2010) convergent validity comparison of the Extraversion dimension from at least one dozen of the most popular personality inventories, which found the EPI had the strongest convergent validity ( $\rho = .66$ ,  $k = 7$ ,  $N = 1017$ , 95% CI [.59, .74]).

Form A of the measure was used; the 57 items consisted of a yes/no response format. The EPI manual reports test-retest reliability of 0.81 to 0.97 for nine months to one year. The split-half reliability of the scales is between 0.74 and 0.91 (Furnham, Eysenck, & Saklofske, 2008). Cronbach's alpha in this study was .82. Table 1 contains items from Form A and Table 2 contains scoring information for this scale (Eysenck & Eysenck, 1964).

**Learning goal orientation (LGO).** Button et al.'s (1996) goal orientation measure captures both learning goal orientation and performance goal orientation scores. The learning goal orientation scale was used in this study (Cronbach's alpha = .84). The directions and items were contextualized and asked leaders to report their LGO in relation to their talent development role. The measure used a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) and the LGO scale contained eight items (see Table 3).

**Core self-evaluation (CSE).** The Core Self-Evaluation Scale (Judge et al., 2003) was used as the dependent variable. The measure was contextualized and asked leaders to report their CSE in relation to their talent development role capability. This scale has four dimensions: self-esteem, general self-efficacy, locus of control, and neuroticism (emotional stability), and was measured on a Likert scale of 1 (*strongly disagree*) to 5 (*strongly agree*). This is the original measure for the construct, and has been validated through extensive use, including meta-analyses correlating it with a plethora of variables such as job performance and job satisfaction (Chang, Ferris, Johnson, Rosen, & Tan, 2012). The Cronbach's alpha in this study was .83. Table 4 contains the 12 items and contextualized directions.

**Demographics.** The number of direct reports (NoDR) was self-reported. Participants were provided with a definition of how this study defined a 'direct report': ["an employee who is directly subordinate to you and who reports directly to you on tasks, responsibilities, and for feedback purposes. Additionally, they are an employee whose career/job development and/or performance management is your direct responsibility to manage. For example, you may be responsible for generating their performance and development goals, providing them with project feedback, or filling out their annual reviews (if your organization has such a performance management system in place)."]. They were then asked to supply an answer in the informed consent form, as a means of screening participants for this study. Participants had to have at least one direct report to participate in the study. While nearly all participants provided this voluntary information in the demographics section (and it was screened to ensure it matched the



informed consent response), the response provided in the informed consent was used for the participants who did not supply the data here or whose numbers did not match.

In order to capture characteristics of the sample, additional demographic information was collected (see Table 5). The demographic data collected is described in more depth below in the Descriptive Statistics section.

### **Design and Procedure**

**Design.** The proposed study was a between-subjects research design utilizing moderated multiple regression analysis to test for the presence of a quadratic moderated relationship (i.e., where NoDR and I/E interact to impact CSE) and a quadratic three-way interaction relationship (i.e., where NoDR, I/E, and LGO interact to impact CSE). All variables were measured continuously. The study process is described below.

**Procedure.** First, the primary researcher emailed her professional and personal networks and asked contacts to forward the survey link to people in their networks, specifically targeting managers and leaders responsible for the development of direct reports. If the contacts were leaders with direct reports, they were asked to take the survey. A link to the anonymous survey was also posted on social media (e.g., LinkedIn and Facebook) to disseminate it to as many potential participants as possible. The survey began with an electronic informed consent form that was mandatory to be completed and agreed to in order to gain access to the survey. As previously noted, participants who did not have any direct reports were dropped from the study through a manipulation check in the informed consent. The measures and demographics were randomly presented to participants within the online survey to mitigate order effects and monotonic response

patterns. Data collection for the purposes of the dissertation ceased once the minimum threshold for complete cases per the power analysis was met.

### **Data Analyses**

The hypotheses were tested using hierarchical multiple regression. All variables were entered from lowest to highest order terms per proper hierarchical multiple regression equations.

**Hypothesis 1.** For the first hypothesis, CSE was regressed on NoDR and I/E. All variables were centered to simplify interpretation of the results (Aiken & West, 1991; Cohen et al., 2003; Field, 2009).

To begin, a multiple regression was conducted to test for linear effects since this represented the simplest explanation of the relationships:

Multiple Regression with dependent variable = CSE

Step 1 (main effects)

Number of Direct Reports

I/E Scores

Step 2 (linear interaction effect)

Number of Direct Reports x I/E Scores

Then, a second set of analyses was conducted to see if a curvilinear relationship could be detected:

Multiple Regression with dependent variable = CSE

Step 1 (main effects)

Number of Direct Reports

I/E Scores

Step 2 (2-way interaction effects)

Number of Direct Reports x I/E Scores

Number of Direct Reports<sup>2</sup>

Step 3 (3-way curvilinear interaction effect)

Number of Direct Reports<sup>2</sup> (to assess for curvilinearity) x I/E Scores

**Hypothesis 2.** For the second hypothesis, LGO was added to the model as a third predictor. All variables continued to be centered. Again, a multiple regression was first

conducted to test for linear effects since this represented the simplest explanation of the relationships:

Moderated Multiple Regression with dependent variable = CSE

Step 1 (main effects)

Number of Direct Reports

I/E Scores

LGO Scores

Step 2 (2-way interaction effects)

Number of Direct Reports x I/E Scores

Number of Direct Reports x LGO Scores

I/E Scores x LGO Scores

Step 3 (3-way interaction effect)

Number of Direct Reports x I/E Scores x LGO Scores

Then, a second set of analyses was conducted to test for curvilinear relationships:

Moderated Multiple Regression with dependent variable = CSE

Step 1 (main effects)

Number of Direct Reports

LGO Scores

I/E Scores

Step 2 (2-way interaction effects)

Number of Direct Reports x I/E Scores

Number of Direct Reports x LGO Scores

I/E x LGO Scores

Number of Direct Reports<sup>2</sup>

Step 3 (3-way linear interaction effects)

Number of Direct Reports x I/E Scores x LGO

Number of Direct Reports<sup>2</sup> x I/E Scores

Number of Direct Reports<sup>2</sup> x LGO Scores

Step 4 (3-way quadratic effects)

Number of Direct Reports<sup>2</sup> x I/E Scores x LGO

## CHAPTER III

### Results

#### Data Preparation

Data were collected using the Qualtrics survey platform. Overall, a total of 204 cases were collected and screened for missingness. Cases in which experimental mortality was present after agreeing to the informed consent (i.e., participant quit the survey before completing any of the measures) were removed from the sample because multiple imputation would fail to work to remedy the missing data. Ultimately, 154 cases (75%) contained enough data to be included in the sample. Before the research hypotheses were tested, initial analyses were conducted to ensure data integrity.

**Missing data.** The data was analyzed for its pattern of missingness. Overall, nine values were missing from the entire sample (i.e., less than 1%). One value was a learning goal orientation item, two were contained in the core self-evaluation variable, and six were from the Eysenck Personality Inventory. Little's Missing Completely at Random (MCAR) test was used to identify the pattern of missingness, which indicated that data was missing completely at random [MCAR ( $\chi^2 = 331.05$ ,  $df = 352$ ,  $p = .78$ ; Little, 1988)]. Multiple imputation (MI) was employed to fill in missing values, and pooled averages were rounded to the nearest whole integers and transposed into the missing values cells so that the values would reflect potential scores participants could have selected on the Likert scales, which did not contain decimals.

**Outliers.** Scatterplots of each of the variables were generated to visually inspect the patterns of the data. On the number of direct reports scatterplot, approximately 66% of the raw data was contained between one and seven direct reports ( $M = 9.31$ , median =

5.00, mode = 4,  $SD = 17.56$ ), though the remainder of the values ranged from eight to 180 direct reports. Four visual data points appeared to be outliers on the LGO scatterplot toward the lower end of the scale, while the rest of the data skewed positively above the mean ( $M = 5.65$ ,  $SD = 1.07$ , skewness = -1.68). Frequencies indicated that 55.2% of leaders scored above the mean on this seven point Likert scale.

Finally, the standardized residuals of the criterion were regressed on the predictors and graphed in a scatterplot to visually inspect the data for outliers. In order to determine which values were true outliers, both in terms of distance (i.e., how far outside the normal curve the residual is) and leverage (i.e., how influential the residual is on the slope), three techniques were employed: Mahalanobis distance, Cook's distance, and leverage points (Field, 2009). The corresponding formulas for each were computed (see Table 6) and the data was recoded into different variables (values exceeding the computed cut-offs equal 1.0; all other values equal 0.0).

A moderate cut-off of  $p = .01$  of the Chi-Square statistics test was employed for the Mahalanobis test. Selecting the  $p = .01$  cut-off (versus the  $p = .001$  cut-off) reduced the variance between extraverted and introverted leaders by shrinking the extraverted leaders' inflated range on the numbers of direct reports variable to be identical to that of introverted leaders (i.e., range of 42; identical minimum and maximum values of 1, 43) and thus ensuring similar variance on all predictors. This allowed for a robust comparison at different levels along the introversion/extraversion spectrum and resulted in a more powerful ability to make inferences about the relationships between variables. Cases were removed if they violated at least two out of three of these cut-offs. Eight

cases were removed as true outliers based on these criteria, resulting in a total sample of  $N = 146$ .

**Scoring.** Three measures required scoring: the Core Self-Evaluation Scale (Judge et al., 2003), the Learning Goal Orientation scale (Button et al., 1996), and the Eysenck Personality Inventory extraversion subscale (Eysenck & Eysenck, 1964). The CSE scale required half of the items to be reverse-scored. The CSE and LGO scales were then scored by taking the mean across all items. The EPI-E was scored by creating conditional formulas in Excel according to the scoring key that came with the proprietary measure materials. A total extraversion score was computed, ranging from zero to 24 (introversion to extraversion, respectively).

**Multicollinearity.** Correlations between the predictor variables were examined to ensure that no pairs covaried at levels worthy of concerns about multicollinearity (see Table 7). None of the correlations exceeded  $r = .08$ . Therefore, multicollinearity was ruled out as a concern.

### **Statistical Assumptions**

In order to ensure that statistical assumptions of multiple regression were met, several tests were conducted. A histogram of residuals (Figure 4) and a P-P plot were evaluated to determine normality and linearity, respectively. Residuals appear to be normally distributed between three standard deviations on either side of the mean, and contrary to the hypothesized pattern, the data appeared to be linear and not curvilinear indicating that both linear and non-linear multiple regression tests should be conducted. The Durbin-Watson statistic was calculated to determine residual independence, and with a value of 1.78, independence was established. Standardized predicted values and

standardized residual values were plotted to check for homogeneity and homoscedasticity. The scatterplot indicated that residuals were not quite evenly dispersed around the zero axes, suggesting a potential violation of homogeneity, so Levene's tests were conducted for each predictor to determine whether this assumption was violated; results indicate it was not. Lastly, over 95% of the residuals fit between two standard deviations from the mean, indicating the data are homoscedastic. Therefore, no statistical assumptions were violated.

### **Descriptive Statistics**

Descriptive statistics and correlations can be found in Table 7. Participants ranged in reported age from 23 – 73 years ( $M = 39.96$ ,  $SD = 11.46$ ), and were 50% female. First-level supervisors (24%), mid-level managers (26.7%), and senior managers (25.3%) each made up roughly a quarter of the sample. Chief officers and executives (11.6%) and individual contributors (3.4%) made up the remainder of the sample. Roughly nine percent of participants chose not to disclose their job position. A comparison between more introverted (i.e., participants who scored 0 to 11 on the EPI) and extraverted (i.e., participants who scored 12 to 24 on the EPI) leaders' descriptive statistics and study variables is provided in Table 8. There was more variance in introverted leaders' CSE ratings ( $\sigma^2 = .35$ ;  $N = 78$ ;  $M = 3.76$ ;  $SD = .59$ ; range: 2.17 – 5.00) compared to extraverted leaders' CSE ratings ( $\sigma^2 = .23$ ;  $N = 68$ ;  $M = 3.95$ ;  $SD = .48$ ; range: 2.58 – 4.83). Mean CSE across both I/E typologies was 3.85 ( $SD = .55$ ;  $\sigma^2 = .30$ ).

**Hypothesis One: The Effect of I/E Typology and NoDR on CSE**

The data for the first hypothesis was analyzed using multiple regression. Two regression analyses were conducted: the first for linear effects, the second for curvilinear effects (see Tables 9 and 10).

The results indicated the interaction effect explained about 6% of the variance, but was not significant [ $R^2 = .06$ ,  $\Delta F(1,142) = 1.97$ ,  $p = .163$ ]. However, analysis of zero-order effects of I/E typology across the highest reported centered number of direct reports indicates that extraverts reported a higher mean CSE rating consistent with previous research (Elliot & Thrash, 2002; Ferris, Rosen, Johnson, Brown, Risavy, & Heller, 2011). These findings suggest that I/E typology does not moderate the relationship between the number of direct reports a leader has and their core self-evaluation rating. Rather, leaders of both personality typologies saw increases in their CSE ratings as their number of direct reports increased with extraverts generally scoring higher.

There was no significant main effect between number of direct reports and core self-evaluation ( $B = -0.009$ ,  $p = .16$ ). However, a main effect for introversion/extraversion (I/E) was detected such that I/E was significantly related to core self-evaluations beyond the number of direct reports ( $B = 0.02$ ,  $p = .04$ )

A second analysis assessing the curvilinear effects was conducted (see Table 10). Results indicated that there was no significant quadratic interaction present [ $R^2 = .07$ ,  $\Delta F(1,140) = 1.37$ ,  $p = .25$ ]. Therefore, hypothesis one was not supported. Figure 5 depicts the results of Hypothesis 1a.



**Hypothesis Two: The Effect of I/E Typology, NoDR, and LGO on CSE**

The second hypothesis, a three-way interaction between number of direct reports, introversion/extraversion typology, and learning goal orientation, was partially supported (see Figures 6-11). An analysis was conducted to assess the three-way interaction between number of direct reports, leader introversion/extraversion (I/E) typology, and leader learning goal orientation (LGO). In testing Hypothesis 2a (for a linear interaction effect; see Table 11), results indicated a significant three-way interaction [ $R^2 = .151$ ,  $\Delta F(1,138) = 7.36$ ,  $p = .008$ ]. The main effect of I/E typology was also significant ( $B = .019$ ,  $p = .049$ ).

The three constructs significantly interacted to impact leader core self-evaluation ratings of their talent development role [ $R^2 = .15$ ,  $\Delta F(1,138) = 7.36$ ,  $p = .008$ ] in the linear analysis. The results indicated that LGO moderates the relationship between NoDR, I/E, and CSE, though an analysis of the graphs reveals that the rationale is rather counterintuitive. Where participants reported strong LGO scores (+1 *SD*), there was a positive correlation for extraverted leaders between NoDR and mean CSE rating, while introverted leaders reported a negative correlation. For example, the mean CSE rating for extraverted leaders was 2.1 points higher than introverted leaders at the highest centered NoDR (see Figure 8). This might suggest that not only are extraverted leaders more likely to feel confident in their ability to develop large numbers of direct reports, but this comfort level may afford them the desire to persevere in the face of failure in order to learn new things and try harder next time (i.e., “approach”). Where participants reported mean LGO scores, both typologies had negative correlations between centered NoDR and mean CSE ratings. However, extraverted leaders reported a higher mean CSE rating

compared to introverted leaders; specifically, extraverted leaders report mean CSE ratings that are 0.5 points higher than introverted leaders at the highest centered NoDR (see Figure 7).

Where participants reported weak LGO scores ( $-1 SD$ ), there was a slightly positive correlation for introversion between NoDR and mean CSE ratings that was higher than the relationship between extraversion and CSE. Additionally, the extraverted correlation was negative. In this circumstance, introverted leaders reported a mean CSE rating that was one point higher than extraverted leaders' mean CSE rating (see Figure 6). Together, these results suggest that when there is less of a desire to persevere in the face of failure and to try harder to succeed (i.e., do not approach), introverts are more likely to have a larger margin for arousal input available to approach the tasks needed to develop their direct reports. This lack of desire or do not approach motivation at weak LGO levels may occur when one's implicit leadership biases lead one to believe he or she is not as good a leader as one's peers (i.e., "So what's the point of putting all of my energy into talent development?") or when one feels out of their comfort zone with respect to their arousal input level (i.e., introverts at high NoDR, extraverts within low approach condition). This margin for arousal input subsequently allows them to feel more in control, more efficacious, more emotionally stable, and/or have higher self-esteem, which may effectively allow them to report higher CSE ratings.

In Hypothesis 2b, a marginally significant curvilinear three-way interaction was found [ $R^2 = .181$ ,  $\Delta F(1,134) = 3.79$ ,  $p = .054$ ; see Table 12]. However, given an unstandardized beta equal to zero ( $B = .000$ ) and a 95% CI  $[-.001, .000]$ , there was not adequate evidence that a significant curvilinear effect present.

Due to the minimal effect sizes, the curvilinear trend appeared to be small and non-significant (see Figures 9-11 for a depiction of the reported relationships). Within the hypothesized curvilinear analysis, mean CSE ratings for extraverted leaders grew nearly three-fold from weak LGO (-1 *SD*) to strong LGO (+1 *SD*) scores, while mean CSE ratings for introverted leaders dropped across LGO scores within the highest reported centered NoDR, suggesting that if a small curvilinear effect does exist, extraverted leaders' CSE ratings improve as their LGO gets stronger and their number of direct reports increases, whereas introverted leaders experience an opposite effect. However, no significant curvilinear effect was detected in this study, so the veracity of these patterns is currently undetermined.

Given that there was a statistically significant linear three-way interaction effect and a marginally significant curvilinear relationship detected in the data, hypothesis two was partially supported. Figures 6-11 depict the results for Hypotheses 2a and 2b.

## CHAPTER IV

### Discussion

#### Summary of Key Findings

This research study sought to examine the relationships between the number of direct reports (NoDR) a leader is responsible for developing (see Table 13 for frequency of each NoDR occurrence), the leader's introversion/extraversion (I/E) typology, and their core self-evaluation (CSE) of their talent development role. Additionally, the strength of the leader's learning goal orientation (LGO) was assessed to explore if it impacted the former relationship, particularly in situations when the leader likely felt challenged because their "personological predispositions" (i.e., I/E typology and corresponding preferences; Diener et al., 1984, Judge et al., 2000, p. 238) did not match the demands of their talent development role (e.g., introverts who had high NoDR). The relationships between the predictors (e.g., I/E typology, NoDR, LGO) and leader CSE were hypothesized to be curvilinear because leaders have limited time to expend on talent development. At high levels of direct reports, their CSE rating should begin to taper off or decrease due to their inability to spend any more time or resources developing the direct reports in their care.

The strengths and limitations of this study, as well as future research suggestions are discussed below, but first, further theoretical and practical explanations for these findings will be discussed.

#### Theoretical Implications

The purpose of the current investigation was to better understand the conditions under which introverted and extraverted leaders could best thrive in the workplace while

being true to their innate personality dispositions. No matter which industry or organization a leader finds him or herself in, he or she is likely to have the same expectations and goals as other leaders: manage, develop, and motivate a team of direct reports toward achieving metrics that keep the company competitive and profitable. Leaders are therefore in a position where it would behoove them to be engaged in developing their direct reports to become better performers and team players, so that the team's superordinate goals – and ultimately, the leader's performance goals – can be effectively met. Following this logic, holding job satisfaction, job performance, and most other variables constant, a (new) leader will realize they need to understand the behaviors that they are (a) most comfortable with (i.e., typically based on their I/E typology), and (b) most effective at employing when focusing on their talent development role with their direct reports. It is not enough to only assess relatively fixed leader traits (e.g., I/E typology, leadership style, gender, age) to determine leadership effectiveness (DeRue, Nahrgang, Wellman, & Humphrey, 2011). In fact, DeRue et al. (2011) found that leader behaviors explained more variance in leadership effectiveness than did leader traits.

**A note on extraversion as a construct.** But first it needs to be reiterated that, on a biological level, extraversion is synonymous with sensation seeking or reward seeking responses (Depue & Collins, 1999; Eysenck & Eysenck, 1985; Gray, 1970); that is, it is activated via the impulsive behaviors through which an individual strives to increase dopamine and other neurotransmitter reactions to reach the energy baseline he or she needs to feel satiated (Depue & Collins, 1999; Depue & Fu, 2013; Matthews & Gilliland, 1999). In a leadership context, extraversion has been correlated with “status striving” (Barrick, Mitchell, & Stewart, 2003, p. 68), and it has been suggested that extraverts use

sociability as a means for more opportunities to pursue and attain rewards (e.g., status, recognition, and other dopamine responses; Lucas, Diener, Grob, Sun, & Shao, 2000). However, it has been suggested that extraverts seek to gain influence through persuasion rather than inclusion (Anderson, Spataro, & Flynn, 2008), and leader extraversion does not always contribute to quality relationships with direct reports (Nahrgang, Morgeson, & Ilies, 2009). These two suggestions may lend some rationale behind how extraverts are able to maintain high CSE ratings at high NoDRs within the strong LGO condition. This will be elaborated on below. The other necessary piece of information that may explain the results of this study is the understanding that extraversion (and introversion) falls on the BAS (behavioral approach system) axis of Gray's (1970) psychophysiological theory; the other orthogonal axis, BIS (behavioral inhibition system), correlates with neuroticism (and emotional stability). While the two axes measure divergent constructs, the BAS may impact a person's BIS as will be explained below.

**Approach-avoidance framework.** The approach-avoidance framework of both goal orientation and motivation is a widely accepted one in psychological research. It takes multiple forms, for example: Gray's (1970) psychophysiological theory (BAS/BIS), VandeWalle's (1997) cognitive approach- versus avoidance-performance goal orientation theory, Eysenck's (1967) biological ARAS theory of cortical stimulation and correlating personality, as well as several others outside the scope of this study (Elliot & Thrash, 2002; Jackson, 2008; Kolb, 1984). The general idea is predicated on different input stimuli resulting in different behaviors or motivations: either approach (reward) or avoidance (punishment). Depending on the theory, the approach and avoidance outcomes are usually orthogonally aligned with traits or states on the axes representing

the corresponding theorized disposition [e.g., Eysenck: extraversion/introversion (approach) and neuroticism/emotional stability (avoidance), Gray: impulsivity (approach) vs. sociability (avoidance), VandeWalle: performance seeking reward (approach) vs. performance avoiding negative judgment (avoidance)]. The results of this study appear to be supported by this approach-avoidance framework, falling somewhere in the middle of Eysenck's beliefs that personality effects are mainly impacted by level of stimulation (arousal) and Gray's beliefs that reinforcement signals (reward/punishment) are the chief predictors, as will be explained below.

**Hypothesis 1.** *The relationship between the number of direct reports and core self-evaluation will be curvilinear and moderated by personality type such that extraverts will report higher CSE than introverts do as the number of direct reports increases and vice versa at low numbers of direct reports [see Figure 1]. The hypothesis will be tested in two steps: Hypothesis 1a will test for a linear interaction (the simplest explanation) and Hypothesis 1b will test for a non-linear interaction.*

There were no significant interaction results in hypothesis one. However, there was a significant and positive main effect for the I/E typology spectrum correlating with CSE, which appeared to drive the positive correlation between NoDR and CSE for both introverts and extraverts. This makes sense given previous research that found a positive correlation between extraversion and CSE, particularly in a leadership context. For example, Hu, Wang, Liden, and Sun (2012) found a positive relationship between CSE and transformational leadership behaviors, and Sears and Hackett (2011) likewise found a positive relationship between CSE and the quality of leader-member exchanges. These two types of leadership behaviors (i.e., particularly regarding leadership emergence) have been consistently correlated with extraversion (Hunter, Neubert, Perry, Witt, Penney, & Weinberger, 2013; Judge et al., 2002; Lord et al., 1986). While there was inadequate support to establish a baseline relationship indicating that introverted leaders would

report higher CSE at low levels of NoDR and extraverted leaders would report higher CSE at high levels of NoDR (i.e., because these patterns were hypothesized to fall within each typologies' comfort zone), there was statistically significant support suggesting these relationships may exist once LGO was factored in, as will be discussed next with hypothesis two.

**Hypothesis 2.** *Learning goal orientation will buffer the relationship between number of direct reports and core self-evaluation rating for each personality typology such that in the presence of stronger levels of LGO, leaders will report higher CSE ratings across all levels of direct reports, particularly the ranges where they are predicted to be least comfortable (per hypothesis 1), and this relationship will be curvilinear as numbers of direct reports increases [see Figures 2 and 3]. The hypothesis will be tested in two steps: Hypothesis 2a will test for a linear interaction (the simplest explanation) and Hypothesis 2b will test for a non-linear interaction.*

**Hypothesis 2a (linear interaction).** The introduction of learning goal orientation (LGO) in hypothesis two resulted in a significant three-way linear interaction, which merits a deeper examination as to what appears to be happening within each of three LGO conditions: weak, average, and strong (i.e., - 1 *SD*, mean, +1 *SD*, respectively). Of particular note is that extraverted leaders scored higher than introverted leaders within the simple effect of NoDR across LGO conditions. The following discussion will mostly focus on what may be happening within the high NoDR condition, so before exploring that, a couple of comments about what may be happening at low levels of NoDR.

First, while hypothesis one postulated that extraverts may report lower mean CSE at low NoDR because there would hypothetically not be enough stimulation for them, the results indicate otherwise. One reason for this may be that while these leaders had only a few direct reports, there were many other people within the organization that they could talk and interact with on a daily basis, and this would allow them to maintain their baseline arousal level and feel adequately rewarded throughout the day. In turn, this



would impact and bolster their CSE rating, and it would be difficult for an individual to separate their general CSE rating from their CSE rating of their talent development role, as the confidence derived from socially interacting at work would likely spill over to their interactions with their direct reports. This contagious confidence effect has been documented in other literature, including Judge and Kammeyer's (2011) literature review of CSE within organizational contexts which references Erez, Misangyi, Johnson, LePine, & Halverson's (2008) empirical study that found transformational leaders who have high self-confidence are able to transfer that confidence (e.g., in goals) to their followers.

Second, it is important to note that within every condition of this study, CSE scores are clustered around a rating of four (on a five point scale) for both introverted and extraverted leaders at low NoDR. There are negligible differences in mean scores, which would subsequently likely equate to negligible differences in both implicit leadership biases and outward behaviors. In other words, both introverted and extraverted leaders rate themselves relatively highly on the CSE scale at low NoDR, indicating they feel confident in their talent development capabilities with only a few direct reports. There are no true differences between perceived capabilities here. Only when the NoDR begins to increase do we see differences in the patterns that emerge.

An examination of what may be occurring at high NoDR across different LGO scores (e.g., weak, average, strong) is the next step. In the presence of strong LGO scores, at the highest NoDR, extraverted leaders reported a mean CSE rating that is more than two points higher (4.5) than introverted leaders' reported mean score (2.4). Additionally, introverted leaders' mean CSE scores were negatively correlated with

NoDR, while extraverted leaders' reported a positive correlation. One explanation for this pattern is that extraverted leaders may be prone to learning from their mistakes quickly so that they can receive their desired rewards without much delay. While this may not lead to forging quality relationships with direct reports (Nahrgang et al., 2009), it does allow them to be agile and possibly more effective at their jobs, as indicated by the bulk of organizational psychology literature that indicates extraversion predicts a host of positive workplace outcomes, and from where the subsequent implicit leadership preference for extraversion in western cultures may originate.

Conversely, introverted leaders are both (a) more prone to think deeply when they receive learning input cues, and (b) more likely to reach their transmarginal inhibition level (TMI; e.g., extreme arousal input level, at which point there is diminishing returns); both instances would result in them seeing reductions in their response times (Eysenck, 1994; Matthews & Gilliland, 1999). At higher NoDR, all this "learning" (i.e., arousal) is likely negatively interacting with their level of responsibility and triggering their CSE scores to drop. Gray's theory would explain the drop in CSE scores as an avoidance (to punishment) response; introverted leaders may be concerned with being harshly judged by others within the organization if they do not do a comparable job at developing their direct reports as their extraverted leader peers (are perceived to) do. This cognitive dissonance, generated from a perceived implicit leadership bias, may be interacting with their arousal level (i.e., the amount of learning to do, or getting comfortable outside of their comfort zone with so many direct reports) and resulting in a loss of self-efficacy, locus of control, self-esteem, and/or an increase in neurotic thinking patterns. These

effects may come into play in the curvilinear condition, where there is a much sharper decrease in mean CSE scores for introverted leaders, as will be discussed below.

In the presence of average LGO scores, both typologies are negative, but the reported mean CSE scores are closer together on the scale [i.e., the difference between extraverted (3.6) and introverted (3.1) leaders' mean CSE scores drops from 2.1 points to 0.5 points at the highest NoDR]. Taking into consideration that extraverts were hypothesized to feel more naturally comfortable with higher NoDR, and that their reward-seeking nature likely makes them more agile (quicker learners), it is not too surprising that extraverted leaders' CSE scores are higher than those of introverted leaders at mean levels of LGO.

In the presence of weak LGO scores, introverted leaders reported a slightly positive correlation between NoDR and CSE, which equates to one full point higher (3.8) than extraverted leaders' reported mean CSE (2.8). In this circumstance, introverted leaders' mean CSE was generally higher than extraverted leaders' mean CSE, with extraverted leaders reporting a negative correlation between NoDR and CSE. The score of 2.8 is the lowest mean CSE score that extraverted leaders' reported across any comparison in the study, with the exception of the curvilinear condition of this hypothesis (2.0). A possible reason why extraverted leaders' CSE ratings were negatively correlated with number of direct reports and weak LGO is because this interaction represents the *do not approach* end of the BAS spectrum. Extraverts would not be expected to fare well outside of *approach* conditions, because these conditions are where they experience a biological and motivational need for an energy boost to allow them to reach their dopaminergic baseline (Depue & Collins, 1999; Eysenck & Eysenck, 1985). The weak

LGO end of the spectrum represents leaders who reported less agreement with items examining their desire to (a) persevere in the face of failure, (b) try harder, and (c) learn new things, when developing their direct reports. Extraverted leaders would reasonably be expected to take an approach mindset toward talent development regardless of any environmental factors, because extraverts generally exist in the approach end of the BAS as previous research has indicated (Matthews & Gilliland, 1999).

However, as mentioned earlier, introverts tend to analyze situations more intensely than their extraverted counterparts; therefore at weak levels of LGO when their TMI level has not yet been reached, they may be slightly more agile than extraverts at adapting to the increased responsibility of high NoDR (i.e., they react faster to the arousal inputs; Depue & Collins, 1999; Eysenck, 1994; Eysenck & Eysenck, 1967; Matthews & Gilliland, 1999). In turn, this may result in higher CSE scores for introverted leaders within this end of the LGO spectrum only; beyond a weak LGO stimulus, introverted leaders would likely be too highly aroused to function as agilely as their extraverted peers.

**Hypothesis 2b (quadratic interaction).** Though this hypothesis was marginally significant (i.e., non-significant), the resulting patterns are still noteworthy. In particular, introverted leaders' mean CSE scores sharply decrease as the NoDR increases. It is at this point in which the BAS appears to impact and activate the BIS, and neurotic thinking patterns may begin to cloud introverted leaders' core self-evaluations. Eysenck (1994) said that relationships incorporating extraversion (i.e., BAS) should be moderated by stimulation, while relationships incorporating neuroticism (i.e., BIS) should be moderated by stress levels, and that is what appears to be happening here. Therefore, this decrease

in mean CSE ratings is likely due to lower emotional stability scores (and potentially lower scores on the other CSE dimensions as well) due to a stress response to the level of stimulation the leaders are perceiving, which in turn leads to a decrease in the CSE rating.

It was hypothesized that introverts would struggle at higher NoDR, and they do appear to be struggling at high NoDR, but this effect is only present when learning goal orientation is present. One reason for this effect may be that introverts tend to be more critical (i.e., self-reflective and punishment-averse) of their leadership and talent development skills across all NoDR compared to their extraverted peers. However, at high NoDR, they neither have as much time to be reflective and learn from their mistakes, failures, and challenges, nor do they have the arousal bandwidth available to function with ease once their TMI level is reached, as it likely is at the highest NoDRs. Their energy, compared to extraverted leaders' energy, would likely already be fading with so many direct reports to think about and interact with, and this may impact their self-efficacy, emotional stability, self-esteem, and/or locus of control, causing their CSE scores to decrease as we see in Figure 11. This study did not seek to identify the threshold for the number of direct reports at which the curvilinear effect really surfaces, but at some point it likely exists, and at this point, introverted leaders will need to rely on other strategies to cope and prevent their CSE ratings from sagging, as will be discussed below.

Also in the results associated with this hypothesis, we see extraverted leaders' CSE scores exponentially increase, effectively tripling from the weak LGO end of the spectrum to the strong LGO end of the spectrum. This is not surprising given previous research that correlates extraversion highly with CSE (Hu et al., 2012; Sears & Hackett,

2011). In addition, prior research on goal orientation and Big 5 personality has found that extraversion (i.e., sensation-seeking) is correlated with the approach style of goal orientation. Critics may point out that the approach style of goal orientation refers to performance goal orientation, not LGO. However, it could be argued that LGO is a form of approach; it is tackling an obstacle head on instead of avoiding it.

### **Practical Implications**

Taken together, the extant literature and the results from the current study indicate that one can expect that extraverts will manifest higher CSE ratings of their talent development role than introverts. This may at least in part explain why extraverts are more likely to also have high job satisfaction and performance ratings, better interpersonal relationships, fare better through organizational changes, and any other outcomes where CSE is an antecedent, compared to introverts (Bono & Judge, 2003; Erez & Judge, 2001; Judge & Bono, 1999). While this does not imply introverts cannot see these same positive organizational outcomes, it does indicate that they will be less likely to rate their CSE as highly as their extraverted counterparts without additional strategic interventions and behaviors to compensate for trait tendencies. To be clear, it is not that they do not enjoy developing their direct reports; it is that their self-efficacy, locus of control, self-esteem, and/or emotional stability suffer in the process of talent development.

The findings in this study suggest that extraverted leaders may be more likely to approach challenging situations (i.e., developing high NoDR) with a positive attitude, and subsequently, reflected a high(er) CSE rating. Introverted leaders seemed to have higher mean CSE scores within weak LGO scores with high NoDR, possibly because within this

condition, the BAS did not impinge upon the BIS. However, introverted leaders appeared to struggle in with strong LGO scores and high NoDR, possibly because the BAS may be impacting the neurotic thinking patterns associated with the BIS. Therefore, given these two outcomes, there appears to be differences between how extraverted leaders' and introverted leaders' motivation (goal orientation) mindsets should be focused to maximize certain outcomes such as CSE when generalizing the results of this study externally.

This may leave one asking, "How?" For starters, extraverts with high numbers of direct reports should be directed to focus on what they are learning. If they can avoid failures in their talent development work and subsequently perceive rewards from their work more often, this will allow them to be more agile; a valuable attribute in today's fast-paced, global business environment. Introverts with high numbers of direct reports might consider focusing on other strategies to help them avoid getting stuck in a ruminating pattern. For example, a leader might take 10 minutes to write a journal entry in order to clear their mind of extraneous thoughts that are clouding their ability to focus on the task at hand. Or, if a leader feels really overwhelmed, they can collaborate with others for help, leveraging each other's strengths or trading favors to build good will and strengthen networking bonds. Introverts might consider drinking less caffeine, because research shows that it can lead them to reach their TMI level (i.e., peak arousal) quickly, which can impair their procedural learning, whereas caffeine enhances extraverts' procedural learning (Corr, Pickering, & Gray, 1995). Last but not least, an introverted leader may need some stereotypical time alone to quietly meditate or otherwise regain some energy amidst a chaotic workday. The take home point is that extraverted leaders

and introverted leaders will need different inputs to achieve and maintain high CSE scores, especially with a strong learning goal orientation when they have a high number of direct reports (i.e., high arousal).

As society's implicit leadership biases shift to include introverts within a paradigm of successful leadership possibilities (i.e., traditionally attributed more often to extraverted leaders), we may see increases in introverted leaders' CSE scores across all levels of NoDR and LGO scores. The popular press and media have been shining a spotlight on this issue since the release of Cain's book, *Quiet*, in 2012 and more and more research is beginning to emerge (e.g., Grimes, Cheek, & Norem, 2011; Hvidsten, 2016; Stephens-Craig, Kuofie, & Dool, 2015). This study sought to be among that new research which would help address stigma attached to introversion in leadership, and a rational first step to dispelling stigma is attempting to better understand the underpinning idea that is stigmatized. This study examined the differences in CSE ratings between introverted and extraverted leaders across various NoDR and LGO interactions, and found that at low NoDRs there are negligible differences in CSE scores, while at higher NoDR, both introverts and extraverts thrive under different conditions. Thus, neither typology is superior to the other; they are merely different in the mechanisms that take arousal and motivation inputs, and convert them into affective and behavioral outputs. Furthermore, this study applied Eysenck's and Gray's (among other researchers) extensive body of research that examined both I/E typologies from different angles in the hopes of better explaining why and how the results of this study were operationalized the way that they were.



Leaders of both I/E typologies have a positive place in the modern workforce, let us consider what the future of work will entail. It has been suggested that the future will bring a less hierarchical workforce (e.g., due to an increase in technology; Rifkin, 2004). Should this be true, it would seem important that the leaders that do remain are the best and most highly qualified candidates for their positions, in order for organizations to remain competitive, innovative, and productive. To this end, selecting leaders who are high in CSE, given the myriad attributes already discussed (e.g., self-confidence, contagious positive attitude, better under psychological strain, higher job satisfaction and job performance) would allow individuals and teams to more easily and more likely achieve these ends. However, given the extant literature has suggested that extraverted leaders have positive (e.g., more likely to initiate conversations) but also negative attributes (e.g., dominating social interactions; Grant et al., 2011), introverted leaders with high CSE should not be overlooked to fill leadership positions due to the different, yet valuable, behaviors they can bring to leadership roles, should this flatter organizational hierarchical trend become the norm.

### **Strengths and Limitations of this Study**

This study contains several strengths and limitations in construct, internal, and external validity, as described below.

**Strengths.** This research study contains many research design and analytical strengths. Construct validity was strong in the operationalization of introversion/extroversion, learning goal orientation, and core self-evaluations, which all represent constructs with abundant research histories and significant validation. Of particular note, introversion/extraversion was operationalized based on the Eysencks'

conceptualization tied to the biological underpinnings that drive the attribute, after ruling out many other operationalization options.

Learning goal orientation and core self-evaluation were assessed using well-validated measures that were consistent with the theoretical underpinnings of this study. Furthermore, the measures were contextualized to more precisely target the constructs underlying the theorized relationships. The Cronbach's alphas for all of the scales in this study were above .80, indicating that this contextualization did not compromise the reliability of the measures. The direct report construct was more difficult to define, and this will be discussed below as a limitation.

The external validity of the sample showed several strengths, including a broad array of industries, leadership positions, job titles, and ages of leaders in the sample. Additionally, IP addresses indicated that participants worked in a majority of states and regions of the United States. This allows limited, yet robust, inferences to be made about the generalizability of the results to higher-educated, office setting type professionals across the country.

**Limitations.** No study is without limitations, and several exist which should be taken into consideration when interpreting the results of this study. First, as previously mentioned, this research was not designed to include random assignment into different conditions. Several of the variables would not be easy to manipulate because they are trait-based (e.g., introversion/extraversion) or manipulation would limit external validity of the results (e.g., people reported the actual number of direct reports they had in real workplace settings). Therefore, internal validity represents the most significant limitation

in the current study. Because the research design was correlational, causal inferences cannot be made.

Part and parcel to this reality is that there is a potential for many confounding variables (due to the lack of random assignment) that may be contributing noise and making it more difficult to detect any effects that do exist between these focal variables. For example, maturation is a threat to internal validity that cannot be ruled out due to the research design. It is not unreasonable to expect that most leaders experience a natural, yet not necessarily steady, improvement in their CSE rating (i.e., maturation effects) as they navigate their own personal development and similarly learn to manage I/E tendencies when working with others from first time to late career leadership roles, and gain more self-efficacy, self-esteem, a stronger internal locus of control, and become more emotionally stable due to experience (Mortimer, Finch, & Kumka, 1982; Schinkel et al., 2004). An experimental design with random assignment would have given better means to control for age, years of leadership experience, and other organizational factors that might impact participants' learning goal orientation scores and/or core self-evaluation ratings, and future research should consider a design that does so.

Another limitation is inadequate pre-operational explication of constructs for *direct report(s)* and *leader*. Given these were the two constructs upon which participants self-selected into the study, it needs to be noted that there was some confusion among a small number of (potential) participants about whether they qualified based on the definitions of these constructs that was provided in the recruitment message and informed consent. This may have resulted in a small number of participants selecting into the study and passing the safeguard question about number of direct reports in the informed

consent, as evidenced by the number of participants who either reported they are individual contributors or chose not to report their leadership position at all. However, participants who reported multiple direct reports may have also struggled with the boundaries of the term. For example, should a teacher identify her students as direct reports? Similarly, at least one participant who identified as an individual contributor explained to the primary investigator that she regularly trained new employees at work, despite not having an official manager title. Due to her role of developing employees who reported to her during the duration of their training, she self-identified as a leader per the definition provided in the recruitment material. The possibility also exists that potentially ideal participants self-selected out of participation based on confusion with the definition.

External validity also is likely limited for some employee populations. While there was broad variance within this sample of industries and job titles (extrapolated from the job titles provided voluntarily), the sample was largely from professions that typically require at least a bachelor's degree and take place in corporate office settings. This limits the ability to generalize findings to other types of leaders, such as within vocational/technical jobs, academic positions (e.g., teachers and professors), military, and advanced professional careers (e.g., doctors, nurses, lawyers), and therefore, the applied reach of this research is currently limited to U.S. leaders in mainly management positions and business settings until additional research confirms that it extrapolates to international samples or more specific industries and jobs. It is recommended that future research focus specifically on those excluded occupations if generalizations about those professions are required for practical use. Future research may also wish to focus on a

more vocational/technical and industrial sample in order to better understand the trends that exist in these different settings.

Lastly, while this study was originally sufficiently powered to detect linear effects between the focal variables, once outliers were identified and removed, the current study design and sample size did not allow the detection of small effect sizes. Therefore, if small curvilinear effects were present, an additional, more highly powered study would be needed to detect them. Replication of this study is encouraged to extend the robustness of the inferences that can be drawn. In the meantime, inferences about the findings of this study should be interpreted with this understanding in mind.

### **Future Research Suggestions**

This study is one of the first to examine both extraversion and introversion in relationship to other variables. As noted earlier, very few studies examine or report statistical results for the introverted participants in their sample, so much of the published and utilized literature is based solely off of extraverted participants' affective, cognitive, and/or behavioral outcomes and does not consider that those people representing the low extraversion end of the spectrum may display entirely different behaviors or cognitions and not just opposite behaviors or cognitions. To this end, several future research questions are generated, as outlined here.

First, it is imperative that we understand how the introversion end of the spectrum works, particularly within motivation and affective constructs. This includes replication studies based on this current study, preferably with larger sample sizes to reduce the chance of error in results found and reported, and replication studies of the classic studies researchers in our field tend to cite the most that have implications for extraverted

individuals (e.g., Barrick, Stewart, Neubert, & Mount, 1998; Barrick & Mount, 1991; Judge et al., 2002). Next, an exploration of the behaviors that allow introverted leaders to perform (or be perceived to perform) as well as extraverted leaders, where performance could be measured as leadership effectiveness, performance, or some variation of (a) career longevity, (b) number of promotions within company during tenure, and (c) 360 approval ratings. Alternatively, an exploration into how implicit leadership biases impact introverted leaders within different industries or divisions (e.g., stereotypical introverted ones versus stereotypical extraverted ones, such as technology/engineering versus marketing/sales).

As for better understanding the relationship between I/E typology and goal orientation, future research could explore how introverts' affect, cognition, and behavior affect both performance (approach and avoidance) and learning goal orientation conditions (weak and strong). For example, do introverts tend to fare better within PGO frameworks in challenging scenarios? When do introverts fare better within LGO frameworks? And last but certainly not least, research could examine the differences between introverted and extraverted leaders regarding how much time, energy, and willingness (e.g., affinity or care) is spent developing direct reports in relationship to other aspects of their jobs. Do introverts report enjoying talent development as much as extraverts do? If so, in what ways (if any) do they differ, and if not, why not?

### **Conclusion**

Extraverted leaders appear to fare well across all numbers of direct reports, across all learning goal orientation scores – though experience a lower mean CSE score than introverted leaders when reporting weak LGO scores. Introverted leaders appear to see a

similar, albeit slightly lower, mean CSE score as extraverted leaders at low numbers of direct reports, and express a higher mean CSE score than extraverts in the presence of weak LGO scores at high numbers of direct reports, but see a steep decrease in their mean CSE score as numbers of direct reports increase, when reporting strong LGO scores. This is evidence that there are biological, affective, cognitive, and behavioral differences in the way introverts and extraverts interact with and react to their environments. It is not prudent to assume that leaders of both personality typologies will have similar outcomes to identical inputs. This study demonstrates that introversion is not the operationalized opposite of extraversion, and that more research is needed to better understand the introverted leader/worker population in order to maximize their core self-evaluation ratings, and ultimately, their performance and satisfaction (among other criterion metrics) within a work context.

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## Appendix A

## Figures and Tables

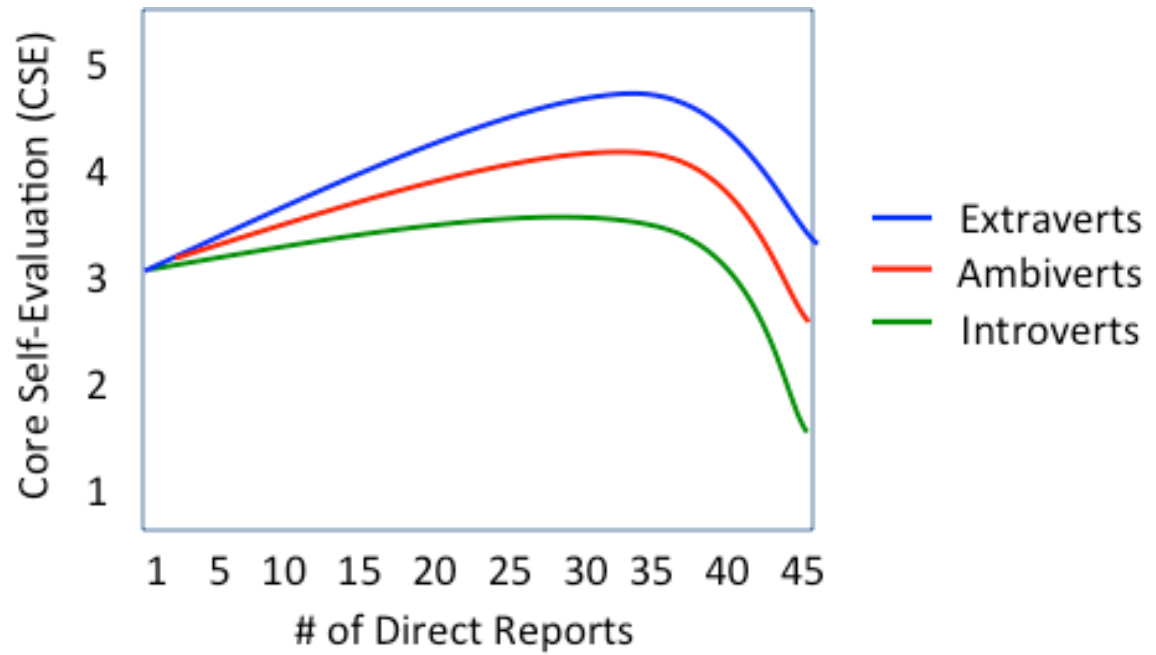
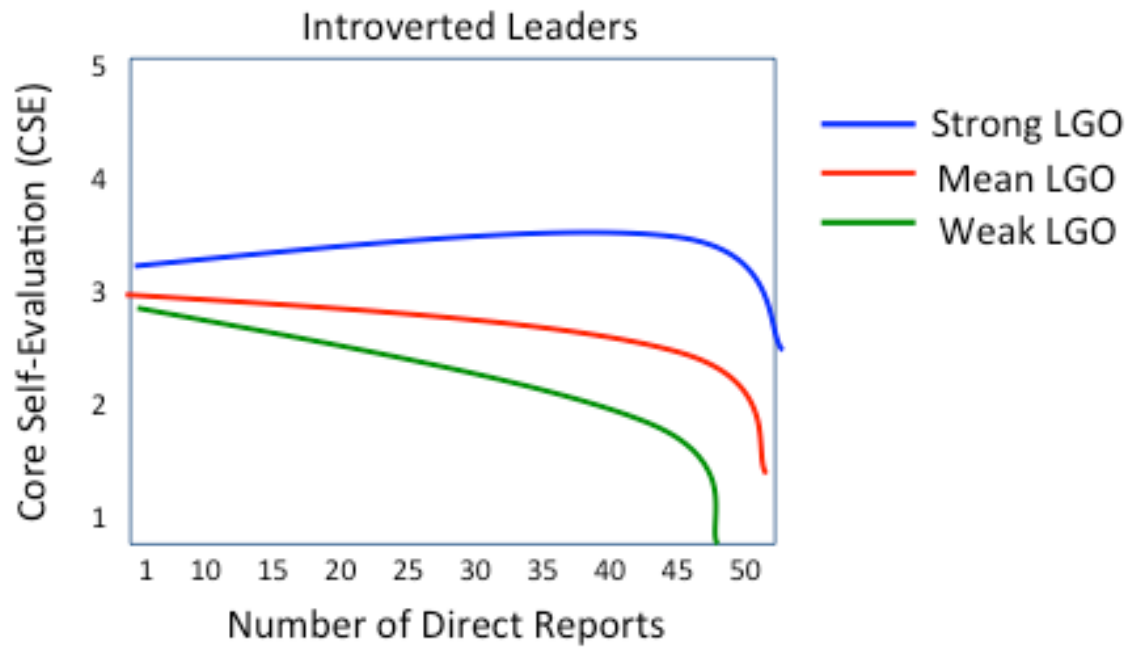
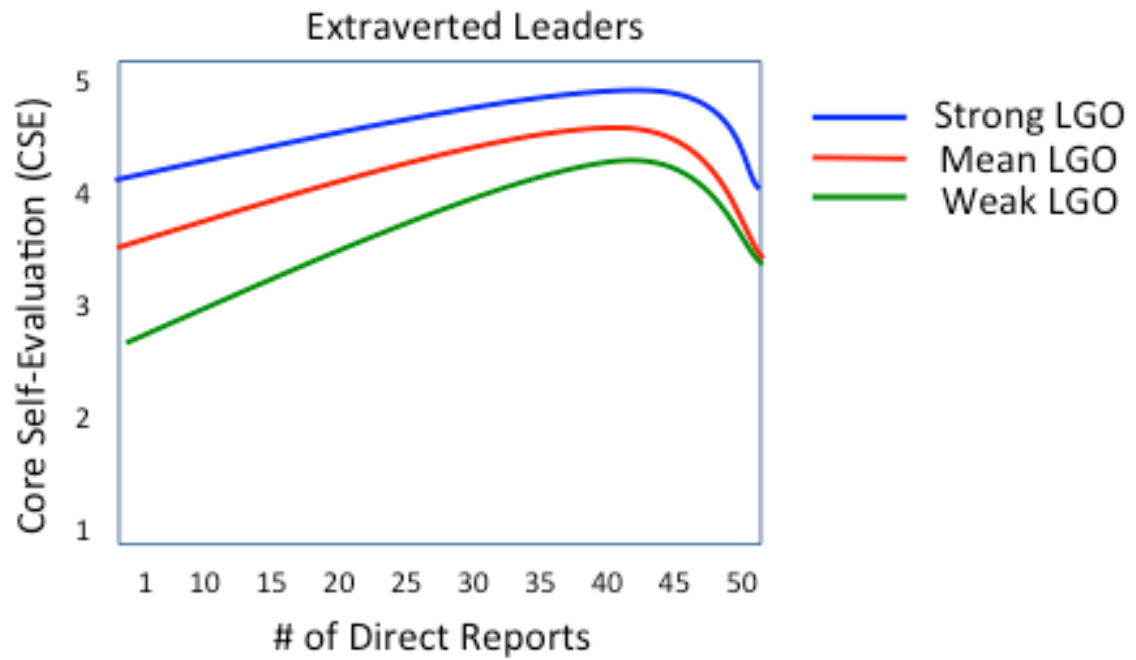


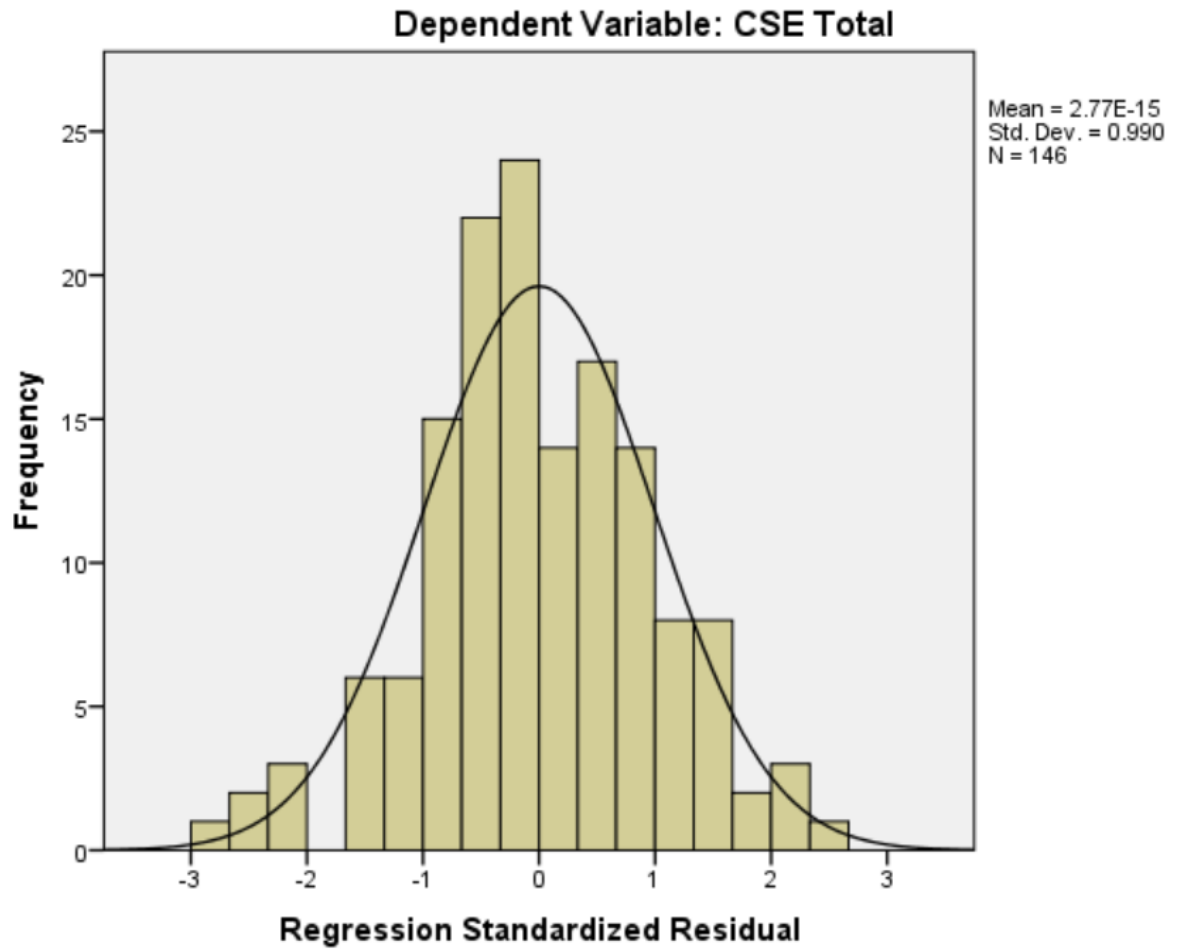
Figure 1. Graphical representation of hypothesis 1b.



*Figure 2.* Graphical representation of proposed relationship between variables for introverted leaders in hypothesis 2b.



*Figure 3.* Graphical representation of proposed relationship between variables for extraverted leaders in hypothesis 2b.



*Figure 4.* Histogram depicting normality of the standardized residuals.

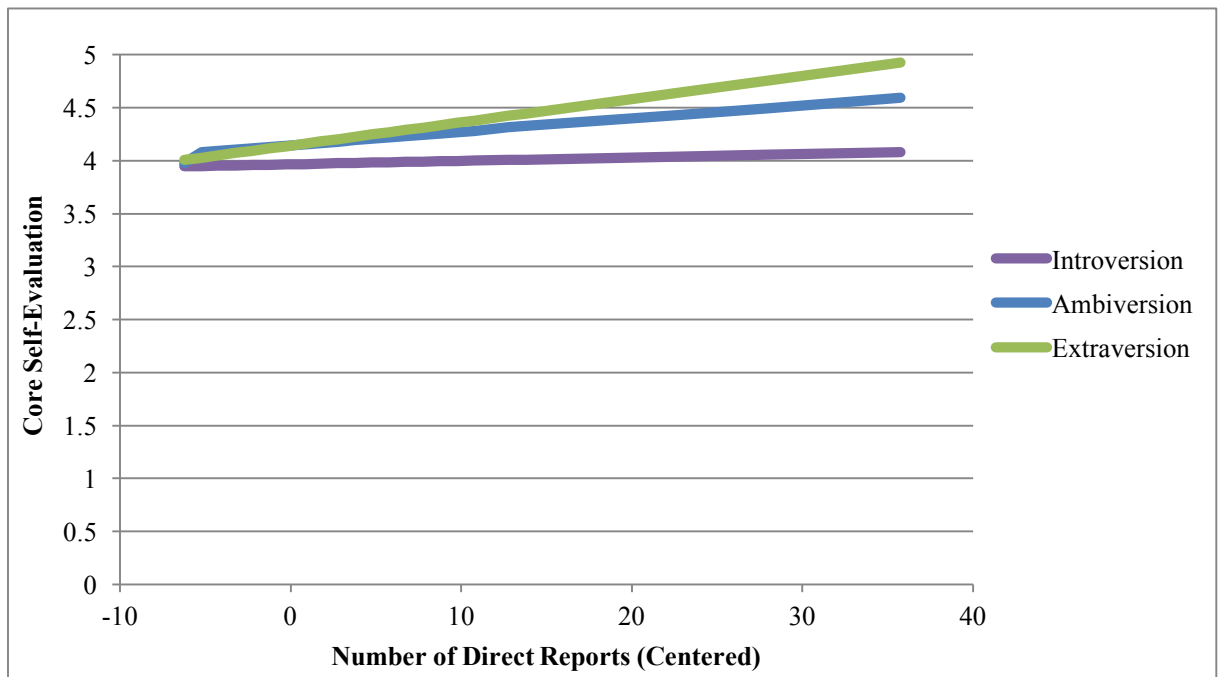


Figure 5. CSE linearly regressed on NoDR and I/E (hypothesis 1a).

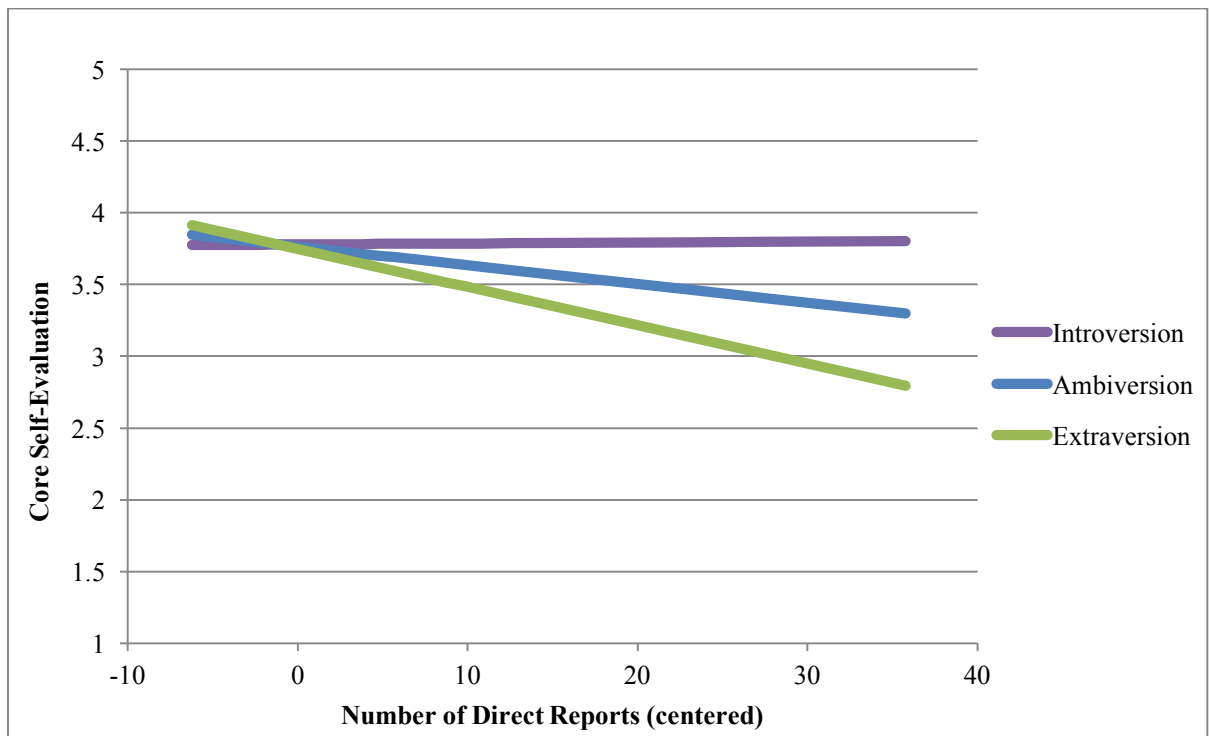


Figure 6. CSE linearly regressed on NoDR and I/E at weak levels ( $-1 SD$ ) of LGO (hypothesis 2a).

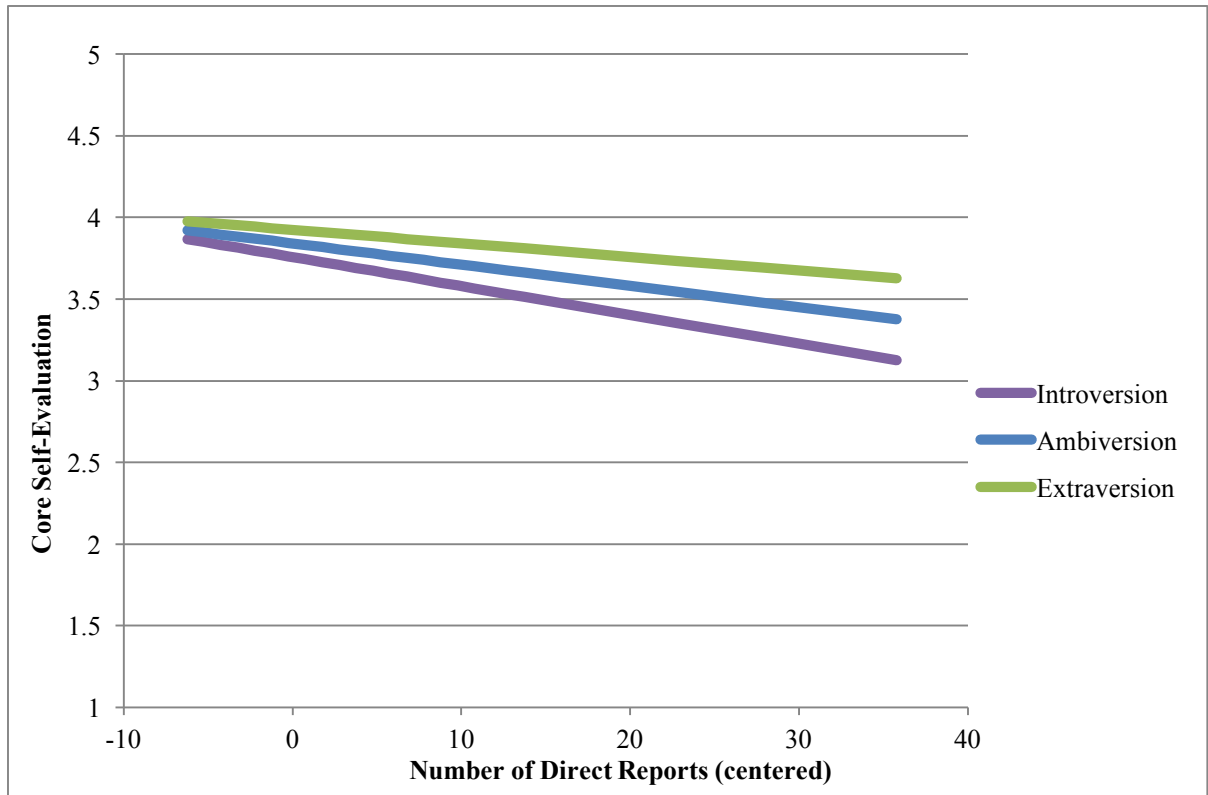


Figure 7. CSE linearly regressed on NoDR and I/E at average (mean) levels of LGO (hypothesis 2a).



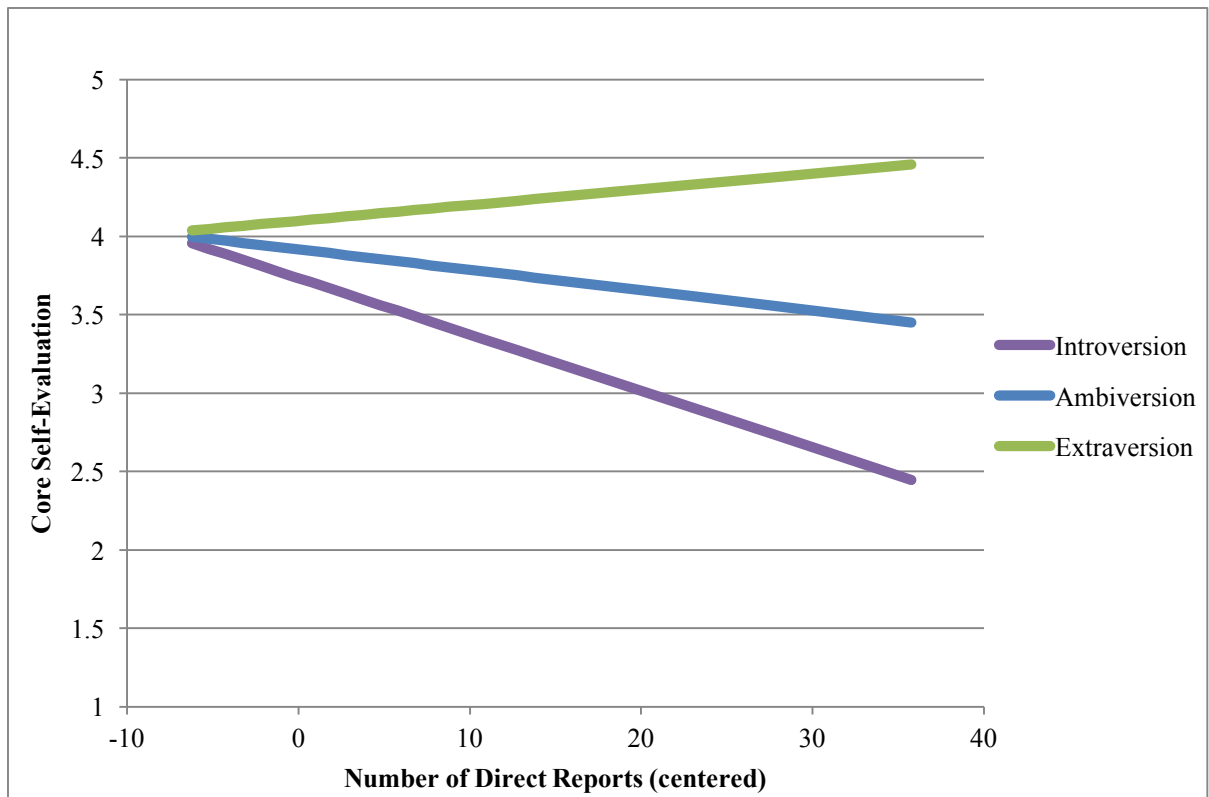


Figure 8. CSE linearly regressed on NoDR and I/E at strong levels (+1 SD) of LGO (hypothesis 2a).

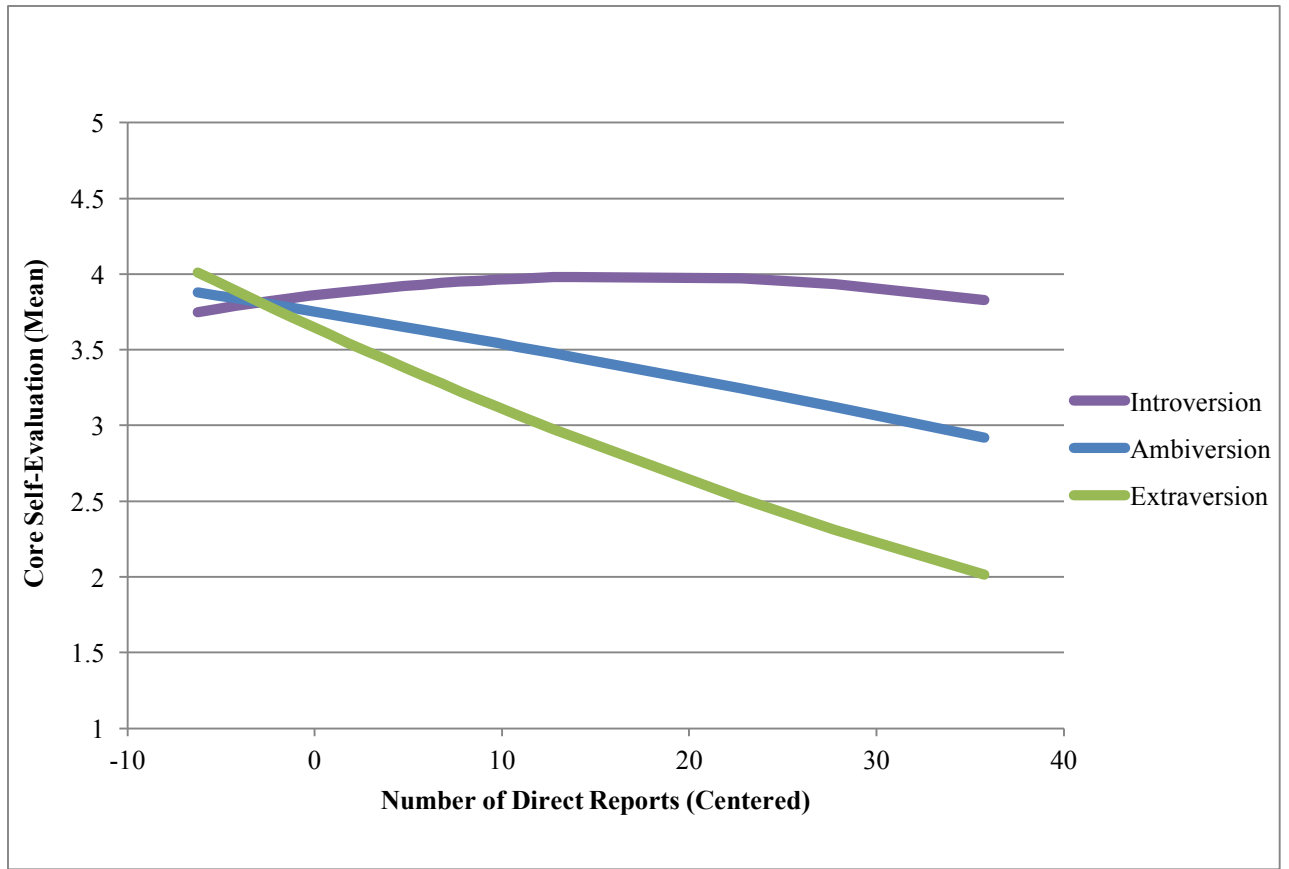


Figure 9. CSE curvilinearly regressed on NoDR and I/E at weak levels ( $-1 SD$ ) of LGO (hypothesis 2b).

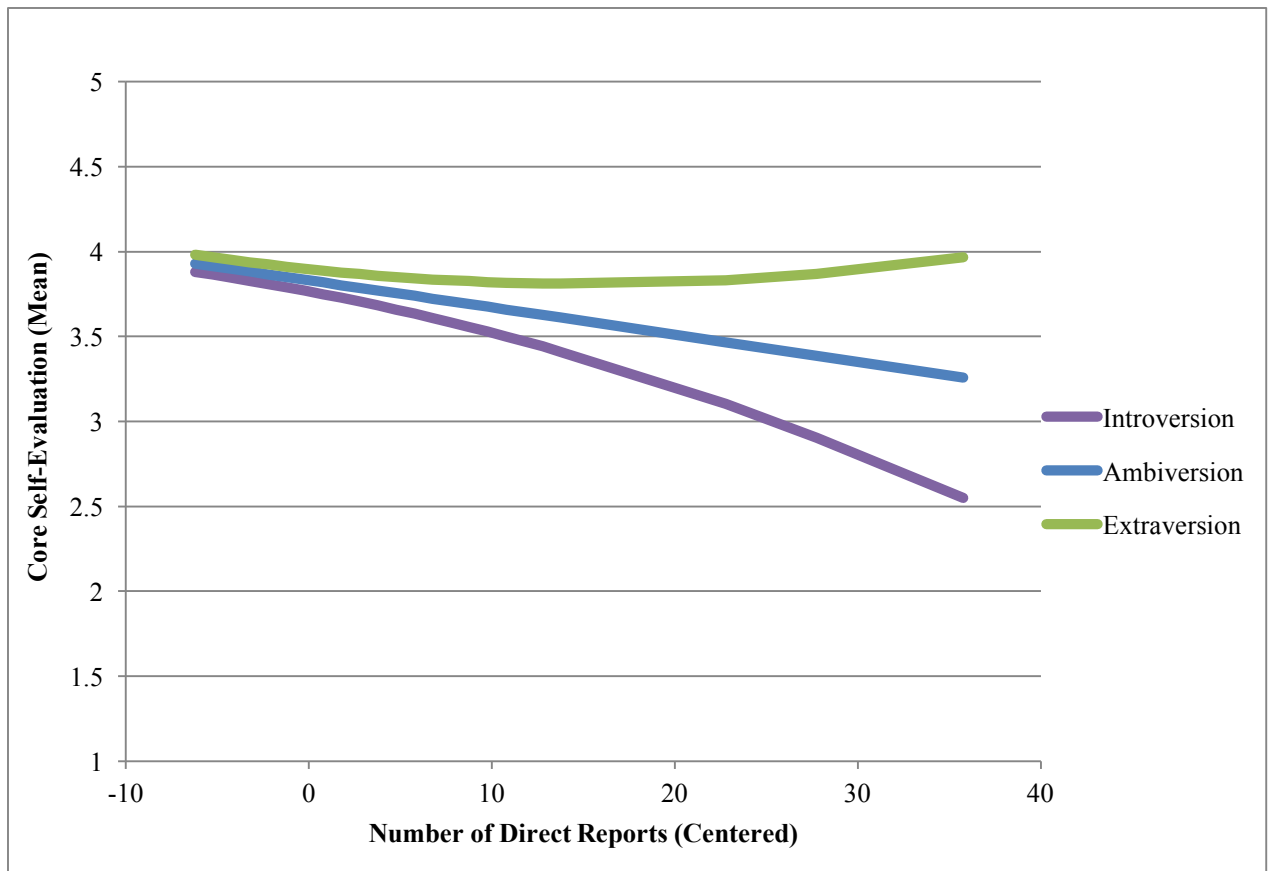


Figure 10. CSE curvilinearly regressed on NoDR and I/E at average levels (mean) of LGO (hypothesis 2b).

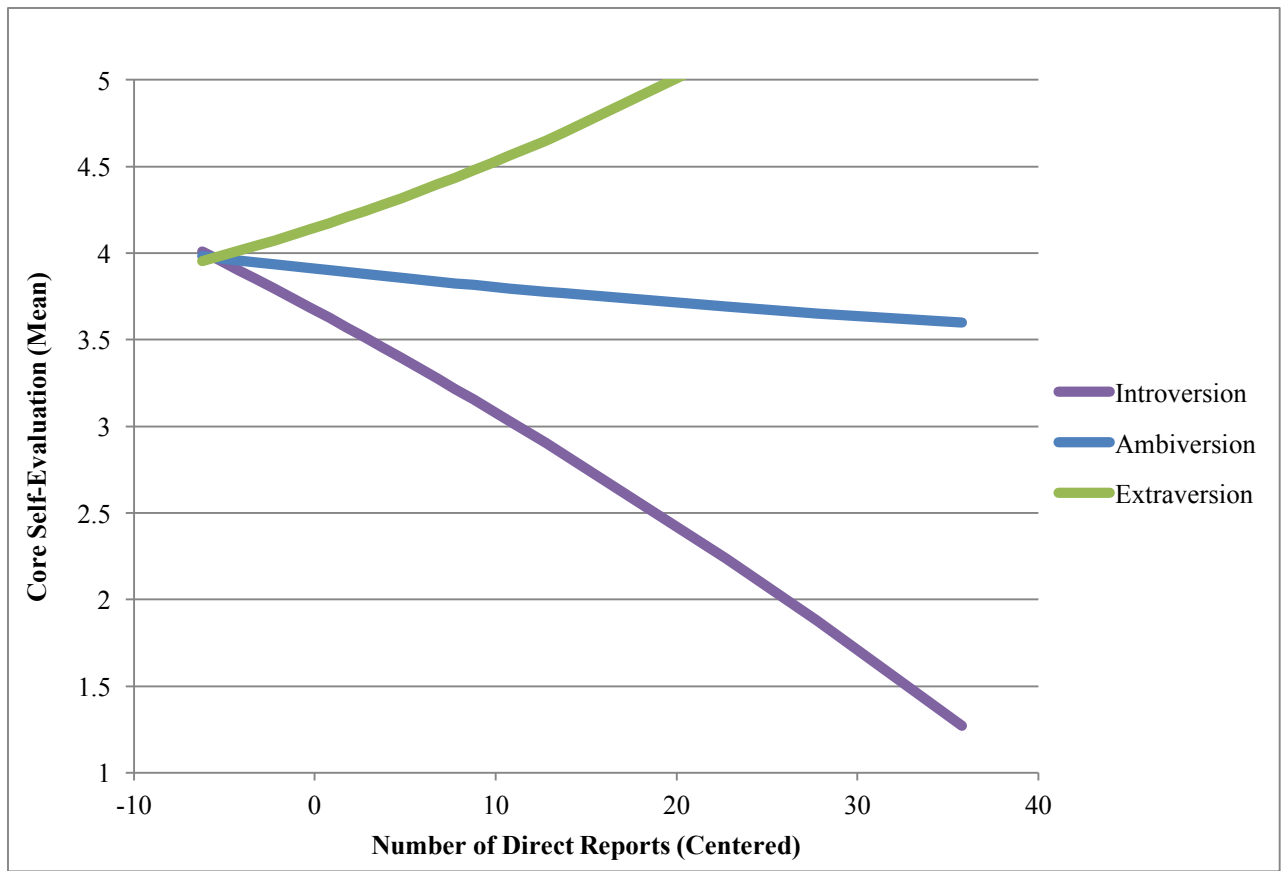


Figure 11. CSE curvilinearly regressed on NoDR and I/E at strong levels (+1 *SD*) of LGO (hypothesis 2b).

Table 1. *Eysenck Personality Inventory (Eysenck & Eysenck, 1964)*

**Directions:** Please respond to each question with Yes or No based on how you typically feel or behave. Responses are completely anonymous.

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Table 2. *Scoring for Form A of the EPI*

Award one point for every YES response below. Sum the number of points and this is the Extraversion scale score for Form A of the EPI.

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Table 3. *Learning Goal Orientation Scale* (Button, Mathieu, & Zajac, 1996)

**Directions:** As you answer the following questions, please respond to each one **as it applies only to the responsibility of managing your direct report(s).**

1	2	3	4	5	6	7	N/A
<i>Strongly Disagree</i>	<i>Mostly Disagree</i>	<i>Disagree</i>	<i>Neither Disagree Nor Agree</i>	<i>Agree</i>	<i>Mostly Agree</i>	<i>Strongly Agree</i>	<i>Not Applicable</i>

1. When developing my direct reports, the opportunity to do challenging work is important to me.
2. When developing my direct reports, if I fail to complete a difficult task, I plan to try harder the next time I work on it.
3. When developing my direct reports, I prefer to work on tasks that force me to learn new things.
4. When developing my direct reports, the opportunity to learn new things is important to me.
5. When developing my direct reports, I do my best when I'm working on a fairly difficult task.
6. When developing my direct reports, I try hard to improve on my past performance.
7. When developing my direct reports, the opportunity to extend the range of my abilities is important to me.
8. When developing my direct reports, when I have difficulty solving a problem, I enjoy trying different approaches to see which one will work.

Table 4. *Core Self-Evaluation Scale (Judge et al., 2003)*

**Directions:** Below are several statements about you with which you may agree or disagree. Please indicate your level of agreement or disagreement with each item ***only in relation to how it describes your role as a leader managing your direct report(s).***

1	2	3	4	5	N/A
<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Strongly Agree</i>	<i>Not Applicable</i>

1. I am confident I get the success I deserve in life.
2. Sometimes I feel depressed. (r)
3. When I try, I generally succeed.
4. Sometimes when I fail I feel worthless. (r)
5. I complete tasks successfully.
6. Sometimes, I do not feel in control of my work. (r)
7. Overall, I am satisfied with myself.
8. I am filled with doubts about my competence. (r)
9. I determine what will happen in my life.
10. I do not feel in control of my success in my career. (r)
11. I am capable of coping with most of my problems.
12. There are times when things look pretty bleak and hopeless to me. (r)

*Note.* (r) = reverse-scored.



Table 5. *Demographic Items*

1. A “direct report” is an employee who is directly subordinate to you and who reports directly to you on tasks, responsibilities, and for feedback purposes. Additionally, they are an employee whose career/job development and/or performance management is your direct responsibility to manage. For example, you may be responsible for generating their performance and development goals, providing them with project feedback, or filling out their annual reviews (if your organization has such a performance management system in place).

How many direct reports do you currently have?

(1) \_\_\_\_\_ Direct Reports

2. What is your gender?

(1) Male (2) Female (3) Other/Prefer not to say

3. Which of the following best describes your position?

1. Individual contributor
2. First-level supervisor
3. Mid-level manager
4. Senior management
5. Chief officer/Executive
6. N/A Not applicable

4. What is your current job title?

(1) \_\_\_\_\_

5. How old (in years) are you?

(1) \_\_\_\_\_

Table 6. *Outlier Analysis Formulas*

Analysis Name	Formula	Cut-off
Mahalanobis distance	<i>On chi-square statistics table:</i> find <i>df</i> equivalent to the number of predictors and select a <i>p</i> -value to determine the <i>F</i> statistic cut-off	<i>p</i> = .001: 16.27 <i>p</i> = .01: 11.35 <i>p</i> = .05: 7.82
Cook's distance	$4/(N - k - 1)$	0.0267
Leverage points	$(2k + 2)/N$	0.0519

*Note.*  $N = 154$ ,  $k = 3$ .

Table 7. Means, Standard Deviations, Correlations, and Scale Reliabilities

	Mean	Centered Mean	Standard Deviation	1	2	3	4
1. Number of Direct Reports	7.23	-.0040	7.35	--			
2. Introversion/Extraversion	10.77	.0040	4.66	-.01	(.82)		
3. Learning Goal Orientation	5.78	0	0.79	.08	.06	(.84)	
4. Core Self-Evaluation	3.85	-	0.55	-.12	.17*	.15	(.83)

*Note.*  $N = 146$ . Introversion/Extraversion was measured with the Eysenck Personality Inventory (Eysenck & Eysenck, 1964), Learning Goal Orientation was measured with the Learning Goal Orientation scale from Button et al. (1996)'s Goal Orientation Scale, and Core Self-Evaluation was measured with the Core Self-Evaluation Scale (Judge et al., 2003). \* $p < .05$ .

Table 8. *Comparison of Descriptive Statistics of Introverted and Extraverted Participants*

Variable	I/E	N	Range	Minimum	Maximum	Mean	SD
NoDR	Introvert	78	42	1	43	7.14	7.56
	Extravert	68	42	1	43	7.32	7.15
Gender	Introvert	78	2	1	3	1.53	.55
	Extravert	67	1	1	2	1.51	.50
Position	Introvert	75	5	1	6	3.39	1.38
	Extravert	67	5	1	6	3.36	1.10
Age	Introvert	75	50	23	73	40.47	11.53
	Extravert	66	43	23	66	39.39	11.45
EPI Score	Introvert	78	11	0	11	7.32	3.21
	Extravert	68	9	12	21	14.74	2.30
LGO Total	Introvert	78	3.38	3.63	7.00	5.66	.82
	Extravert	68	2.88	4.13	7.00	5.92	.73
CSE Total	Introvert	78	2.83	2.17	5.00	3.76	.59
	Extravert	68	2.25	2.58	4.83	3.95	.48

*Note.* NoDR = Number of Direct Reports. EPI = Eysenck Personality Inventory extraversion scale. LGO = Learning Goal Orientation. CSE = Core Self-Evaluation. Gender: Male (1), Female (2), Other/Prefer Not to Say (3). Position: Individual contributor (1), First-level supervisor (2), Mid-level manager (3), Senior management (4), Chief officer/Executive (5), N/A (6). The Introversion/Extraversion spectrum was arbitrarily dichotomized for the purposes of this representation; Introverts scored 0-11 on the EPI, while Extraverts scored 12-24.

Table 9. *Linear Regression Analysis Estimates for CSE Regressed on NoDR and I/E*

Model and Variable(s)	$R^2$	$\Delta R^2$	$\Delta F$	$B$	$SE$
<b>Step 1</b>					
NoDR				-0.009	0.006
I/E	0.043*	0.043*	3.20	0.020	0.010
<b>Step 2</b>					
(Constant)				3.85	0.045
NoDR x I/E	0.056*	0.013	1.97	0.002	0.001

*Note.*  $N = 146$ . NoDR = Number of Direct Reports. I/E = Introversion/Extraversion. All variables are centered. \* $p < .05$ .

Table 10. *Quadratic Regression Analysis Estimates for CSE Regressed on NoDR and I/E*

Model and Variable(s)	$R^2$	$\Delta R^2$	$\Delta F$	$B$	$SE$
<b>Step 1</b>					
NoDR				-.009	.006
I/E	0.043*	0.043	3.20*	.020	.010
<b>Step 2</b>					
NoDR x I/E				.002	.001
NoDR <sup>2</sup>	0.056	0.013	0.98	-.00005	.000
<b>Step 3</b>					
(Constant)				3.85	0.051
NoDR <sup>2</sup> x I/E	0.065	0.009	1.37	.000	0.000

Note.  $N = 146$ . NoDR = Number of Direct Reports. I/E = Introversion/Extraversion. All variables are centered. \* $p < .05$ .

Table 11. *Linear Regression Analysis Estimates for CSE Regressed on NoDR, I/E, and LGO*

Model and Variable(s)	$R^2$	$\Delta R^2$	$\Delta F$	$B$	$SE$
<b>Step 1</b>					
NoDR				-.010	.006
I/E				.019	.010
LGO	.065*	.065	3.27*	.103	.057
<b>Step 2</b>					
NoDR x I/E				.001	.001
NoDR x LGO				.003	.009
I/E X LGO	.106*	.041	2.13	.026	.013
<b>Step 3</b>					
(Constant)				3.84	.043
NoDR x I/E x LGO	.151**	.045	7.36**	.005	.002

*Note.*  $N = 146$ . NoDR = Number of Direct Reports. I/E = Introversion/Extraversion. All variables are centered. \* $p < .05$ , \*\* $p < .01$ .

Table 12. *Quadratic Regression Analysis Estimates for CSE Regressed on NoDR, I/E, and LGO*

Model and Variable(s)	$R^2$	$\Delta R^2$	$\Delta F$	$B$	$SE$
<b>Step 1</b>					
NoDR				-.010	.006
I/E				.019	.010
LGO	.065*	.065	3.27*	.103	.057
<b>Step 2</b>					
NoDR x I/E				.001	.001
NoDR x LGO				.004	.009
I/E x LGO				.026	.013
NoDR <sup>2</sup>	.106*	.042	1.61	.000	.001
<b>Step 3</b>					
NoDR x I/E x LGO				.005	.002
NoDR <sup>2</sup> x I/E				.00002	.000
NoDR <sup>2</sup> x LGO	.158**	.051	2.74*	-.001	.001
<b>Step 4</b>					
(Constant)				3.831	.052
NoDR <sup>2</sup> x I/E x LGO	.181**	.023	3.79	.000	.000

*Note.*  $N = 146$ . NoDR = Number of Direct Reports. I/E = Introversion/Extraversion. All variables are centered. \* $p < .05$ , \*\* $p < .01$ .



Table 13. *Frequency Table Depicting Number of Cases per NoDR*

NoDR	Frequency	Percent	Valid Percent	Cumulative Percent
1	10	6.8	6.8	6.8
2	16	11	11	17.8
3	21	14.4	14.4	32.2
4	25	17.1	17.1	49.3
5	10	6.8	6.8	56.2
6	10	6.8	6.8	63.0
7	6	4.1	4.1	67.1
8	9	6.2	6.2	73.3
9	7	4.8	4.8	78.1
10	5	3.4	3.4	81.5
11	5	3.4	3.4	84.9
12	5	3.4	3.4	88.4
13	1	0.7	0.7	89.0
14	2	1.4	1.4	90.4
15	2	1.4	1.4	91.8
16	1	0.7	0.7	92.5
17	1	0.7	0.7	93.2
18	1	0.7	0.7	93.8
21	1	0.7	0.7	94.5
22	2	1.4	1.4	95.9
30	3	2.1	2.1	97.9
35	1	0.7	0.7	98.6
43	2	1.4	1.4	100.0
Total	146	100	100	

*Note.* NoDR = Number of Direct Report(s).  $N = 146$ .