Intellectual Humility and Arrogance and Their Relationship with Self-Awareness: A Longitudinal Analysis of Congruency Through Self / Other Evaluations

by

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Abstract

Character and leadership have long coupled to show benefits to organizations and their personnel. During the near century of modern leadership study, psychologists have focused on dozens of leader traits with an infusion of new traits of interest like general humility (GH) surfacing with the inception of the positive psychology movement. Over the past two decades, the benefits of GH to organizational success are well documented in folk and scholarly literature (Collins, 2001; Owens et al., 2011; Owens & Hekman, 2012; Owens et al., 2013a, 2015b, 2016c). Research in GH has garnered interest in related constructs like intellectual humility (IH) and contrasting intellectual arrogance (IA). The emergence of IH as a psychological construct of interest occurred only within the past 10 years. Because of this, much remains to learn about the trait and its components. The purpose of this dissertation is to empirically examine IH and IA and their relationship with self-awareness (SA), a theorized principal component of IH. To do this, a longitudinal analysis was conducted to examine the relationship between IH and IA with self-awareness using path analysis and linear latent growth analysis. Self-awareness is determined utilizing congruence-*d* to measure the congruence between self and other reports. For this study, self-awareness is defined in two variables of congruency. The first is between self and peer while the second is determined between self and the participant's cadet chain of command (CoC) reports.

In this paper, the theoretical conceptualizations and empirical research related to GH, IH, IA, and SA are discussed to framework theory, identify knowledge gaps and potential impact of IH in leader and organizational performance. To establish common understanding of the constructs themselves and their relationship with each other, the folk and scholarly conceptualizations of GH, IH, IA, and SA are discussed. This discussion identifies the common

definitions used for the variables of interest for this study prior to an overview of empirical research on IH. The IH literature review consists of two parts with the first focused on existing IH measurements and IH implications for leadership. With little empirical research existing directly linking IH and IA to leadership and organizational performance, a brief synopsis of empirical findings within leadership and organizational literature for their parent domains of GH and arrogance is provided. Concluding the literature review is a summary of SA literature as defined as self-other agreement (SOA) followed by the hypotheses centered on the IH and IA relationship with SA.

The purpose of this study was to determine if SA is a component element of IH. To do this, the IH, IA, and SA of 201 Cadets who attend the United States Military Academy (USMA) at West Point, was collected at a total of six data collection time periods, three times per each variable with IH and IA collected together, and the SA variables collected simultaneously. The variables were then examined through cross-lagged path analysis to assess potential relationships between IH and IA with SA determined by self-peer congruency and SA determined by self-CoC congruency. Following this, the growth patterns for each variable were analyzed and compared utilizing linear latent growth modeling. The findings were inconclusive. Although there exist relationships between IH and the SA variables and a smaller amount between IA and the SA variables, the strength of the significant relationships are small and inconsistent. More research is needed to further study the relationship between IH / IA with SA.

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List of Abbreviations

ADP	Army Doctrine Publication
CAPS	Cumulative Academic Program Score
CCDP	Cadet Character Development Program
CMPS	Cadet Military Performance Score
COC	Chain of Command
CPPS	Cadet Physical Program Score
CQPA	Cadet Quality Point Average
GH	General Humility
IH	Intellectual Humility
IA	Intellectual Arrogance
IO	Intellectual Openness
MI	Multiple Imputation
NCT	New Cadet Training
OIR	Office of Institutional Research
PDR	Performance Development Report
SA	Self-Awareness
TAC	Tactical Officer
USMA	United States Military Academy

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Chapter 1: Introduction

"A fool thinks himself to be wise, but a wise man knows himself to be a fool." -Shakespeare

The construct, humility, has recently gained interest in the field of psychology. This interest in humility parallels the evolution of technology and proliferation of social media platforms designed to enable personal postings on a spectrum of topics where opinions become "facts" and misinformation about oneself and life. These advancements in technology and information growth create a new set of challenges for organizational leaders. Organizational leaders must unite diversified teams effectively towards common goals. To lead teams of today, organizations are in search of adaptable leaders and personnel who possess the right combination of attributes to ensure company relevance and continued success. Humility, long studied by theologians and philosophers, has often been associated with open-mindedness and willingness to hear alternative perspectives (Collins, 2001; Morris et al., 2005; Owens et al., 2013; Tangney, 2000; Van Tongeren et al., 2016). Therefore, it has gained traction as a virtue of interest among both organizational researchers and practitioners.

Humility gained recognition as a construct of individual and organizational importance with the advent of positive psychology in the late 1990s (Gable and Haidt, 2005). Martin Seligman, American Psychological Association (APA) President at that time, wanted to balance study within psychology to focus not only on human ails but also human fulfillment (Seligman, 1999). The inception of the positive psychology movement was quickly followed by the seminal work of June Tangney (2000). Tangney proposed humility as a multi-faceted construct with six, interdependent dimensions which categorize within intrapersonal and interpersonal processes that enable a deliberate forgetting of self and focus on others. Organizational researchers such as

Collins (2001) began to study the value of humility as well. Collins (2001) summarized research conducted to distinguish good from exceptional firms. A major conclusion was that "great" organizations shared a secret ingredient, humble leaders. Since that time, an increasing number of scholars have demonstrated its individual and collective impact within organizations (Exeline & Geyer, 2004, Nielsen & Marrone, 2018, Owens et al., 2010a, 2011b, 2013c, Owens & Hekman, 2016, Wang et al., 2018). In 2020, the United States Army incorporated humility as a formal attribute into its leadership development doctrine, acknowledging its potential for positive impact for both leaders and those they lead (ADRP 6-22, 2019).

The United States Army's recent formal recognition of humility as an important attribute of leadership is in stark contrast to a national canvas of polarized discourse where respect for others and open-mindedness are often clouded with subjective accounts of expertise based on the vast availability of information at the swipe of a finger. Baehr (2011) and Roberts and Wood (2007) suggest that humility, or general humility (GH), may include several sub-domains like those found within intelligence or self-efficacy (Davis et al., 2016). The subdomain of intellectual humility (IH) is theorized to be more specific than humility and focus on one's knowledge and intellectual influence. Those having higher levels of IH are theorized to show a greater tolerance for diversity in polarizing topics like religion and politics (Hook et al., 2017; Zhang et al., 2015a, 2018b). Increased tolerance and openness to others is thought to stem from the humble person's accurate self-evaluation and understanding of her strengths and limitations (Owens et al., 2011). For the wise leader, as Shakespeare states, understands themself "to be a fool." Intellectual humility is still in its infancy as a construct of study but the potential for increased understanding and subsequent impact are promising, especially for leaders desiring to

unite diverse people, with potentially polarizing public beliefs, into effective and successful teams.

The intended purpose of this research is to determine whether those high in IH possess self-awareness as determined by greater self/other report congruency compared to those high in intellectual arrogance (IA). Before this relationship can be assessed, a construct review is provided of general humility (GH), intellectual humility (IH), intellectual arrogance (IA), and self-awareness. Next, empirical evidence of these constructs is reviewed with findings that support a closer examination of self-awareness and its relevance to IH and IA. The literature review generates support for this study which examines the longitudinal development of IH and IA relative to self-awareness. This study uses archival data from a longitudinal leadership study as well as administrative data, to include self / other evaluations and demographic information, conducted at the United States Military Academy at West Point. The analysis is provided and results discussed along with implications for organizations seeking integration of IH into their personnel selection and training programs. Finally, recommendations for future research are provided.

General Humility

General humility (GH) has a rich history from classical to modern times. Philosophers and theologians' pursuit of knowledge and truth have placed GH as a central principle among world religions and philosophical discussions of morality (Owens et al., 2010). However, some scholars have asserted humility is not a virtue but a vice, an assertion which is supported based on the varying folk and scholar definitions throughout history (Kellenberger, 2010; Weidman et al., 2018). These contrasting ideas influence common understanding of the term and challenge psychologists who seek consensus to appropriately measure and study the construct. The next

section examines GH as defined in common usage and provides a discussion of its theorized intrapersonal and interpersonal dimensions as seen in psychological research.

GH in Common Usage

Humility as a word traces back to the Latin root *humilitas* which means “insignificance”, “unimportance”, “debasement”, “humiliation”, or “submissiveness” (online Oxford Dictionary, 2021). These are words which, from a secular, western perspective, connote weakness or shortcomings. However, the word *humilitas* originates from the Latin word *humus*, a noun which translates to “Earth, soil, ground” (online Etymologeek, 2021). These root words can be found within colloquialisms like “down to Earth” and “well grounded” which characterize the targeted individual as possessing no “illusions or pretentions; practical and realistic,” overall positive characteristics (online Oxford Languages, 2021). The original roots of humility, therefore, are related to the issue of whether GH is a virtue or a vice. Other modern definitions share a similar individual outlook where the humble person is “not proud or haughty” (Webster, 1988); “modest” (online Dictionary.com, 2021); and possessing a “freedom from arrogance” (online Merriam-Webster, 2021).

The definition of humility, “freedom from arrogance”, establishes a potential change in the view of GH from an intrapersonal construct, where the focus is on the individual and her vision of self, to include a more interpersonal definition (online Merriam-Webster, 2021). Here GH is related to processes which describe how the humble person sees others and reacts to how others see her (Argandona, 2015). Arrogance is defined as “an insulting way of thinking or behaving that comes from believing that you are better, smarter, or more important than other people.” (online Merriam Webster, 2021). In the case of arrogance, the individual is no longer

introspective but making an external comparison between self and "other" which is inherent in the definition of arrogance.

Other definitions of humility either directly or indirectly infer a similar comparison between self and "other". This can be seen in the definition of humble which is described as "reflecting, expressing, or offered in a spirit of deference or submission"; "ranking low in a hierarchy or scale"; a "low social, administrative, or political rank"; "having a modest or low estimate of one's own importance" (Oxford Languages, 2021). Most researchers conceptualize humility as consisting of intrapersonal and interpersonal processes. However, there is more agreement on the former than the latter (McElroy- Heltzel et al., 2019).

The definition of GH leads to the conclusion that there are multiple dimensions within the intrapersonal processes of general humility which overall characterize the humble person's view of self as accurate, truthful, and positive (McElroy-Heltzel et al., 2019; Tangney, 2000; VanTongeren et al., 2019). Accuracy is at the heart of what scholars argue is fundamental to the intrapersonal processes – self-knowledge. It is the accuracy in self-knowledge which fuels the refutation of one of the largest misconceptions of GH, its synonymity with modesty.

Folk understanding of GH often leads to the use of GH interchangeably with the term modesty despite clearly distinguished differences between the two constructs (Exeline & Geyer, 2004). Woodcock (2008) defined modesty as the quality of being unassuming or otherwise having a moderate estimation of oneself. In displaying modesty, people underrepresent their own positive traits, contributions, and expectations (Cialdini and de Nicholas, 1989). According to Driver (1989), it is the 'dogmatic disposition' to underestimate one's worth which distinguishes a modest person from a humble person. She asserts that a humble person ably paints an accurate picture of herself while a modest person not only needs to underestimate her excellence but also

demonstrates a resistance to believing it. If a modest person is presented evidence establishing all her strengths, she will still refuse to believe it (Roberts and Wood, 2007). Tangney (2017) adds to the distinction between the two terms and states that modesty is both too narrow and too broad to be used synonymously with GH. To Tangney (2000), modesty is absent the interpersonal component present in GH and includes a dimension of propriety absent in GH. She emphasizes that GH is neither low self-esteem nor self-deprecation (Nielson & Marrone, 2018). Thus, modesty fails to accurately replicate the self-knowledge accuracy found in definitions of GH.

Intrapersonal GH

Self-knowledge as a core intrapersonal component represents underlying processes of self-awareness (Nielsen & Marrone, 2018; Owens & Heckman, 2016; Owens et al., 2013; Nielsen et al., 2010; Morris et al., 2005), self-evaluation (Rowatt et al., 2002; Tangney, 2000) and self-acceptance (Nielsen & Marrone, 2018; Morris et al., 2005; Tangney, 2000). To truly "Know Thyself", as commanded at the entrance stone at Apollo's temple in Delphi, requires a series of processes which are only theorized to date as components. Argandona (2015) is among the few who identify these processes in a chronological order within the intrapersonal dimension and identifies them as "self-knowledge", "self-evaluation", and "self-respect" with "self-knowledge" at the core. It is this awareness of status, knowledge, capabilities, strengths, mistakes, and limitations (Exeline & Geyer, 2011; Nielsen et al., 2010; Snow, 1995; Tangney, 2002) which enables the individual to make an impartial judgment about themselves. It is this judgment and subsequent self-evaluation of the individual's truth[1] that leads to an informed self-respect which motivates the individual to improve (Argandona, 2015; Wardle, 1983). Morris et al. (2005) contend that the process of understanding strengths and limitations includes the

[1] Seen as objective fact absent of regulated opinion or seductive emotions (Wardle, 1983); or candid self-knowledge gained through recognition of the limitations of one's soul before God (Fullam, 2014).

absence of desire to overestimate oneself and is supported by an enduring orientation to objectively appraise one's abilities and limitations. Owens et al. (2011) also reflect a similar understanding in their first of three proposed GH dimensions. They describe this dimension as the capacity or willingness to self-evaluate without positive or negative exaggeration, leading to a more accurate, non-defensive, objective self-view.

The humble person's objective self-evaluation involves measurement against a standard with cognitive and affective outcomes. Argandona (2015) suggests that the humble person's active, continuous disposition to examine herself demands a benchmark against which she can compare herself. He proposes four potential standards which include what she owes to others (God, parents, friends, colleagues, society in general); how she compares to personal, professional, technical or moral standards of others; comparison with a reality greater than what she has attained; or acknowledging a higher objective that enables her shift to other people, projects, or realities. Through the awareness of one's limitations and possibilities of higher ideals, Weidman et al. (2018) argue that there is a darker side of humility in which the humble either demonstrate appreciative humility or self-abasing humility. The latter is elicited by personal failure, involves negative self-evaluations and not seeking opportunities to be known, and is linked to emotional and personality dispositions such as shame, low self-esteem, and submissiveness (Weidman et al., 2018; Argandona, 2015). Others suggest that humility is at the midpoint or "crest of human excellence between arrogance and lowliness" or low self-esteem (Morris et al., 2005, 1331; Vera & Rodriquez-Lopez, 2004), inferring a virtuous status by its placement between vices. Snow (1995) suggests that there is a disposition to allow the awareness of a concern about one's limitations to have a realistic impact on one's attitude and behavior, suggesting humility possesses cognitive and affective conative elements. Others suggest that in

her awareness, a humble individual gains an appreciation of her worth and limit, which enable despair avoidance and the impetus for action. It is this catalyst for action which drives the humble person to focus outward towards the proverbial "other".

Interpersonal GH

The interpersonal dimension of GH is "other" related and is also theorized to contain multiple components. Argandona (2015) proposes the interpersonal dimension can be seen in two ways. The first is how the humble person expects or desires to be treated by others and the second is how the humble person judges others. It is the interaction between the humble person and others where humility is developed, catalyzed, and strengthened in the exchange of information, feedback, and criticism through active listening, seeking counsel, judging others, and allowing oneself to be known (Argandona, 2015). Unlike Argandona, Tangney (2017) does not infer a causal sequence with her proposed dimensions but sees them as interdependent, overlapping, and informing one another. Four of her six proposed GH dimensions could be categorized as interpersonal: low self-focus; openness to new ideas; keeping one's place in the world in perspective; and possessing an appreciation for others. These dimensions serve as general themes which unite disparate scholarly propositions on the interpersonal processes as a dimension of GH.

Low self-focus as a component of interpersonal processes balances the GH spectrum against the vices of vanity, narcissism, and arrogance, which center on the humble individual's regard for others. Roberts and Wood (2007) define vanity as the excessive concern to be well regarded by other people for the social status it confers. Vain individuals are hypersensitive to others' views, demonstrating an excessive concern for others' opinions and approval. The vain person is enslaved to others' opinions and lacks the objectivity found in the humble individual

who seeks truth in feedback (Roberts and Wood, 2007). Where the vain are about appearances, the narcissists, often associated with vanity and opposite of humility, encompass more (Egan and McCorkindale, 2007). Although the vain person may be frustrating, the narcissist can be malignant. From a clinical viewpoint, a narcissist suffers from Narcissistic Personality Disorder (NPD) which consists of "a pervasive pattern of grandiosity, need for admiration, and lack of empathy" (online American Journal of Psychiatry, 2021). To the clinician, a narcissist is a seriously disturbed person with a damaged sense of self. For social psychologists, conceptualizations of narcissists center on grandiosity, overestimation of one's abilities, and an exaggerated sense of self-importance (Tangney, 2002). Neither definition is compatible with the concept of GH, but the absence of narcissism within an individual does not equate to the presence of humility (Tangney, 2000). Owens et al. (2015) argue that the presence of narcissism does not equate to the absence of humility, identifying an association between leader effectiveness and the interaction between leader narcissism and humility. Although aspects of narcissism may have beneficial associations, its contrast with humility and association with arrogance still defines it as something GH is not.

Related to narcissism but with greater contrast to GH, arrogance is often viewed as the antithesis of humility. Robert and Woods (2003, p. 243) define arrogance as "a disposition to 'infer' some illicit entitlement claim from a supposition of one's superiority and to think, act, and feel on the basis of that claim." Arrogance emphasizes one's qualities and worth are superior to those of others (Hareli and Weiner, 2000). Johnson et al. (2010, p. 346) similarly define workplace arrogance as "an individual's tendency to engage in behaviors that convey an exaggerated sense of superiority" which manifest in a number of workplace behaviors. Some of these might include devaluing other people's ideas, discounting feedback, disparaging others

publicly or claiming to know things she does not (Borden et al., 2017). Arrogance is often defined by interpersonal behavior aforementioned and characterized by dominance, superiority, and sometimes anger (Borden et all, 2017). However, the humble do not possess a strong need to either self-enhance or dominate others (Peterson & Seligman, 2004). Where the arrogant individual is compelled to dominate and reinforce their superiority through elevating self and subjugating others, the humble person, owning her limitations, is motivated in her orientation to learn from others as vessels of truth and knowledge. Like narcissism, just because an individual is low or absent of arrogance does not make them humble by default. However, it is believed that a person cannot both possess humility and arrogance because an arrogant person has an inaccurate knowledge of self; are self-centered and self-focused; and absent an "other" orientation.

The focus on others and forgetting of self is theoretically linked to openness to new ideas and possessing an appreciation for others (Nielsen & Marrone, 2018; Owens et al., 2011; Tangney, 2017). In a study which examined the compilation of organizational research on humility, Nielsen and Marrone (2018) found that, second to accurate self-awareness, that respondents identified openness to new ideas / teachability and appreciation of others and their strengths and contributions as humility components which emerge in organizational research. Whitcomb et al. (2017) argues that for an individual to properly adapt, she must understand her own strengths and weaknesses to survive in a complex, dynamic and challenging environment. Because of this awareness, the individual is open to ideas and a focus on others as exemplars of strengths she does not possess.

The final proposed component within the interpersonal process is the idea that the humble keep their place in the world in perspective. Among ancient Greeks, it was believed that

every human should not tempt fate by overstepping the boundary established by nature, exceeding limits, and rivaling the Gods (*hybris*). Chappell (2021) argues *hybris* avoidance is exactly the point of Socrates famous claim, "I neither know nor think that I know." Like their polytheistic, ancient Greek counterparts, the Judeo Christians believe a boundary exists between humans and their God who they see as the Creator of Heaven and Earth. The Judeo-Christian sees her God as omnipresent (Ps 139: 7-12) and omnipotent (Gen 17:1) while humans are limited and finite (Matt. 19:26). Therefore, man must not "think of himself more highly than he ought to think, but to think with sober judgment . . ." (Romans 12:3). Nielsen and Marrone (2018, p. 809) found this concept of "transcendence/perspective" identified in six of 11 humility studies focused on organizational settings. Ou et al. (2014) defined humility as a "relatively stable trait that is grounded in a self-view that something greater than the self exists." (Whitcomb et al., 2017). The faith-based concept of self-transcendence, or the acknowledging something greater than the self (Tangney, 2000) leads to "other" focused behavior. Owens and Hekman (2016) suggest their three dimensions of GH: the focus on others' strengths, being open to others' ideas and perspectives, and possessing the willingness to acknowledge one's limits are all manifestations of self-transcendence. It is one's awareness of a larger existence, however defined, which enables an individual's willingness or motivation to focus outside of oneself.

Intellectual Humility

Intellectual humility is a proposed subdomain of general humility (Davis et al., 2016; McElroy et al., 2014). Like GH, IH suffers from a lack of consensus on its general character, construct definition and identified dimensions. Intellectual humility is thought to differentiate from GH in its specificity (Ballantyne, 2021; McElroy et al., 2014). Where GH is thought to relate to behavior and one's accuracy in self-perceptions across relationships and all situations, IH is thought to relate specifically to one's perceptions of self-knowledge, beliefs, opinions, and

ideas in specific settings (Hook et al., 2017; Krumrei-Mancuso, 2017). Davis et al. (2015) found evidence to support this concept in a series of studies which found IH and GH latent constructs were related but distinct; IH more accurately predicted behavior in contexts associated with being a fair negotiator of ideas; and predicted openness to experience after controlling for GH while the reverse was untrue. Gregg and Mahadevan (2014, p. 8) further explain the difference between GH and IH through their emphasis that the specificity in IH reflects an "intermediate and realistic evaluation of one's epistemic capacities", as opposed to an intermediate and realistic evaluation of an individual's general capacities. With research on IH only emerging within the last decade in the field of behavioral sciences, there remains a dearth of empirical research to address conceptual inconsistencies. In the upcoming section, varying IH definitions are examined and themes discussed, to include the relationship between IH and IA. To conclude this section, a working definition of IA is provided.

Epistemic Virtue

Intellectual humility definitions originate within the philosophical consideration of intellectual humility as an epistemic virtue. Epistemic is defined as "of or relating to knowledge or knowing" and epistemology as the "study or theory of the nature and grounds of knowledge especially with reference to its limits and validity" (online Merriam-Webster, 2021). Roberts and Wood (2007, p. 33) posit that epistemology is the study of knowledge and their associated epistemic goods which they summarize as "warranted true belief", "acquaintance", and "understanding". These epistemic goods are best understood as the aims to intellectual activities with warranted beliefs associated with the traditional idea of collecting information and facts. Information and "facts" are associated with processes which both give and improve reason to believe that they are true. However, individuals do not always aim to improve warranted beliefs

but pursue experiences to become “acquainted” with something. For example, a war correspondent embeds with a tactical, infantry platoon during a conflict to gain a better sense for conditions underlying foreign policy. The correspondent’s experience with the unit and Soldiers supplements their knowledge. This experience may inform current beliefs, but this is not necessarily the aim. As Roberts and Wood (2007) identify, the individual enriches their knowledge of the conflict whether they gain or improve the warrant for their beliefs, and that this focus and attention over time enables the individual to attain a deeper understanding. When epistemology and virtue are combined, the product is theorized excellent human functioning which can be found within theorized intellectual virtues (Church and Samuelson, 2016; Roberts and Wood, 2007).

Virtues are most frequently thought of as realizations or perfections of human nature (Tanesini, 2018). Scholars believe there may be as many as four categories of character virtue: moral, civic, performance, and intellectual (Murray, 2019). Baehr (2016) identifies a commonality in historical texts which suggest personal character as not only having a moral and civic orientation but also an intellectual one, specifically an epistemic orientation. Although there is no agreement on the nature of virtue, it is believed that intellectual virtues represent the excellences of the intellectually humble. Roberts and Wood (2003) argue IH is a virtue because the:

> . . . acquisition, maintenance, transmission, and application of knowledge are integral parts of human life, and a life characterized by humility with respect to these activities, as well as many other activities, is a more excellent life than one that lacks it. (p. 272)

This process is not strictly a matter of cognitive ability but the function of multiple factors. Baehr (2016, p. 3) distinguished between raw cognitive ability and epistemic excellence. He characterizes the latter as “robustly volitional, desiderative, and affective”. Overall, virtue

epistemology focuses on the processes in which beliefs are formed and whether the beliefs were formed by an "intellectually virtuous knower" (Church and Samuelson, 2017, p.5).

Foundational definitions of IH begin within the field of philosophy and the study of epistemic virtues. Roberts and Wood (2003, p. 258; 2007) provide the first, contemporary conceptualization of IH as an epistemic virtue by contrasting it against a number of vices, summarized as "proper pride", but focus specifically on the vices of vanity and arrogance. The possession of these vices infers a type of concern for social status which may explain why Roberts and Wood define IH by contrast (Church and Samuelson, 2017). Roberts and Wood (2007) define IH as:

> an unusually low dispositional concern for the kind of self-importance that accrues to persons who are viewed by their intellectual communities as talented, accomplished, and skilled, especially where such concern is muted or sidelined by intrinsic intellectual concerns-in particular, the concern for knowledge with its various attributes of truth, justification, warrant, coherence, precision, load-bearing significance, and worthiness. [IH] is also a very low concern for intellectual domination in the form of leaving the stamp of one's mind on disciples, one's field, and future intellectual generations. (p. 250)

However, the definition of IH as simply the opposite of an intellectual vice negates the idea that virtues can be in excess (Church and Samuelson, 2017; Kapstein, 2017). Church and Samuelson (2017) argue that a person highly accomplished in their field not concerned with intellectual social importance and status may defer to someone significantly less qualified which is not virtuous. They argue (2017, p.10) that IH may be best conceived as a "virtuous mean" between intellectual arrogance and intellectual diffidence. To Church and Samuelson (2017, p. 7), an intellectually humble individual neither overvalues nor undervalues their beliefs but rather "values her beliefs, their epistemic status, and her intellectual abilities as she ought". The term "ought" infers the possessor is accurately assessing their beliefs, epistemic status and intellectual abilities. That they are right to value them appropriately. This definition contrasts against the

more one-sided definition of Whitcomb et al. (2017, p. 20) who define IH as the "proper attentiveness to, and owning of, one's intellectual limitations". In this definition, the accuracy and ownership of assessment is only on the possessor's intellectual limitations and not for their strengths. Whitcomb et al. (2017) see the ownership of strengths in another virtue altogether. From these definitions, some themes emerge in the conceptualization of IH: an accurate understanding of self-knowledge and an external focus on others.

Conceptualizations of IH all contain a direct or inferred variation of self-knowledge. Self-knowledge is absent in Roberts and Wood (2003a; 2007b) IH definition. However, in the explanation of their account, Roberts and Wood (2007, p. 239) state that "the humble person is not ignorant of their value or status, but in a certain way 'unconcerned' about it". This acknowledgement demonstrates an understanding that underlies their definition and highlights what other definitions state more explicitly like Church's (2016, p. 427) doxastic account of IH. He proposes, "[IH] is the virtue of accurately tracking what one could non-culpably take to be the positive epistemic status of one's own beliefs." This definition adds to Church and Samuelson (2017) definition to negate potential weaknesses in their argument based on word meaning like: "values" and "ought". Church (2016) identifies that "values" (p. 424-425) should not be a value of belief firmness but rather relevant reasons, evidence, or justifications which he calls, "positive epistemic status". Hazlett (2012, p. 220) also sees IH as a "disposition not to adopt epistemically improper higher order epistemic attitudes, and to adopt (in the right way, in the right situations) epistemically proper higher-order epistemic attitudes." Although Hazlett's definition identifies IH as an attitude rather than as a disposition (Church, 2016), the focus remains on the accuracy of self-knowledge. Both Barrett (2017) and Ballantyne (2021) identify accurate self-assessment as a shared theme among the multitudes of IH definitions like: a

realistic evaluation of one's epistemic capacities (Gregg & Mahadevan, 2014); "an accurate view of one's intellectual strengths and limitations" (Davis et al., 2016); "non-threatening awareness of one's intellectual fallibility" (Krumrei-Mancuso et al., 2020). It is this last definition which returns to Whitcomb et al. (2017) who underscore the importance of owning one's limitations.

Ownership of intellectual limitations is a key concept for IH and its self-knowledge dimension. Although some scholars find the focus on accurate understanding of limitations limited (Church & Samuelson, 2017), it is the acknowledgement that one's cognitive faculties are not perfect and can be erroneous which is important, especially when combined with the concept of ownership (Krumrei-Mancuso, 2017). Ownership of one's fallibilities in beliefs requires the individual to attribute these limitations to oneself rather than to something external (Whitcomb et al., 2017). When this occurs, the individual is more likely motivated to mitigate the impacts of these fallible beliefs and pursue behaviors which correct them. Whitcomb et al. (2017, p. 521-524) suggest the limitations-owning definition provides plausible predictions about IH to include: the intellectually humble person is more likely to admit her limitations to self and others; defer to others without similar intellectual limitations; increase likelihood to either revise or reduce confidence in cherished belief when presented with legitimate evidence; and increase likelihood to include alternative ideas. In essence, the ownership of one's intellectual limitations is theorized to induce open-mindedness (Speigel, 2012). According to Speigel (2012), as the intellectually humble become more aware of their fallible beliefs, they become more willing to consider alternative perspectives on a range of topics. This willingness even includes those beliefs which reflect their core convictions. Ultimately, they are motivated to look for insights and alternative views that oppose their own. An unwillingness to pursue alternative or contrary evidence to their own view manifests itself as closemindedness whether from a defense

mechanism, general ignorance, or the type of ignorance born from beliefs of superiority and associated with arrogance. The humble person will become more eager to recognize, or at least look for, insights in alternative views, including those that directly oppose their own. McElroy et al. (2014) also suggest that the insight into the limits of one's knowledge is marked by openness to new ideas which are found externally in others.

External focus on others is another frequently found theme among IH definitions. Scholars like Porter and Schumann (2018) characterize IH by an individual's awareness of one's intellectual fallibility and a willingness to appreciate others' intellectual strengths. Krumrei-Mancuso et al. (2020) posit that the individual's knowledge of their own cognitive imperfections enables them to critically assess and remain open to information which may improve their knowledge. They argue that there is a divide between ego and intellect which enables the intellectually humble to feel unthreatened by intellectual disagreements, not overconfident about their knowledge in respect to others' viewpoints, and open to revising their viewpoints when warranted. Hook et al (2017, p. 29) state that the intellectually humble possess the ability to regulate their "concern for being 'right'" and are open to new information and pursuing and incorporating knowledge and truth from other sources, even when it is discrepant from [their] original position". Davis et al. (2016, p. 215) characterize this openness to ideas in their two-part definition of IH which contains the accurate view of one's intellectual strengths and limitations as well as the "ability to negotiate ideas in a fair and inoffensive manner". To Gregg and Mahadevan (2014, p.8), the intellectually humble individual possesses an idealized state of mind, an "unbiased truth-seeker" who pursues the truth without ego. It is the absence of ego which leads IH scholars to define IH by contrast to intellectual arrogance (IA). The presence of ego interrupts and challenges an individual's quest for truth. Those unwilling to question their

knowledge and assert its truth by virtue of being its possessor are embodying the definition of IA.

Intellectual Arrogance

Scholars often include intellectual arrogance within the conceptualization of IH. McElroy et al. (2014) believe that IH involves not only having insight into self-knowledge and intellectual influence but also in its regulation of arrogance. They argue that a key aspect of IH is the ability to both present and receive ideas without offense, regardless of the difference between beliefs shared between self and others. Analyzing the same survey data used in this study, Murray (2019; 2020) examined the longitudinal development of IH utilizing the Intellectual Humility Scale (IHS). The IHS contains two subscales, Intellectual Arrogance (IA) and Intellectual Openness (IO). Murray (2019; 2020) found that participants significantly increased in IA on average whereas their IO remained stationary. Upon closer examination, Murray found two patterned trajectories within IA. One in which IA increased significantly over time with women more likely to have response patterns consistent with this group and another where IA decreased non-significantly. Murray's findings (2019; 2020) are concerning for an institution whose mission is to produce leaders of character and where the development of IH is valued. In the upcoming section, definitions of IA are discussed, the relationship between IA and IH is explored, and the theorized motivations for IA provided.

The definitions of arrogance vary but each shares a theme of ignorance. Roberts and Wood (2007) define arrogance as "a disposition to infer some illicit entitlement from a supposition of one's superiority, and to think, act, and feel on the basis of that claim." Others summarize the arrogant as willfully ignorant of their intellectual limitations or fail to recognize their shortcomings (Haggard et al., 2018) or that they regard "a belief as true simply because it is

one's own" (Gregg and Mahadevan, 2014, p.11). Scholars often conceptualize IH in its relationship with IA. These relationships include IH and IA as opposing ends of the same construct (Whitcomb et al., 2017); a virtuous mean between the vices of intellectual arrogance and diffidence / servility (Haggard et al., 2018; Samuelson et al., 2015); or IH simply as the absence of IA (Gregg and Mahadevan, 2014). The latter is misleading as Gregg and Mahadevan (2014) suggest that the characterization of IH is achieved through triangulation of two possibilities. The first possibility is that IH is the opposite of IA and the second, is that IH is what occurs when IA is absent.

A commonality in the conceptualization of the relationship between IH and IA centers on the individual's acknowledgement of their intellectual limitations. The intellectually humble understand they do not know as much as they think they do and this manifests itself in their openness to other people's views. On the other hand, those who are known as IA are absent, or low, in IH and express insistence that their beliefs are correct, disregarding others' views (Leary et al., 2017). Samuelson et al. (2015) found that folk descriptions of IH and IA were primarily inversely related. Taking a similar view, Gregg and Mahadevan (2014, p. 8) define IH and IA by the absence or presence of "ego-involvement in one's beliefs". Church and Samuelson (2017) characterize someone who possesses IA as someone who is doggedly dogmatic regardless of evidence, dissent, or disagreement. For the intellectually humble, there exists a prioritization to accurately self-assess and possess an awareness of the impact of their epistemic limitations. Haggard et al. (2018) state that those who are lacking IH are either dismissive of criticism (IA) or completely consumed by it (Intellectual Servility (IS)). In sum, there appears to be a consensus that where IA exists, IH does not but from where does the motivation lie to be either?

Scholars vary on theoretical explanations of motivation behind IH and IA. Samuelson et al. (2014) argue that the IH individual pursues education for love of learning while the IA individual uses education to confer social status. Some delineate the difference in motivation between IH and IA as the presence or absence of ego. Gregg et al. (2017) argue that ways of thinking tied to our evolutionary heritage are at the foundation of IA existence. They believe that people are inclined to protect, "ideological territoriality", their beliefs, "mental materialism" (p. 59). However, they state people are capable of "emancipated cognition" which is defined as "weighing the merits of beliefs from a detached and impartial perspective" (p. 61). Church and Samuelson (2017) also differentiate between IH and IA based on the idea of automatic and deliberate cognitive processes which they identify as Type 1 and Type 2 thinking. Type 1 thinking is fast, automatic, and contains intuitive processes with low demand on working memory and controlled attention (Evans & Stanowvich, 2013). Type 1 is associated with heuristics and resulting biases while Type 2 thinking reflects a more deliberate, analytic process which requires greater working memory. An individual conducting Type 2 thinking is said to run experiments in thought to answer considered hypotheses. Church and Samuelson (2017) make a limited argument that heuristics and biases exhibit IA because individuals are unable to divorce themselves from Type 1 thinking and their own perspective. Gregg and Mahadevan (2014) see this inability as an egotistical bias coupled with a disregard for reality and objectivity, a hallmark of IA. To Gregg and Mahadevan (2014, p. 62), one high in IA "should ignore and reject reality, in a spirit of hostility; and he should resist arguments and refuse to bow to evidence, in a spirit of dominance".

In summary, the concept of IA is inextricably linked to the concept of IH. Its definitions can be characterized as an unquestioning allegiance to one's own beliefs, willful ignorance, and

intentional, unearned, epistemic superiority. Its relationship with IH is often described as bipolar, with its position at opposing ends with IH or with IH as a mean between IA and other vices. Scholars describe the motivation behind IA as an evolutionary default or automatic, flawed cognitive process which operationalizes in closed-minded behaviors and an overall absence of self-knowledge, of reality. It is this absence of self-knowledge which characterizes IA and its antithesis, the presence of self-knowledge, which most frequently characterizes IH. Those who are IH see the limitations of their knowledge and accurately assess their strengths and weaknesses. However, both the definition of self-knowledge as well as its role as a component of IH has not been robustly studied.

Self-Knowledge

General humility and IH scholars mostly agree within their respective areas of interest that the theorized constructs of GH and IH both relate to accurate self-knowledge. Whereas GH relates to the accuracy of self-perceptions across all relationships and situations, IH is thought to relate specifically to the accuracy of an individual's self-knowledge, opinions, beliefs, and ideas in specific contexts (Hook et al., 2017; Krumrei-Mancuso, 2017). There is less consensus on the relationship between IH and IA, however, there is general agreement that IH is characterized by accurate self-knowledge while IA is not (Alfano et al., 2017; Roberts and Wood 2003a, 2007b). To date, there is little empirical evidence to confirm self-knowledge as a theorized component of IH. The dearth of research is unsurprising given the recent emergence of IH as a construct within psychology. Self-knowledge, however, enjoys a longer history of theoretical and empirical exploration. Within psychology, the term self-knowledge is often used synonymously with self-awareness and, at times, self-concept and self-perception. In the upcoming section, the construct of knowledge, self-knowledge, and self-awareness are explored. Following this examination,

theories of self-awareness, obstacles to accurate self-awareness, and operationalization of self-awareness are discussed.

Self-knowledge as a construct is inextricably wedded to the complex, multi-layered conceptualization of knowledge. Folk definitions of knowledge include: “facts, information, and skills acquired by a person through experience or education” (Oxford English Dictionary online, 2021), “information, understanding or skill that you get from experience or education” or “the state of being aware of something” (Merriam-Webster online, 2021). The American Psychological Association (2021) defines knowledge as “the state of being familiar with something or aware of its existence, usually resulting from experience or study”. Within the field of epistemology, the definition of knowledge depends on the philosopher, school of thought, and theory. Roberts and Wood (2007, p. 55) summarize the traditional epistemology definition of “propositional” knowledge as a “warranted or justified true belief”. However, they argue that this definition is incomplete, and that knowledge is more complex, a blend of properties in varying proportions dependent on conditions. These properties include “truth, belief, acquaintance, grasp of coherent relationships, and various kinds of justifiers or warrants” (p.56). From these definitions, knowledge is known as a justified, warranted belief, acquaintance or understanding of something gained through experiences or education. Self-knowledge must then relate specifically to beliefs, acquaintance or understanding applied to the person.

Wikforss (2020) adds that self-knowledge concerns knowledge of one’s present mental states which include knowing what an individual currently believes, desires, feels, and thinks. Wikforss (2020) distinguishes between self-knowledge and the idea of “knowing oneself” attributed to pop culture “self-help” books which focus on the importance of knowing one’s own abilities and character. Others, like Alicke et al. (2010), view self-knowledge as a polylithic

concept consisting of multiple self-concepts at the conscious and unconscious level; dependent on situation; and subject to misinterpretations and biases. They argue that self-knowledge manifests biologically, interpersonally, and introspectively. Building on the latter, Alicke et al. (2010) posit that self-awareness provides another means for self-knowledge and state that psychologists see self-awareness as a step enroute to self-knowledge.

Self-awareness possesses a long and substantial theoretical and empirical body of evidence within the field of psychology. Wicklund and Duval's (1971) theory of objective self-awareness (OSA) provides a seminal concept built on work by Mead (1934), Piaget (1966) and Festinger, Pepitone and Newcomb (1952). Overall, the commonalities which unite the theorists center on the dichotomy of conscious attention between oneself or external objects, underscoring the importance of the social environment. For Mead and Piaget, it is the conflict between an individual's thoughts and those of others which generate doubt in self and provide a catalyst for an individual to move from egocentrism or self as subject to self-consciousness or self as object to reduce inconsistencies and consequently affect (Wicklund and Duval, 19). In contrast, Hull and Levy (1979) contend that self-awareness involves a more complex attributional, encoding process than the self-regulative process described in OSA. With empirical findings to support, they found self-criticism and attribution are not characteristic of self-awareness but aspects of the immediate situation.

Zaborowski and Slaski (2003) offer the contents and forms (CF) theory of self-awareness which they believe compliments earlier theories. For CF theory, the state of self-awareness is a balance between contents and forms. Contents are "phenomena and processes which appear in the self-awareness of an individual" and include "thoughts, desires, attributions, beliefs, moods, tensions", (p. 100). Internal or external, contents are viewed as a continuum rather than a

dichotomy where internal contents are characterized by greater self-focus than external and where situations can transform external to internal and vice versa. The contents are processes through four basic forms which include individual, defensive, outer, and reflective and can be conceptualized on two perpendicular axes (Zaborowski and Slaski, 2003). Defensive form, roots traced to feelings of fear, danger, and frustration of needs, is on the opposite end of a spectrum from reflective form, representing processing and understanding information and behavior of self while considering self and environmental needs. On the perpendicular axis are the functions of individual and outer forms. The individual form is a subjective processing of information about the self and connected to self-concepts like self-schema and esteem. On the opposite end of the spectrum is the outer or social form which consists of objective processing of information concerning self. Zaborowski and Slaski (2003) argue that self-awareness is not like the homogenous OSA account of self-awareness but a multi-faceted and dynamic structure depending on both its contents and forms. In CF theory, OSA, and other theories of self-awareness, there exists a dichotomy or continuum of accurate self-awareness determined through the processing of both internal and external accounts.

Reconciling an individual's internal and external account of self is central to the accuracy of an individual's self-awareness. Eurich (2018) found that most people believe they are self-aware, however, only an estimated 10-15% of people studied fit qualifying criteria. The criteria organized under two categories of self-awareness, internal and external. The former represents how one sees their values, passions, aspirations, environment fit, reactions, and impact on others while the latter includes how other people view the individual based on the same factors which makeup internal self-awareness (Eurich, 2018). Contrasting theories like self-assessment theory and self-enhancement theory present differing theories of motivation for individuals who seek

information about the self. Some seek information with a desire to attain an accurate self-view while others seek information to maintain a positive self-view and are therefore averse to negative information. Alicke et al. (2020) state that context and concerns for self-presentation influence an individual's preferences to pursue one or the other – accuracy or enhancement. Wilson and Dunn (2003) argue that accurate self-knowledge is limited by motivational and nonmotivational systemic reasons. They believe individuals are motivated to suppress, repress, and intentionally forget information to keep material out of consciousness although this does not necessarily preclude its influence. Individuals may be deliberately motivated to forget but there are mistakes to processing which exceed an individual's control.

Psychological research has long shown that the human mind is not without faults and is prone to mistakes in its processing (Danovitch et al, 2019; Dunning, 2011). Adults and children alike often overestimate and are overconfident in their knowledge and understanding (Danovitch et al., 2019; Dunning, 2011; Kruger & Dunning, 1999; Rozenblit & Keil, 2002; Shin, Bjorklund, & Beck, 2007; Spinath & Spinath, 2005). An individual may not accurately judge their beliefs or knowledge and believe things to be true which are unwarranted. In these instances, the individual may be assessed as having low metacognition. Church and Samuelson (2017, p.119) describe metacognition as "awareness of cognitive thought processes", stating that the more an individual is aware of their capacity for knowledge and ability to make mistakes, the more likely to be IH. Deffler et al. (2016) identify meta-cognitive bias as a cause for an individual's faith that their beliefs are true despite evidence to the contrary and that individuals vary in the degree to which they may recognize their beliefs may not be correct. Citing research from Kruger and Dunning (1999), Deffler et al. (2016) identify that people who are less knowledgeable in a domain are less able to assess the limits of their understanding on topics

within that domain. Abilities and biases related to metacognition remain just one of many obstacles to self-knowledge.

One of the greatest limitations to self-knowledge is the inaccessibility of the mind to conscious awareness (Wilson & Dunn, 2004). The idea of unconscious is that there are mental processes and states which are inaccessible, either temporarily or permanently, to either conscious awareness or control (Kihlstrom, 2008). There exists a growing body of empirical research which has documented the role of nonconscious mental processes related to explicit perception, motor learning, personality and implicit versus explicit attitudes and self-esteem (Bhalla & Proffitt, 2000; Fazio and Olson, 2003; Greenwald & Banaji, 1995; McClelland et al., 1989; Wilson and Dunn, 2004). Collectively, the research identifies biases and heuristics which can unconsciously influence an individual's thoughts, beliefs, opinions, and behavior. It is the proclivity to remain ignorant to these biases and heuristics combined with a general overestimation of knowledge and cognitive abilities which characterizes IA while overcoming the aforementioned typifies IH (Church & Samuelson, 2017, p.103). Even when individuals attempt unbiased introspection to attain self-awareness, their efforts are often in vain (Silvia & Gendolla, 2001). Eurich (2018) found that sometimes those who introspect are less self-aware because of those biases which lead the individual into selecting belief based on a feeling of truth. Unfortunately, experience does not always enable an individual's ability to distinguish between what is true or false information. To the contrary, experience can lead to a false sense of confidence, reduced likelihood of doing the homework, and greater likelihood to overvalue skills (Eurich, 2018). Because of this unconscious or consciously willful inaccuracy in self-knowledge, the measurement of self-awareness has often relied on comparison with external beliefs and perceptions of others as an objective truth.

Self-awareness within the field of psychology has often been operationalized as the congruence between self and other reports (Atwater & Yammarino, 1992; Church, 1997; Taylor, &Leslie, 19; 93; Van Velsor, Yammarino & Atwater, 1997). Since the early 1920s, psychologists have viewed self-estimates suspiciously with empirical findings which support self-ratings as unreliable and inaccurate when compared to ratings by others or objective criteria (Ashford, 1989; Fleenor et al., 2010; Harris & Schaubroeck, 1988; Yammarino & Atwater, 1993). Yammarino and Atwater (1993, p. 232) proposed a model of self-perception accuracy which they defined as the "degree of agreement between 'self' and 'other' ratings". They included superiors, subordinates, peers/co-workers in their definition of 'other'. This congruence or agreement between an individual and others is known as self-other agreement (SOA) in leadership and specifically self-awareness research (Atwater & Yammarino, 1997; Fleenor et al., 2010). Yammarino and Atwater (1997) found four types in self-other agreement ratings which include the over-estimator; in-agreement ratings favorable; in-agreement ratings unfavorable; and under-estimator. Over-estimators rate themselves significantly higher and see themselves more positively than others for a number of theorized reasons. Since inaccurate self-perceptions can result from an individual's tendency to ignore, discount, or reject negative feedback, overestimation could be an indication of IA (Yammarino and Atwater, 1997). It is through multi-source multi-rater feedback processes where SOA has influenced self-awareness and an identified connection with organizational performance (Fletcher & Bailey, 2003). Methods to determine the extent to which self and other raters agree vary and include "gap analysis" or "congruence-d" and "relative self-awareness" or "congruence-r" as two of the more prevalent, albeit imperfect methods (Fletcher & Bailey, 2003).

Self-knowledge is a theorized core component of intellectual humility. The individual who possesses the trait is believed to have an accurate knowledge of their present mental state which includes knowing their current beliefs, desires, and feelings while the intellectually arrogant individual possesses an exaggerated belief in the correctness of their knowledge and feelings. Objective self-awareness is challenged by numerous conscious and unconscious processes which lead to external evaluation as a method to improve self-awareness accuracy. Self-evaluation versus other-evaluation congruency is a method of self-awareness accuracy determination which has been used within the field of psychology to varying degrees of success over the past three decades.

Chapter 2: Literature Review

Research on intellectual humility (IH) is still in its infancy. Since its emergence as a construct of interest within the field of psychology in 2014, IH research has focused on scale development, cognition, and openness to opposing ideas. Although there has been interest in the potential benefits of IH for leaders and their relationships with others, little research connecting the two exists. Constructs like self-awareness (Bracht et al., 2021; Hall, 2004; Moshavi et al., 2003; Goleman, 1998), arrogance (Borden et al., 2017; Silverman et al., 2012), and humility (Owens et al., 2013; Owens & Hekman, 2012) are established within leadership and organizational literature but the benefits and / or drawbacks of IH are not. While IH literature is not yet robust enough to strongly establish its impact on leaders, their organizations, and potential partners, the empirical findings to date suggest IH can build collaboration and advancement in conflicted contexts (Porter & Schumann, 2018; McElroy et al., 2014; Hook et al., 2017). It is the potential benefit of IH to leaders and leader development which serves as both the catalyst for this study and a review of IH empirical findings which encourage further exploration. The upcoming literature section is divided into two parts. The first explores IH scale history and empirical findings with implications for leadership. Part two focuses on implications of IH and IA through empirical evidence of their parent domains of humility and arrogance within leadership and organizational literature. Next, a summary of self-awareness literature defined and measured through self / other congruency is provided and concluded with subsequent research question and hypotheses.

Intellectual Humility Scale History

For less than a decade, psychologists have explored how to empirically measure the construct of IH and its theorized subdomains. To date, scholars have developed multiple scales

without agreement on which best measures the complex construct (McElroy et al, 2014; Krumrei-Mancuso & Rouse, 2016; Leary et al., 2017; Alfanao et al., 2017; Haggard et al., 2017). Because there is no agreement on the exact definition of IH, the existence of multiple scales is unsurprising. The handful of scales empirically supported are constructed from differing theoretical viewpoints, each contributes a consistent and distinctive understanding of IH (Haggard et al., 2017). Some are narrowed in their focused measure (Hopkin et al, 2014; Hoyle et al., 2014) while others are more general (McElroy et al., 2014; Krumrei-Mancuso & Rouse, 2016; Alfanao et al., 2017; Leary et al., 2017).

McElroy et al. (2014) believed IH was fundamentally relational and involved behavior regulation when engaged with others in discourse based on personal beliefs and worldview. They developed an informant report measure of IH perceptions using exploratory and confirmatory factor analysis as part of a study on an individual's own knowledge and how it affects relationships with religious leaders. Results of the exploratory factor analyses revealed a two-factor model, with Intellectual Openness and Intellectual Arrogance as its subscales. McElroy et al.'s (2014) confirmatory factor analysis indicated good fit (Comparative Fit Index [CFI] = .98, standardized root mean residual [SRMR] = .04, root mean square error of approximation [RMSEA] = .03), and the subscale scores displayed high internal consistency (.92-.94 for IO and .93 for IA). Intellectual openness, positively worded, measured an individual's openness to different ideas while IA measured an individual's ability to regulate her emotions when confronted with conflicting perspectives. McElroy et al.'s (2014) series of studies distinguished their IH scale (IHS) from other constructs as well as identified that IH is related to strength of social bonds as they found IH was related to higher trust, lower unforgiveness, and higher conciliatory motivations. McElroy et al. (2014) believed that IH is especially relevant when there

is a competition or negotiation of ideas in a relationship or group (Krumrei-Mancuso & Rouse, 2016).

Additional IH scales either narrowed (Hoyle et al., 2015) or widened the measurement (Krumrei-Mancuso & Rouse, 2016; Alfano et al., 2017; Haggard et al., 2018). Hoyle et al. (2015) scale contained a single-factor measure and focused on measuring specific intellectual humility (SIH) as a subdomain of IH. Contrasting this simplified approach, Krumrei-Mancuso and Rouse (2016) saw IH as multi-dimensional construct, both interpersonal and intrapersonal, and developed a four factor, 22 item comprehensive intellectual humility scale (CIHS). Their four factors included: "Assessment of independence of intellect and ego, openness to revising one's viewpoint, respect for others' viewpoints, and lack of intellectual overconfidence" (p. 220). Like Krumrei-Mancuso & Rouse (2016), Alfano et al. (2017, p. 21-22) also found IH had four core dimensions with some of those dimensions sharing overlap in metrics with the CIHS. Their dimensions included: "open-mindedness (vs. arrogance); intellectual modesty (versus vanity), corrigibility (vs. fragility) and engagement (vs. boredom)". Their studies found IH negatively related to constructs theorized as opposites to IH. Both Alfano et al. (2017) and Krumrei-Mancuso (2016) found their measure of IH was negatively related to dispositions naturally opposed to IH. Krumrei-Mancuso (2016) believed their scale supported their theory that IH can be "conceptualized as a balance between the two vices of intellectual arrogance and intellectual cowardice."

Unlike Krumrei-Mancuso and Rouse (2016) and Alfano et al. (2017), Haggard et al. developed a scale focused specifically on a limitations-owning perspective. They argue that the binary explanations of IH, to include the CIHS and GIHS (Leary et al., 2017), include recognition of the potential of the fallibility of one's beliefs, openness to revising one's beliefs,

and absence of intellectual over-confidence, but they "neglect the impact that intellectual servility may have, tenuous overlap with open-mindedness, and do not account for proper motivation in overcoming one's intellectual limitations" (p.191). Haggard et al. (2018) scale incorporates motivational aspects of why one might be intellectually humble (Murray, 2019). Their exploratory and confirmatory factor analyses revealed a three factor, 12 item scale (p. 191; L-OIHS; "owning intellectual limitations", "appropriate discomfort with intellectual limitations", and "love of learning").

Intellectual Humility and Interpersonal Processes

Intellectual humility research focused on interpersonal processes presents the closest connection to leaders and their relationships. In fact, McElroy et al. (2014) theorized that IH functions as a social lubricant between leaders and subordinates, preventing relational wear and tear like oil prevents an engine from overheating. They theorized that subordinate perceptions of leader IH would help regulate the formation and repair of social bonds following a religious leader's betrayal. They found that IH was related to higher trust, lower unforgiveness, and higher conciliatory motivations. McElroy et al. (2014) argued there are conditions which challenge the practice of IH because of their proximity to an individual's identity, situations which induce powerful emotions tied to moral decisions and outcomes, and where imbalanced power controls influence on ideas. These conditions are often associated with highly sensitive topics like religion and politics which challenge deeply held beliefs and an individual's ability to remain objective.

There exist several studies focused on IH and the benefits of IH within the religious domain on interpersonal relationships not tied directly to leadership. Davis et al. (2015) found that IH predicted objectivism and was associated with lower religious ethnocentrism which

compliment findings by Hopkin et al. (2014). They explored how religious IH related to individuals' reactions to op-ed newspaper articles which argued for or against a core religious belief. They found that those with strong religious beliefs, low in religious IH, compared to those high in IH, reacted more strongly to the article regardless of belief contradiction. Additionally, they found those low in religious IH who also scored low on respect for others' beliefs provided derogative ratings of the article author on intelligence, competence, and knowledge. In a study of sociopolitical opponents, those low in IH compared to high IH counterparts were more likely to derogate the intellectual capabilities and moral character of their opponents; were less willing to befriend their opponents; or "friend" or "follow" an opponent on social media (Stanley et al., 2019). These particularly low opinions give insight into potential thoughts and subsequent behaviors of those who possess low IH. Related to this, Van Tongeren et al. (2016) studied the extent to which humility diminished negative attitudes, behavioral intentions, and behaviors towards religious outgroup members. Overall, they found that IH was related to decreased intentions for aggression while IA was strongly associated with aggressive intentions.

Rodriguez et al. (2019) examined the role of IH in attitude change and relationship closeness in the context of a religious conflict. The researchers assessed participants' attitudes on contentious religious issues and then paired them for a 10-minute discussion with someone who held an opposing view. Rodriguez et al. (2019) found that the pairs with the greatest degree of attitude change were those who possessed mutually high levels of IH. They found that the higher the perceiver viewed their discussion partner's IH, the more likely her feeling of closeness or trust toward their partner, suggesting positive relationship outcomes which have also been found with GH (Farrell et al., 2015). Additionally, IH is also associated with forgiveness (Zhang et al., 2015), as a predictor of religious tolerance (Hook et al., 2017), and moderator of the relationship

between religious diversity and religious belonging (Zhang et al., 2018). Zhang et al. (2018) found that for those low in IH, ideological diversity was a negative predictor of belonging and meaning whereas, for those high in IH, homogeneity exhibited only a small relationship with belonging and had no relationship with meaning. The Zhang et al. (2018) study, at a minimum, suggests that IH and its relationship within the religious domain is not necessarily completely beneficial.

Krumrei-Mancuso (2016) conceived of the relationship between IH and religion as more paradoxical, where aspects of the religious domain would either support or negate IH. She found only negative and small links in which religious fundamentalism, participation, belief salience, prayer fulfillment, and universality were associated with less IH. Additionally, Krumrei-Mancuso (2016) found that right-wing authoritarianism[2] (RWA) accounted for most links between IH and religion and argued that it is not religion which is associated with the decrease in IH but sociopolitical attitudes. Once RWA was controlled for, religious participation remained the only negative predictor of future IH (Krumrei-Mancuso, 2016). Based on these findings and others, Krumrei-Mancuso (2016) contends that prejudice and intolerance to others is less about the content of religious beliefs and more about the RWA among religious leaders. RWA is associated with various measure of prejudice but increasing their self-awareness can improve their motivation to change (Krumrei-Mancuso, 2016; Altemeyer, 1994).

The study of IH and interpersonal processes is not limited to the religious domain. Intellectual humility is associated with beneficial social attitudes and behaviors (Krumrei-Mancuso, 2018). Intellectual humility scholars have found data which collectively characterizes the intellectually humble as objective and therefore more likely open to others (Davis et al.,

[2] Krumrei-Mancuso (2016, p.67) defined RWA as "an emphasis on obedience to leaders (authoritarian submission), intolerance of deviance (authoritarian aggression), and conformity to norms (conventionalism)."

2015). Haggard et al. (2017) found that IH correlated negatively with dogmatism, closed-mindedness, and hubristic pride and positively with openness, assertiveness, and authentic pride (Leary et al., 2017; Tracy & Robbins, 2007). It is this openness to ideas which makes the presence of IH salient in disagreements. Individuals with IH are more open to learning about the opposition's views and exposing themselves to a greater proportion of opposing political perspectives (Porter and Schumann, 2018). Leary et al. (2017) found that Leary et al. (2017) found that those high in IH were less certain that their beliefs about religion were correct, judged others' opinions less, were less inclined to think politicians who changed their attitudes were "flip flopping" (p.793) and were more attuned to the strength of persuasive arguments. They too, found IH related to openness and negatively related to dogmatism. It is also openness to learning from others which is fundamental in transformational leadership (Avolio et al., 1991) and linked to the leadership attribute of empathy (Conkey, 2021; Krumrei-Mancuso, 2017). Exeline and Hill (2012) studied the link between humility and generosity, finding that humble individuals can look past themselves and their own interests to be more open to the possibility of giving to others. Krumrei-Mancuso (2017) built upon this research by tying a cognitive component to pro-sociality.

Krumrei-Mancuso (2017) empirically supported her belief that there was a connection between IH and prosocial values. She found that IH was predictive of more perspective taking, empathetic concern, gratitude, altruism, benevolence, universalism, and less power seeking. Her mediation analyses were also significant. She found that perspective-taking empathy acted through empathetic concern to mediate links between IH and greater altruism, benevolence, universalism, and less power-seeking and gratitude mediated links between IH and greater altruism, benevolence, and universalism. Although she could not determine causality, her

findings support the possibility IH could be a precursor to previously established links of empathy and gratitude to prosocial outcomes (Krumrei-Mancuso, 2017). Her findings contribute to the limited existing knowledge on IH and its relationship to interpersonal processes which suggest its contributions to tolerance for diverse people and perspectives, favorable perceptions of others and ability to ameliorate social bonds (Krumrei-Mancuso, 2017). How the intrapersonal processes enable this is another area of research within IH.

Intellectual Humility and Intrapersonal Processes.

Intellectual humility research on intrapersonal processes often centers on self-knowledge assessment, knowledge acquisition, and subsequent outcomes. Awareness of one's own knowledge and its fallibilities are central to the IH construct but little research exists to support this claim. Deffler et al. (2016) examined the relationship between IH and cognitive measures of recognition sensitivity and bias utilizing a series of cognitive tests. They found that individual differences in IH were associated with cognitive processing of new information and people's metacognitive recognition of their own knowledge. When compared to the intellectually arrogant, the IH individuals considered counter opinions longer; distinguished more successfully between sentences they had and had not read; and between knowledge they had and had not encountered previously. Even when general knowledge and education level were controlled, the findings between IH and IA individuals remained, suggesting the effect may be a result of differential attentional processing while learning new information. Although this suggestion may hold truth, there are several other scholars with different and potentially complimentary theories.

Davis et al. (2015) found that IH incrementally predicted two cognitive styles that they reasoned should promote higher IH. They found need for cognition, which involves intrinsic motivation to engage in effortful cognitive processing, and objectivism, which suggests an

individual's willingness of submitting one's ideas to a broader system of thought to base decisions on empirical information or reason rather than intuition. Jarvinen and Paulus (2016) saw this willingness to evaluate one's ideas as a type of cognitive openness and believed there was a relationship between it and attachment. They found that participants primed in a secure attachment condition demonstrated greater cognitive openness to counterarguments than those in ambivalent priming conditions. They also found that attachment anxiety, emotional valence, and the intelligence of the discussion partner significantly predicts an individual's openness to more counterarguments. The link between epistemic and social aspects of IH were also supported by Danovitch et al. (2019) whose study of IH differences and development in children evidenced social component development occurred more quickly than its epistemic counterpart. Yet, research has shown cognitive processing is preprogramed to utilize heuristics for cognitive benefits which come with unintended drawbacks.

Zmigrod et al. (2019) build on Samuelson and Church (2015) proposition that human tendency to rely on heuristics may lead to intellectually arrogant behaviors. Using the dual-systems account of human cognition, they suggest that thinking and reasoning are characterized by two distinct systems. System 1 processes are fast, automatic, associative, and intuitive and are contrasted by the processes of System 2 which are characterized as slow, conscious, deliberate, and analytical. To reason intelligently and avoid biased thinking, it is necessary to override the automatic and often bias System 1 to engage System 2 processes which are deliberate and analytical. Zmigrod et al. (2019) found that IH is positively related to heightened cognitive flexibility, intelligence, and that an interaction between the two with IH. They found that high cognitive flexibility is valuable in conditions of low intelligence and that high intelligence was beneficial in conditions of low cognitive flexibility. They did not find relevant benefit for IH

when conditions supported both high cognitive flexibility and intelligence. Their findings are important as it implies a dual psychological pathway for IH where either cognitive flexibility or intelligence are sufficient, but an individual does not need to possess both. Zmigrod et al. (2019) argue that deliberate, intelligent, analytical thinking may be important for IH but might not be sufficient or needed. They posit that the IH mind is also a flexible mind and that its antithesis, a mind inflexible, rigid, and unwillingness to hear opposite views is related to RWA and by association, related to belief superiority, the conviction that one's beliefs or attitudes are better or more correct than other's viewpoints – intellectual arrogance (Zmigrod et al., 2019; Toner, Leary, Asher, & Jongman-Sereno, 2013).

Gregg et al. (2016) believe that IA is at the root of our inability to reason. They argue an evolutionary epistemic account (EEE) of IA and IH, viewed as bipolar, in which humans experience their beliefs like positions and are predisposed to "fight" to keep, leading to "mental materialism" and "ideological territoriality" (p.68). It is this proclivity to overvalue one's own beliefs and take a combative approach to argumentation which serve as a default mode of cognition and promotes IA. Recognizing individuals are capable of "emancipated cognition", Gregg et al. (2016) postulated individuals' epistemic worldview, characterized by the communion-agency circumplex, influence the degree IA or IH is exhibited. They found those who scored high in IA were those who enjoyed high status among their peers, saw themselves as competent and assertive but reported they did not fit in with peers nor saw themselves as warm or amiable. Additionally, they reported overvaluing their beliefs, taking a combative approach to argumentation, and wanting their beliefs to prevail (Gregg et al., 2016). Overall, Gregg et al. (2016) found that an individual's social, dispositional, and behavioral stance towards others also matched their epistemic stance.

Given the comparative nature of IH versus IA, it is logical to assume that IH would be associated with positive learning orientations and outcomes. However, there is conflicting research on the relationship between IH and academic performance. Wong and Wong (2021) found that IH had a positive indirect effect on academic performance through receptivity to feedback. Those who were higher in IH perceived feedback as constructive and therefore engaged with it more and earned subsequently higher GPAs. However, Krumrei-Mancuso et al. (2020) found that IH was associated with slightly lower GPA despite its associations with reflective thinking, need for cognition, intellectual engagement, curiosity, intellectual openness, open-minded thinking, and intrinsic motivation to learn. They found IH was associated with more general knowledge but was unrelated to cognitive ability but held social benefits in the learning environment to include less social vigilantism and potential promotion of collaborative learning (Krumrei-Mancuso et al., 2020). Meagher et al. (2019) support these conclusions with their own findings which suggest that IH can buffer students' perceptions of their peers with implications for improved social environments more conducive to learning.

Evidence suggesting benefits of IH and drawbacks of IA continue to grow but there is still much to learn about the construct to include adequate measurement. Meagher et al (2015) compare self-assessments and relational measures of group consensus and found that the different sources of assessment both had challenges and key differences. Meagher et al. (2015) found group member consensus was untenable based on time of task in Study 1 and increased it from minutes to months with success. Between the two studies, they found that group judgments of IH were strongly correlated with self-reported dominance (negatively) and agreeableness (positively). Group impressions of IA were associated with greater extraversion, dominance, and desire for attention. For the context of group work, groups inferred the presence of IH from

positive interaction and deference to others while IA ratings stemmed from observations of individuals who spoke frequently and dominated the direction of the group. For self-ratings, the assessments faced challenges with validity as self-report in both studies resulted in strong, positive association with self-enhancement on socially valued attributes, contradicting the essence of IH where self-knowledge is accurate. Although group consensus evaluations showed a modest and positive correlation with self-ratings on both IA and IH, the relationship was only significant for IA. Overall, their study highlights challenge in the assessment of IH and IA at both the individual and group level. Although additional measurements of IH have been published since completion of this study, the work of Meagher et al. (2015) provide lessons learned to inform future evaluations of IH and IA.

Linking IH and IA to Leadership

IH findings suggest benefits to leaders, their organizations, and partners with whom they work. Scholars have found that IH is linked to traits and outcomes which improve social relations (Rodriguez et al., 2019; Zhang et al. 2018; Davis et al., 2015; McElroy et al., 2014), predict prosocial values (Krumrei-Mancuso, 2017), and are associated with positive learning orientations and outcomes (Wong & Wong, 2021; Krumrei-Mancuso, 2020; Meager et al., 2019). On the other hand, intellectual arrogance is associated with outcomes which oppose the aforementioned benefits, challenging relationships, and collaboration in a variety of contexts, especially those involving conflict (Van Tongeren et al., 2016; Gregg et al., 2016; Meagher et al., 2015). A conceptualized notable difference between IA and IH is an individual's level of self-awareness and subsequent openness to others whose thoughts and beliefs are valued as contributors to truth and knowledge. Although IH and IA are not discussed specifically in leadership literature, there is research connecting GH and self-awareness to leadership and

organizational benefits as well as arrogance to negative outcomes. In the upcoming section, an examination of humility and self-awareness are reviewed in their relationship to leadership styles and subsequent organizational benefits. From this review, potential IH benefits and IA drawbacks to leadership and organizations are identified; the importance of leader self-awareness is underscored and self-awareness measurement findings discussed. All inform the hypotheses which drive this study and conclude this section.

Leadership and Humility. Leadership theorists have long suggested GH holds many potential benefits for leaders and their organizations with empirical support continuing to grow. Because GH is often defined similarly to IH regarding accurate self-concept, orientation to others and receptiveness to feedback (Wang et al., 2021; Vera & Rodriguez-Lopez, 2004; Owens & Hekman, 2011), it is logical to induce similar benefits associated with IH. Unlike IH, GH boasts more empirical research, especially findings related to leadership and organizational benefits. Research has shown that GH enhances team performance (Owens & Heckman, 2016), reinforces employee learning orientation, job satisfaction, work engagement (Sousa & van Dierendonck, 2015) and retention (Owens et al., 2013). Although humility is most often seen as beneficial and as an overall strength, Exeline and Geyer (2004) found participants made distinctions in the value of humility based on social role. When asked to imagine humble people in one of four social roles (leader/entertainer, subordinate, close other, and religious seeker/leader), participants rated humility less favorably for leader/entertainer than any other role. Yet, humility holds a prominent place in leadership theories especially in leadership styles which emphasize a shared, relational global perspective between leaders and their followers like servant leadership.

Humility is central to servant leadership (SL). Servant leadership is based on the premise that leaders are best able to motivate followers when they prioritize fulfillment of followers'

needs above their own (Greenleaf, 1970). Research has shown the benefits of SL in follower and organizational outcomes like job satisfaction (Hebert, 2003), organizational citizenship behaviors (Ng et al., 2008; Graham, 1995), and team effectiveness (Irving and Longbotham, 2007). In their exploration of SL and humility, Sousa and van Dierendonck (2015) found that humble leaders showed the highest impact, among the five SL dimensions tested, on follower engagement regardless of hierarchical position. Van Dierendonck (2011) explains that humility in servant leaders enables the leader to put their talents in perspective and "dare to admit" that they can benefit from the expertise of others (p. 1233). Some scholars identify humility as a main characteristic of servant leaders (Van Dierendonck, 2011; Dennis & Bocarnea, 2005; Patterson, 2003) while others argue its place as a subcomponent (Sendiaya et al., 2008) or do not specify the trait at all (Liden et al., 2008, Russell & Stone, 2002; Greenleaf, 1977). Eva et al. (2019, p.114), in their systematic review of servant leadership, propose servant leadership's essence is summarized in the three features of motive, mode, and mindset which summarize into an altruistic and morality fed motivation to abandon self-orientation and prioritize the follower's needs and development. Even in the explicit absence of humility in these features, its inference and connection to IH can be seen in the understanding of self and absence of ego needed to devote oneself to others.

Leadership and Self-awareness.

Even when humility is not identified as a main component of a leadership theory, self-awareness often is. Leader self -awareness can be found as a focal component in authentic, transformational, charismatic, servant, and spiritual leadership theories (Avolio & Gardner, 2005). However, the centrality of self-awareness and degree to which it is explored varies in its value relative to followers and impact. For instance, self-awareness plays a central role in

authentic leadership development (ALD). Authentic leaders are said to "recognize their shortcomings" (George, 2003, p.12); "are deeply aware of their values and beliefs" (Illies et al., 2005); "self-aware, humble" (Whitehead, 2000, p.850); "know who they are, what they think" (Avolio et al., 2004, p.4). With authentic leaders, there is a merger between self-concept and leadership role which builds trust as the leader's self-concept aligns with her behavior (Shamir and Eilam, 2005; Henderson and Hoy, 1983). However, among the dozen definitions reviewed, there remains a tone of rightness and superiority which draws into question the humility and accuracy of the authentic leader's self-awareness. George (2003, p. 12) states that when an authentic leader's "principles are tested, they refuse to compromise" or the authentic leader "does not try to coerce or even rationally persuade associates" but rather allow their "values, beliefs, and behaviors serve to model the development of associates" (Luthans and Avolio, 2003, p.243). However, in general, the authentic leader is credited for understanding the need to improve and are "dedicated to developing themselves" because "becoming a leader takes a lifetime of personal growth" (George, 2003, p. 12). Within authentic leaders, there is an absence of ego associated with arrogance because they are "more concerned about serving others than they are about their own success or recognition." (George and Sims, 2007, p. xxxi). These characteristics which describe the authentic leader are similar to other leadership styles in their idealized, positivity and beneficial impact, but leaders are human, imperfect, and complex. Successes and experience can often generate arrogance in a leader who no longer feels compelled to seek or receive advice, feedback, or alternative ideas (Ma and Karri, 2005).

Leadership and Arrogance

Arrogance leads to negative outcomes for the leader, her followers and organization (Johnson et al., 2010; Silverman et al., 2012; Borden et al, 2017). Arrogance is a "set of

behaviors that communicates a person's exaggerated sense of superiority, which is often accomplished by disparaging others." Johnson et al. (2010, p. 405). In its extreme form, arrogance fosters, within the arrogant individual, a perception of invincibility and omnipotence (Ma & Karri, 2005) and that the arrogant individual exhibits higher levels of dominance, anger, superiority, vanity and entitlement and less humility and agreeableness than those who are not arrogant (Borden et al., 2017; Silverman et al., 2012; Johnson et al., 2010). Arrogant employees have strong individual identities which reflect the tendency to view oneself as separate and better than others and less giving with their time (Johnson, Selenta & Lord, 2006; LaBouff, 2011). Because of this, it is unsurprising that arrogant individuals are less likely to be respected or liked and their peers more likely to believe their arrogant colleague is deserving of failure (Borden et al., 2017). In fact, arrogance induces similar levels of perceived negativity as betrayal or lying (Kowalski et al., 2003). The ignorance of arrogant individuals challenges interpersonal interactions as those who work around the individual are uncertain how to respond and can feel undervalued (Johnson et al., 2010; Kowalski et al., 2003). Owing to this, Johnson et al (2010) found that self-other ratings of arrogance were negatively related to task performance, especially those pertaining to interpersonal aspects of work. An arrogant supervisor with exaggerated sense of superiority has been shown to deter feedback seeking from subordinates, lower morale and increase burnout (Borden et al., 2017). In addition, high levels of arrogance within individuals are associated with their poor task performance, low OCB, self-esteem, cognitive ability and absence of learning orientation (Silverman et al., 2012; Johnson et al., 2010). In sum, arrogance is associated with a lack of awareness and other personal attributes and traits which impact interpersonal relationships and job performance.

Self-Awareness as Self/Other Congruence

The value of self-awareness as a separate construct has shown to have beneficial individual and organizational outcomes (Bass and Yammarino, 1991; Atwater and Yammarino, 1992; 1997; Fletcher, 1997; Sosik, 2001). Yet determining self-awareness is a challenge. Studies over the decades have shown that individuals consistently overestimate their abilities across a wide range of domains (Larrick et al., 2007; Chambers & Windschitl, 2004; Sedikides et al., 2003; Conway & Huffcut, 1997; Goethals et al., 1991). Leaders are no exception and consistently overestimate their leadership capacity (Owens & Hekman, 2016; Board & Fritzon, 2005; Chatterjee & Hambrick, 2011; Park, Westphal, & Stern, 2011; Harris and Schaubroeck, 1988). To add to the difficulty in assessing self-awareness, an individual is continuing to adapt and change based on their environment. According to the social information processing theory (Salancik and Pfeffer, 1978), individuals adapt their beliefs, attitudes, and behavior to their social context based on cues which aid in meaning making as well as heightening relevance of information. Understanding the importance of environment and the proverbial "other" in creating that context and perspective, self-awareness is often operationally defined between the comparison of self and other evaluations (Ashley & Palmon, 2012). The most common approach for its measure is the level of congruency between those self and other assessments otherwise known as "categories of agreement" (Moshavi et al., 2003, p. 408). Based on these categories, self-awareness is measured in three ways: overestimators, underestimators, and those in-agreement. From this point on, in agreement is referred to as "self-aware". Research using these measurements have revealed important findings relevant to leadership, organizations, and implications for IH and IA.

Research utilizing categories of agreement measurement for self-awareness reveal implications both at the leader as well as the subordinate levels. Early research found that congruency between leaders' self and other ratings was related to successful performance (Bass and Yammarino, 1991). Findings identified that even though leaders' self-ratings were inflated compared to their subordinates' rating of them, the most successful officers had more congruency between self and subordinate reports compared to their less successful peers. Van Velsor et al. (1993) did not find gender differences in self-rating on effective leadership between men and women as found by Beyer (1990; 1992) but did find that women were rated higher by others. Research has also shown self-aware leaders are associated with positive leadership traits like high self-esteem, intelligence, and achievement status (Van Velsor et al., 1993). Assessed self-aware leaders were rated as the most effective performers while overestimators were rated the worst (Moshavi et al., 2003; Yammarino, 1991; Atwater & Yammarino, 1992).

Overestimators possess similar characteristics to individuals identified as arrogant or intellectually arrogant. Reports of subordinates and supervisors collectively see overestimators as lowest in self-awareness (Van Velsor et al., 2002) which may be attributable to their proclivity to rationalize negative feedback and accept positive feedback (Yammarino and Atwater, 1997). Research has shown that when overestimators received negative feedback, they perceived the feedback as less accurate and were more likely to become angry, cynical, discouraged, and less committed to subordinates (Brett and Atwater, 2001; Atwater et al., 2000). Moshavi et al. (2003) findings suggest that overestimators are overconfident in their abilities, less sensitive to their subordinates' concerns, and known to be "hostile, resentful, and engage in frequent conflicts with co-workers" (Moshavi et al., 2003, p. 415). The impact of overestimators' lack of awareness and undesirable attributes impacts more than just their subordinates' perceptions. The

subordinates of overestimators possess less job satisfaction, satisfaction with supervisor and perform worse than subordinates of self-aware and underestimator leaders (Moshavi et al., 2003). Between the subordinates of self-aware and underestimator leaders, the subordinates of the latter report the highest levels of affect, trust and organizational commitment and perform comparably, if not better, than their self-aware, subordinate peers (Moshavi et al., 2003; Sosik, 2001; Sosik and Megerian, 1999; Sosik, 2001).

When the research on intellectual humility and leadership is reviewed, several themes emerge. First, preponderance of empirical evidence supports the idea that GH is associated with a number of positive individual and organizational benefits and is a valued attribute for leaders. In contrast, arrogance stems from a belief of superiority which perpetuates ignorance and leads to entitlement, impacting interpersonal relationships, individual and organizational outcomes. Self-awareness, as defined and measured by self/other evaluation congruence, is the critical difference between arrogance and humility and its intellectual subcomponents of IH and IA. Overestimators lack self-awareness to the detriment of their interpersonal relationships, performance, and the satisfaction and performance of those with whom they work.

Hypotheses and Research Question

Scholars agree that self-awareness is a principal component of IH. Those who possess IH should also possess accurate self-awareness. To avoid biases associated with self-report, an often used method to measure self-awareness is through determination of self / other congruency utilizing evaluation reports completed by the target individual and “others”, defined as subordinates, peers, and superiors. Therefore, the first hypothesis of this study is:

H1: Those who are high in IH will have overall more self-awareness (as measured by greater congruency in self/other report).

Intellectual arrogance is characterized by willful ignorance combined with belief and subsequent behavior of superiority and entitlement. It is believed those who possess IA are absent or low in IH. Those who are IA possess unwarranted high beliefs in their intellectual capacity and therefore should be less self-aware than their peers high in IH. This leads to the second hypothesis:

H2: Those who are high in IA will have overall less self-awareness (as measured by incongruency in self/other report; incongruency defined here as high overestimation by target compared to "other").

Because self-awareness is seen as a component of IH, its growth should also be paralleled by growth in IH. This leads to the third hypothesis:

H3: Growth in IH will be positively related to growth in self-awareness

Growth in IA is an indication that an individual has grown in ignorance, possessing beliefs of superiority and entitlement. Therefore, the growth of IA should show a decline in self-awareness which leads to hypothesis number four:

H4: Growth in IA will be negatively related to growth in self-awareness

Empirical findings on IH show its potential for impact on leaders and organizations. Central to this trait is the component of self-awareness which is not only challenging for an individual to possess but also a construct to measure. Individuals are social beings whose perceptions are flawed and informed by internal and external factors. In a best attempt to determine an individual's truth, researchers look to the social environment and the perceptions of others to determine how aware an individual is. If an individual is intellectually humble, they

must also possess self-awareness. Thus, this study endeavors to answer the following research question:

RQ: Do those high in IH possess self-awareness as determined by greater self / other report congruency?

Chapter 3: Methods

Data used for this study is archival and gained through two primary sources (See IRBs in Appendix A). The first source is Project Arete and the second is the Office of Institutional Research (OIR) at the United States Military Academy (USMA) at West Point. Project Arete is a team of researchers, primarily located at Tufts University and USMA, funded by a $2 million grant from the Sir Templeton Foundation to examine how West Point develops character and leadership in Cadets. Researchers conducted the longitudinal study, collecting data in-person and via online survey (Appendix B) from 2015 to 2020 during two time periods each academic year. The first data collection each year occurred during the first three days of administrative in-processing for New Cadet Training (NCT), a month-long indoctrination training program for incoming first-year students. The second data collection occurred midway through spring semester in late February and early March as a part of USMA's Cadet Character Development Program (CCDP). Data collection success varied by time-period, requiring analysis efforts to focus on NCT2016, CCDP2017, and CCDP2018 data collections (data collected in June 2016, February / March 2017, and February and March 2018 respectively).

Project Arete data was combined with archival data collected by OIR which includes cached demographics, academic records, and periodic development review (PDR) reports. The PDRs (Appendix C) serve as a type of 360-degree evaluative feedback provided to Cadets on institutional identified values, attributes, and skills desired in commissioned officers within the United States Army. Cadets assess themselves and receive feedback from peers and superiors, utilizing the same evaluation report each semester. The number of reports vary by semester as well as the peers and superiors who complete them. Peers are defined as Cadets of any academic year who are assigned to the same company as a target Cadet. Cadets live, eat, and attend most

functions by their assigned company. Because of this, peers provide a more intimate and potentially accurate perspective into the character of fellow peers than what would be attained from strictly attending class or work with an individual. Superiors are defined as adults who serve in varying roles at the Academy to include instructors, coaches, mentors, administrators, and other adult, non-Cadets who support Cadet academics, sports, and other extracurricular activities.

Participants

Two hundred and one Cadets from the Class of 2020 participated in this study from the beginning of their matriculation at West Point in July of 2016 to the end of their sophomore year in May 2018. These Cadets provided data directly through the completion of the Project Arete Character and leadership Survey and indirectly through administrative data collected through the 22 months for this study. Survey data was collected in three waves. The first collection occurred in July 2016 (N_{t1} = 1,255; M_{age} = 19, SD = +/-.822; 22.1% Women; 64.8% White; 12.7% Black; 9.6% Asian; 9.5% Hispanic; 3.6% Other). The first wave captured all incoming first-year student for the Class of 2020. The subsequent two waves only captured a percentage of the initial wave for various reasons largely based on participant availability, conflicting requirements and demands for participants' time and attention. Subsequently, the second data collection occurred in early Spring 2017 and reduced by more than half (N_{t2} = 443; 25.7% Women; 67.9% White; 9.5% Black; 10.6% Asian; 9.3% Hispanic; 2.3% Other). The third data collection occurred in Spring of 2018 with almost the same number of participants as the second wave (N_{t3} = 428; 22.9% Women; 65.9% White; 10.5% Black; 11.4% Asian; 8.6% Hispanic; 2.8% Other). Participation was assessed across all three time periods and then checked for missing data specific to the IHS items as well as PDR reports. There was a total of 216 respondents across all

three waves, seven were removed for no response on more than 50% of IH items in any particular wave. An additional two respondents were removed for no corresponding PDR data and subsequent six participants were removed for missing one or more waves of data on either peer or CoC PDR reports. This resulted in the final sample for this longitudinal study (N_F = 201; 26.9.0% Women; 67.7% White; 9.0% Black; 10.9% Asian; 9.0% Hispanic; 3.4% Other; Table 1). When compared against those in the Class of 2020 who did provide data, the sample population is more female (26.9% vs. 22.2%), White (67.7% vs. 65.0%), Asian (10.9% vs. 9.5%), and Other (3.4% vs. 3.3%); less Black (9.0% vs. 12.6%) and Hispanic (9.0% vs. 9.6%).

Table 1

Numbers and percentages of participants for Character & Leadership Survey for each data wave and final study sample

Data Collection Time	N	Mean Age	Women	White	Black	Asian	Hispanic	Other
Summer 2016 (JUL)	1255	19	22.1	64.8	12.7	9.6	9.5	3.6
Winter 2017 (MAR)	443		25.7	67.9	9.5	10.6	9.3	2.3
Winter 2018 (MAR)	428		22.9	65.9	10.5	11.4	8.6	2.8
Final Study Sample	201		26.9	67.7	9.0	10.9	9.0	3.4

The character and leadership survey used to collect IH and IA data varied in version to manage length and mitigate response bias. Initially, the survey contained over 250 items which Cadets in the NCT2016 data collection completed, including 16 IHS items. Following this data wave, researchers implemented a planned missingness methodology to mitigate potential challenges associated with large survey completion. Three versions of the survey were created with each survey reduced in size by one third of total items. Each version of the survey contained seven IHS items (Table 2). Ten of the sixteen IHS items were maintained between the three versions and, collectively, the three survey versions together accounted for 75% of the original survey.

Measure

Intellectual Humility

For this study, McElroy et al.'s (2014) Intellectual Humility Scale (IHS) is used. At the beginning of the Project Arete project, the IHS was the only published IH scale in use. In addition, as Haggard et a. (2018) noted, most of the IH scales focus on a binary interpretation of IH and IA where IH is primarily defined as the lack of IA (Hill, Laney, & Edwards, 2014; Hoyle, Davisson, Diebels, and Leary, 2016; Krumrei-Mancuso & Rouse, 2015; Leary et al. 2017). Because this study is focusing on the self-awareness of participants and its relationship to both IH and IA and, ultimately, potential implications for future leaders, the IHS is an appropriate scale for use. In addition to the IHS and its subscales of IA and IO, the study will use the periodic development review (PDR) reports from the participant, participant's peers, and superiors. Collectively, the PDRs for each participant are used to measure self-awareness based on the congruency of the "self" versus "other" reporting.

Intellectual humility was measured by one scale, consisting of two subscales. Researchers used an adapted version of a pre-existing "other- report" measure for the McElroy et al.'s (2014) Intellectual Humility Scale (IHS). For example, an original item, "Has little patience for others' beliefs" was rewritten as "I have little patience for others' beliefs." The 10-item measure consists of two subscales, Intellectual Arrogance (IA; five items, e.g. "I act like a know it all."; "I become angry when my advice is not taken."; "I get defensive if others do not agree with me.") and Intellectual Openness (IO; five items, e.g. "I enjoy diverse perspectives."). All Arrogance items are reverse coded. Response scale ranged from 1= S*trongly Disagree* through 5 = *Strongly Agree*. After the reverse coding, higher scores equate to greater IH for both IA and IO. See Table 2 for IHS items included in each survey version.

Self-Awareness

Self-Awareness is measured using the Performance Development Report (PDR) through comparing self-report data to the mean of collective "other" evaluations. The PDR is comprised of attributes and competencies found in *ADP 6-22, Army Leadership and the Profession (2019)* which establishes and describes the Army Profession and the foundations of Army leadership. These same attributes and competencies comprise the Officer Evaluation Report (OER) which is used annually to evaluate junior officer performance. Attributes are defined as those "traits that enable the core leader competencies to be performed with greater effect" (PDR, 2012). Competencies are defined as "traits that provide a clear and consistent way of conveying expectations" (PDR, 2012). The PDR is comprised of six sections or "parent" attributes and competencies and four to five sub-attributes and competencies per parent (Table 3). The first

Table 3

PDR attributes and competencies and associated subcomponents

Attributes:	
Character	Army Values, Empathy, Warrior / Service Ethos, Discipline
Presence	Military and Professional Bearing, Physical Fitness, Confidence, Resilience
Intellect	Mental Agility, Innovation, Expertise, Sound Judgment, Interpersonal Tact
Competencies:	
Lead	Leads by Example, Leads Others, Builds Trust, Extends Influence, Communicates
Develops	Creates a Positive Environment, Prepares Self, Develops Others, Stewards the
Achieves*	Gets Results

***** *Achieves and its subcomponent of "Gets Results" are not included in this study*

two sections (Character and Presence) makeup evaluated attributes while the remaining four sections (Intellect, Leads, Develops, and Achieves) constitute competencies. All attributes and competencies are rated on a scale from "not observed" to four (1 = Unsatisfactory, 2 = Developing, 3 = Effective, 4 = Exceptional). Each section requires the rater to identify an area where the ratee should either sustain or improve behavior. At the conclusion of the PDR, there is an area for the rater to provide general comments as well as an overall rating from one of three

choices: “Most Qualified”, “Qualified”, “Not Qualified”. For this study, qualitative data and the “Achieves” competency are not examined.

The PDR is completed each term by up to six categories of personnel. The first is the participant’s self-report in which the participant evaluates themselves against the attributes and competencies previously mentioned. In addition to this self-report, a participant is rated by peers, their Cadet Chain of Command (CoC), subordinates, Tactical Officer, and Instructors. However, Cadets in their first year are neither assigned subordinates nor leadership positions. Because of this, they do not receive evaluations from subordinates or their Tactical Officer. Therefore, for the purpose of this study, the category of “other” is defined as peer, CoC, and instructors.

The PDR provides brief summaries of each attribute and competency. Cadets receive training on how to complete the PDR, but the depth and comprehensiveness of this training varies and depends largely upon their respective company leadership who is responsible for its completion. Non-Cadets who complete the PDR do not receive training on how to complete the PDR. Non-Cadets who complete the form are a combination of Army officers, Noncommissioned officers, former military and civilians with no military experience. The majority of these non-Cadets have received formal and informal training on the attributes and competencies throughout their military careers and possess experience on evaluating junior leaders on these attributes and competencies. Company leadership provide semester counseling where the results of the PDR among other topics are shared and discussed with the overall objective of Cadet development across academic, military, physical, and character domains. Cadets are also exposed to the attributes and competencies within their leadership training, courses, and reinforcing character development programs while attending West Point.

Gender

Gender was reported as a binary variable (male or female) and provided by OIR as Academy administrative information.

Performance Outcomes

Cumulative Academic Program Score (CAPS). Is calculated in the same manner as other universities and colleges who calculate grade point average on a 4.0 scale.

Cumulative Quality Point Average (CQPA). The CQPA combines the CAPS, CPPS, and CMPS for an overall Cadet score. All scores are calculated on a 4.0 scale.

Procedure

Data collection occurred through three efforts. The first is through Project Arete which collected data using the Leadership and Character Survey containing the IHS and gathered during three periods of time. The first wave occurred during the sample's matriculation year during their administrative in-processing, two or three days after their arrival to the Academy in July 2016. Cadets had one hour to complete a paper survey and respond on provided Scantron sheets that were later scanned for data cleaning and analysis. The survey contained over 250 items, to include the IHS, related to character, Cadet expectations and leadership style. In the subsequent data collection, which occurred in late winter of 2017 and 2018, a shortened version of this survey, with aforementioned planned missingness, was provided through Qualtrics via personalized links sent to Cadets from Project Arete members outside of the Academy. For each collection, Cadets were informed that participation was voluntary and that their information would remain confidential.

The second and third effort of data collection occurred as routine Academy operations and were provided by OIR. The first type of data provided by OIR was the PDR. Cadets and

their evaluators complete the PDR electronically at the end of each semester. Each Cadet completes a self-assessment and is assigned to evaluate a minimum of one or more of their peers. Non-Cadet evaluators which consist of Academy leadership, instructors, coaches, mentors, etcetera also complete PDRs at random so that each Cadet receives anywhere from three to five evaluations a semester in total from a variety of individuals. Number varies based on the Cadet's participation in activities as well as evaluator completion rates. The third data collection source is demographic information which is collected from Cadets prior to their arrival with relevant Academic information accumulating over the course of the Cadets' 47 months at West Point.

Analysis Plan

The purpose of this study is to answer the research question of whether those high in IH possess self-awareness as determined by greater self / other report congruency. Therefore, the analysis plan is focused on answering the four related hypotheses utilizing Statistical Package for the Social Sciences (SPSS) and RStudio statistical packages. To do this, the analysis is organized into three phases. The first phase focuses on survey and PDR data preparation. The subsequent two phases center on analysis to answer hypotheses one and two followed by analysis to address hypotheses three and four. In the following section, more detail is provided on each of the three phases.

Phase 1 – Data Preparation

Data preparation began the first phase of analysis and contained multiple steps. The first step was preliminary data screening which began with examination of variable missingness. The survey administered at time two and three contained three versions as a part of a planned missingness methodology to mitigate respondent fatigue. Because each version was reduced by one third of IHS items, multiple imputation is used to address item missingness. Following this,

an examination is conducted of the distribution of scores for the variable of IH, its subscales IA and IO, as well as the 22 attributes and competencies included in the PDR for each data collection period. Included in this data examination is an assessment of reliability and normality.

Analysis of missing data was conducted on each data wave on IHS items (Table 4) as well as across PDRs (Table 5). The IHS data gathered in March 2017 and March 2018 show missing data at a number and percentage which match the planned missingness based on administered survey versions for March 2017 and March 2018 data waves (Table 2). Additionally, March 2017 data is missing a total of four responses on four items and March 2018 a total of three responses on three items. Analysis of PDR data (Table 5) shows no missing data in self report but some missingness in "other" report categories. When PDR data is missing, it is not missing by item but the entire data collection time point. Cadets missing an entire wave of data on the PDR were removed from the analysis. Analysis of cases support the assumption that both survey and PDR data are missing completely at random.

All missing data in March 2017 and 2018 waves are addressed using multiple imputation. Multiple imputation provides valid inferences about statistical estimates for incomplete data and can be conducted using different approaches like joint modeling (JM) or fully conditional specification (FCS) (van Buuren, 2007). The FCS approach is semi-parametric and more flexible than its JM counterpart which has shown to introduce potential bias in reference curves for longitudinal analysis (van Buuren, 2007). Therefore, the multiple imputation conducted (m = 10) across all items in data waves March 2017 and 2018 utilize fully conditional specification (FCS) implemented through multivariate imputation by chained equations (MICE; van Burren, 2021) in RStudio (van Buuren & Groothuis-Oudshoorn, 2011). The July 2016 data is included in this

imputation to conduct analyses. Preliminary analysis and those used to answer the hypotheses utilize pooled data generated from the multiple imputation (van Buuren, 2007).

In addition to the imputation, the survey data requires recoding based on negatively worded items prior to determining data reliability. Within the IHS, the subscale of IA is negatively worded, so these five items and the subsequent factor of IA are reverse coded for all three data waves. Because of missingness, the Cronbach's Alpha for March 2017 and March 2018 are examined following multiple imputation resulting in a $\alpha > .8$ (n16α = .826, c17α = .898, c18α = .896) which is comparable to results used by other researchers using same scale within the same archival data (Murray, 2019a; 2020b). Internal consistency of PDR data is determined following data aggregation by participant identification for each PDR type and data collection period. The PDR Cronbach's Alpha ranged from its lowest at $\alpha > .881$ to its highest at $\alpha > .952$ (Table 6).

Prior to building the variables of SA utilizing the self and other PDR reports, the psychometric properties of the IHS and its subscales of IA and IO are examined across three time points for each PDR type to determine whether observed change over time can be attributed to actual development or changes in the interpretation of the construct. Three sets of longitudinal invariance measurement were conducted to assess whether the constructs used to measure IH, IA, and SA are measured similarly at different time points within the sample groups who participated. were conducted to measurement assesses whether the constructs used to measure IH, IA, and SA, are measured equally at different time points within the sample groups who participated. For each construct, configural (equal number of items), metric (equal number of items and factor loadings), and scalar (equal number of items, factor loadings, and intercepts) invariance models were tested. Overall, model fit, and subsequent variance is measured through

the chi-square goodness-of-fit and associated fit indices. Because the chi square goodness of fit is based on a dichotomous decision strategy and found to be an unreliable measurement by itself, the measurement is augmented by model fit indices which are used to quantify the extent to which variation and covariation in data are accounted for by a model (Hu & Bentler, 1998).

The supplemental model fit indices used in this analysis include the comparative fit index (CFI), Tucker Lewis Index (TLI), root mean square error of approximation (RMSEA), standardized root mean squared residual (SRMR) and chi square difference test for model comparison. The CFI and TLI larger than > .90 are acceptable and CFI/TLI > .95 indicates a close fit (Xia & Yang, 2018). Acceptable RMSEA is smaller than .08 with values lower than .05 indicating a close fit (Xia & Yang, 2018; Taasoobshirazi & Wang, 2016), and the SRMR values below .05 suggest good model fit. Invariance models were compared using chi square difference tests.

All invariance models for the IA and IO scales were conducted using imputed data across four types of PDR, namely, self, peer, chain of command (CoC), and instructor. For model simplicity and interpretability, each CFA model included only one PDR type. The estimates, standard errors, and model fit indices were pooled based on Rubin's (1987) rules. Based on these rules, data converges across the 10 imputed data sets to determine point and standard estimates and the degrees of freedom for each parameter's t- test and confidence interval.

As stated above, measurement invariance models were tested for the PDR data across all four PDR types for each of the three data collection time periods. The only PDR type evaluated by the same individual across all three time periods is the self-reports. Otherwise, it is likely the other three PDR types are completed by different personnel at each data collection time. The PDR model measured invariance across five parent attributes and competencies and their

respective subcomponents as depicted in Table 3. The end result of the PDR data is to create variables of self-awareness through determination of self / other agreement (SOA). Therefore, the PDR data should meet configural and metric invariance at a minimum. Although scalar invariance would further support a strong model fit, this plan of study does not intend to use PDR mean comparisons across time and groups (Bialosiewicz et al., 2013).

Following determination of metric invariance, the self and other reports are assessed for meaningful difference and then used to create the self-awareness variables utilizing congruence-d (Fletcher & Bailey, 2003; Warr & Bourne, 1999). Determination of meaningful difference between self and other reports is tested by paired sample t-tests. Following this analysis, the self-awareness variables are built. Self-awareness for this study is measured through the congruence of self / other report. Self / other agreement has been measured in multiple ways to include congruence-*d* and congruence-*r* (Fletcher & Bailey, 2003). Congruence-*d* is determined by subtracting the average "other" score from the self-rating score and then dividing the difference by the pooled standard deviation for each evaluation item whereas the congruence-r method uses correlation between self and other ratings across evaluation items. Smaller d score and larger r-score indicate greater self-awareness. The congruence-d score has little relevance in practical application for organizations, however, critics state that the congruence-r method could simply indicate the degree to which items covary rather than actual self-awareness. Because of this, the congruence-*d* method is used to determine two levels of self-awareness: self / peer and self / CoC. Because of the variable invariance across the instructor respondents, this fourth type of PDR is not a valid measure and will not be used to create a third self-awareness variable.

Once the SA variables are created, a preliminary data analysis and screening occurs prior to analyses conducted in phases two and three. The SA variables are replicated (m = 10) to

combine with the imputed IHS data. Together, each of the ten imputed datasets are examined to include descriptive statistics, tests of normality, correlations and estimates were pooled across imputations. Descriptive statistics analyzed include the mean, standard deviation, skewness, and kurtosis for IH, IA, IO, and both SA variables across all three time points. Tests of normality are conducted on the same variables utilizing stem-and-leaf-plots, normal a-a plots, detrended normal q-q plots, and boxplots. Outliers are identified and retained. Pearson's correlation is used to measure the strength of the linear relationship between all variables of interest. After the conclusion of imputation, measurement invariance tests, congruence-d SA variable transformation, and preliminary data analysis and screening conducted, the data is ready for phase two.

Phase 2 – Analysis for Hypotheses 1 and 2

This phase discusses the statistical analysis used to address hypotheses one and two. Hypothesis one asserts those high in IH will also possess greater SA and hypothesis two proposes that those high in IA are low in SA. The first two questions address a simple relationship between IH and IA with SA which reflect the theory that SA is a component of IH without regard to time or growth. To begin, a simple Pearson's r correlation is conducted between IH and IA with both SA variables, paired at each time point. Although IH literature clearly identifies SA as a component of IH like its GH parent, Argandona (2015) conceptualizes GH as possessing a temporal aspect, beginning with self-knowledge which leads to evaluation and improvement. His concept of GH moves an individual from intrapersonal to interpersonal processes based on their evaluation of self-knowledge and subsequent self-respect and desired improvement. If IH mirrors this process, there is a temporal aspect to IH in which the relationship between IH and SA may be causal. To test this, four cross-lagged path models were

conducted to further evaluate relationships between IH and IA with SA Peer / CoC based on the 22-month time in which the data is drawn (Figures 1a, 1b, 2a, 2b). Cross-lagged path models are used to evaluate whether a causal relationship exists between two or more independent variables and the magnitude and significance of that relationship. Four path models are tested: IH with SA determined by self / peer difference; IH with SA determined by self / CoC difference; IA with SA determined by self / peer difference; and finally, IA with SA determined by self / CoC difference. The SA variables are further defined by specifying three levels of awareness: overestimators, self-aware, and underestimators. Overestimators are defined as those with congruence scores above .50; underestimators are those with scores less than -.50; and the self-aware are those whose scores fall between -.50 and .50.

Phase 3 – Analysis for Hypotheses 3 and 4

Phase three utilizes latent growth models (LGMs) to examine the intercepts and slope estimates to answer hypotheses three and four. Hypotheses three proposes that growth in IH will be positively related to growth in SA while hypotheses four states that growth in IA will be negatively related to growth in self-awareness. Latent growth models are a type of confirmatory factor analysis used to model trajectories through fixed loadings of specific values. Because nonlinearity cannot be determined with three time points (Fitzmaurice et al., 2004), a linear latent growth model is applied utilizing lavaan package (Rosseel et al., 2022) in RStudio (RStudio Team, 2021, 2022). For each model, intercepts are fixed to one while slopes are fixed by the progression of time which is measured by month intervals with IH_{t1} variable fixed to 0 so that the mean of the intercept factor is interpreted as the mean of the first timepoint. All subsequent variables are fixed in progression based on the month of their respective data collection during the 22-month period of time. An ordinal increase in one unit equates to the

same number of months. The slope and intercept LGM are used to compare growth between the four pairs of variables across their respective three time points: IH with SAP, IH with SAC, IA with SAP, and IA with SAC.

Chapter 4: Results

The purpose of this study is to explore whether self-awareness is a component of intellectual humility. To do this, the plan of analysis collectively established a way to address the four hypotheses regarding the relationship of IH and IA with SA. Self-awareness is determined through the congruency between self / other reports. All data was gathered during the first 22 months of a cohort of West Point Class of 2020 Cadets' 47-month experience. The first two hypotheses ask whether a positive relationship exists between IH and SA and a negative relationship between IA and SA. Hypotheses three and four seek to strengthen potential findings through longitudinal exploration of the relationships between IH and IA with SA. In the following chapter, the results from the plan of analysis are reported through the three phases. The first is focused on variable measurement and the subsequent two are focused on variable growth.

Phase One – Measurement Models

Invariance Analyses

As previously stated, longitudinal measurement invariance tests were conducted using configural, metric, and scalar invariance models. For each construct and evaluator type, configural invariance models were tested first and model fit was evaluated. Overall, self-evaluations displayed the better fit to data across all data collection periods while instructor evaluations demonstrated the worst model fit (Table 7a and 7b). However, instructor evaluation was removed from further analysis based on its extreme variance which is attributed to the change of rater and their respective evaluations of which leader attributes and competencies can be exhibited in the classroom. Additionally, the attribute of Empathy was removed from the Character construct across the three remaining evaluation types based on its variance across time periods. Based on variances occurring outside the model, the CoC models for Intellect, Lead, and Develop constructs were adjusted to account for these relationships which improved model fit

indices, respectively. In the upcoming section, these findings are discussed in greater detail with a comprehensive report of all measurements for both initial models (Table 7a) and adjusted models (Table 7b) for reference.

The self-report PDR constructs produced the strongest model fit compared to the other PDR types measured (Table 7a). This was anticipated given evaluators remained the same at each data collection and were more likely to assess measurements similarly at each time point. For all five subscales, self-reports attained acceptable or good model fit for configural, metric, and scalar measurement invariance models. The chi square difference tests comparing configural and metric invariance models were significant for all five subscales with $\Delta\chi^2$ (df = 54) = 33.400, $p < .000$, $\Delta\chi^2$ (df =106) = 42.683 , $p <$ 2.555e, $\Delta\chi^2$ (df = 174) = 42.014 , $p < .0002$, $\Delta\chi^2$ (df =174) = 51.324 , $p <$ 7.303e, $\Delta\chi^2$ (df = 106) = 28.701, $p < .004$, for Character, Presence, Intellect, Lead, and Develop subscales, respectively. However, strong invariance models were insignificantly different between metric and strong models for the Character, Intellect, Lead, and Develop subscales with $\Delta\chi^2$ (df = 60) = 7.258 , $p > .298$; $\Delta\chi^2$ (df =186) = 15.214, $p > .230$; $\Delta\chi^2$ (df =186) = 19.504, $p >.077$; $\Delta\chi^2$ (df =115) = 15.630, $p >.075$ respectively. This suggests factor loadings and intercepts were similar across three time-points. For the Presence subscale, chi square difference tests comparing metric and strong invariance models were significant, $\Delta\chi^2$ (df = 115) = 30.832, $p < .0003$. Despite the significant chi square differences for the metric invariance inmodels, the model fit indices showed strong or acceptable model fit for the metric invariance models, suggesting factor loadings were similar across time points (Table 7b). Factor loadings ranged from .545 to .844 for Character, .379 to .781 for Presence, .339 to .776 for Intellect, .462 to .874 for Lead, and .433 to .775 for Develop.

Peer evaluations were second to self-evaluations in the consistency of acceptable model fit with both configural and metric measurements (Tables 7a & 7b). Because peer evaluators are in the same academic class as the self-evaluators, they likely share similar interpretations of the attributes and competencies as their classmates based on similar exposure to attribute and competencies during training and classroom instruction which occur during the first months of their matriculation year. The chi square difference tests comparing configural and metric invariance models were insignificant for Character, Presence, and Intellect subscales with $\Delta\chi^2$ (df = 54) = 5.711, $p > .768$; $\Delta\chi^2$ (df =106) = 9.042 , $p > .699$; and $\Delta\chi^2$ (df = 174) = 22.247, $p > .102$, respectively. However, strong invariance models were significantly different between metric and strong models for all five subscales with $\Delta\chi^2$ (df = 60) = 112.594 , $p <$ 2.2e-16; $\Delta\chi^2$ (df =115) = 109.932, $p >$ 2.2e-16; $\Delta\chi^2$ (df =186) = 203.076, $p <$ 2.2e-16; $\Delta\chi^2$ (df =186) = 204.354, $p <$ 2.2e-16; $\Delta\chi^2$ (df =115) = 151.109, $p <$ 2.2e-16 for Character, Presence, Intellect, Lead, and Develop, respectively. Despite the significant chi square differences for the strong invariance models, the model fit indices showed strong or acceptable model fit for the metric invariance models, suggesting factor loadings were similar across time points (Table 7b). Factor loadings ranged from .596 to .927 for Character, .377 to .744 for Presence, .430 to .874 for Intellect, .471 to .870 for Lead, and .460 to .839 for Develop.

The final PDR for invariance analysis are the evaluations completed by the participants' chain of command (CoC). The chain of command is an institutionalized leadership construct where upper class students are appointed into positions of leadership to facilitate the management of the Corps of Cadets. The CoC shares living and eating space, attend events, and company classes with the participants. These evaluators are likely to share some similarities with the self and peer evaluators as they are only one to two years removed from being in a similar

position. However, based on their own development while at the academy combined with their assigned role, the CoC may evaluate the participant from a different perspective than the participants' peers. The CoC evaluations showed invariance at the configural and metric measurement models for both the Character and Presence constructs. The chi square difference test comparing configural and metric invariance models was not significant for the Character subscale for PDR4 with $\Delta\chi^2$ (df = 54) = 12.752, $p > .174$ but was significant for Presence with $\Delta\chi^2$ (df = 106) = 32.006, $p < .001$. The chi square difference test comparing metric and strong models was significant for both Character and Presence, however, model fit indices showed strong or acceptable model fit for the metric invariance models, suggesting factor loadings were similar across time points for Character and Presence. Unlike Character and Presence for PDR4, the remaining three subscales, demonstrated invariance only with configural measurement.

The assessment of PDR 4 evaluations in the Intellect, Lead, and Develop constructs revealed unexplained relationships between items occurring outside the model which affected model fit. For Intellect, mod indices indicated a relationship between the items of sound judgment (SJ) and interpersonal tact (IT) occurring at every time point. When this relationship was added to the model it increased metric invariance measurements to CFI = .951 and TLI = .946 and the RMSEA = .036 (Table 7b) with the chi square difference between configural and metric at $\Delta\chi^2$ (df = 170) = 25.304, $p < .0460$ and between metric and strong at $\Delta\chi^2$ (df = 182) = 169.069, $p < 2.2e\text{-}16$. In both SJ and IT, the measurements address the ability to assess a situation and make decisions. Although SJ is addressing concepts and IT is addressing people, it is likely the distinction between the two is blurred or related for some evaluators.

For the Lead category, mod indices suggest a relationship between builds trust (BT) and communication (CM) at all data collection periods. When this relationship was added to the

Leads model for the CoC evaluation, model fit measurements improve to CFI = .954 and TLI = .949, and RMSEA = .037 (Table 7b); with chi square difference between configural and metric models at $\Delta\chi^2$ (df = 170) = 46.679, p < 4.413e-05; and chi square difference between metric and strong models at $\Delta\chi^2$ (df = 182) = 98.022, p < 1.358e -15. Although the CM measurement specifically addresses communication, the BT measure does mention communication in its brief description which may be creating unwanted variance. The last category in CoC PDR, Develop, showed a relationship between creates a positive environment (PE) and develops others (DO) which affected variance. With the addition of this relationship to the model for CoC PDR, model fit improved to CFI = .935 and TLI = .924 and RMSEA = .050 (Table 7b); chi square difference between configural and metric models at $\Delta\chi^2$ (df = 102) = 29.472, p > .003; and the chi square difference between metric and strong models at $\Delta\chi^2$ (df = 107) = 142.469, p < 2.2e-16. With the changes to the CoC PDR model in Intellect, Lead, and Develops, the CoC PDR meets the acceptable model fit thresholds for both the configural and metric measurements and is retained for self / CoC SA variable development.

In addition to the model modifications for CoC PDR, there is one measure which impacted model fit measurements across all PDR types. The attribute of Empathy showed an unpredictable pattern of variance across all four PDR types. Although the category of Character showed acceptable model fit without the removal of this item. Its removal improved character model fit measurements across all three PDRs retained (Table 7b). The cause for unpredictable variance in this measure is unknown. The measure of Empathy was a recent addition to the PDR prior to this data collection time, therefore, its newness as a construct may contribute to its variance.

The longitudinal invariance measurements of the IHS and its subscales demonstrated more consistency than the PDR. The IO scale met good fit criteria across all measurements. The IA scale measured with good fit measurements at the configural and metric level. At the scalar level, IA initially measured at CFI = .898, TLI = .884, and RMSEA = .073. Upon further analysis, item six from the IA scale ("*I have little patience for others' beliefs*") was identified as causing greater variance and was removed, leaving four items to makeup the IA scale. The removal of item six improved model fit measurements to at CFI = .941, TLI = .930, and RMSEA = .063 for the IA subscale and improved the overall model fit for the IH as a variable.

Congruence-d

Once invariance tests were complete, the evaluation data was prepared to create the self-awareness variable composite. The first step in creating a self-awareness variable was to create an overall score for each PDR type at each time. This variable is called the Leader variable. The Leader variable equaled the total some of factor scores for the five categories of attributes and competencies for each evaluation at each time point. Upon completion of the Leader variable construction, paired sample t-tests were conducted to determine if there was a statistical difference between the Self and Peer Leader variables as well as the Self and CoC Leader variables (Tables 9a & 9b). Each of the six pairs showed statistical significance at the $p < .001$ level. With significant difference among the pairs determined, the self-awareness variables were built. The Peer Leader variable was subtracted from the Self Leader variable and subsequently divided by the pooled standard deviation of the pair for each data collection period (Fletcher and Bailey, 2003). The same process was repeated for the CoC Leader variable, which was subtracted from the Peer Leader variable, again, at each of the three data collection time periods. Upon completion, a total of six new variables were created: SA defined by Peers (SAP_{t1}, SAP_{t2}, SAP_{t3}) and SA defined by CoC (SAC_{t1}, SAC_{t2}, SAC_{t3}). With variables set, the SA variables were

imputed (m = 10) to complete data analysis for phase one and transition to analysis for phases two and three.

Preliminary Data Analysis

Basic preliminary data analysis was conducted on IHS and new self-awareness variables. Descriptive statistics for SA and IHS variables can be found in Tables 10a and 10b. Overall, SA variables are normally distributed with exception of the SAP_{t3} variable with skewness at 1.00, indicating the distribution is right-skewed and platykurtic. Additionally, the Kolmogorov-Smirnov and Shapiro-Wilk tests confirm a normal distribution of all SA variables ($p > .05$), with the exception of $SAP_{t3.}$ The interpretation of the SA mean scores requires a review as the numbers reflect more than just an average score. Self-awareness is measured by the level of congruency between self and other reports. Therefore, a negative number indicates, on average, a trend of underestimation where the participant sees themselves as possessing attributes and exemplifying competencies below what their peer or CoC believe. For positive mean scores, participants evaluate themselves as possessing or exemplifying attributes and competencies better than what their peers or CoC believe they do. Finally, the closer the mean scores are to zero, the more, on average, the participants are reported to possess self-awareness. There is no intent or ability to determine whether peer or CoC evaluations are more correct than the other for this study.

The means scores for both SAP and SAC variables rise above and fall below zero at the same time points but the degree to which they do this results in different summaries (Table10a). The SAP_{t1} (M=-1.62, SD=1.01) to SAP_{t2} (M=1.47, SD=0.99) difference parallels a similar pattern with SAC_{t1} (M=-0.24, SD=1.01) to SAC_{t2} (M=1.04, SD = 1.00). The SAP increase in mean reflects a transition from an overall tendency for participants to underestimate to an overall

tendency to overestimate. The SAP_{t2} mean is closer to zero than SAP_{t1} which shows a slight improvement in SA but the SAP_{t3} mean (M = -0.38, SD=1.00) shows a return to underestimation and is much closer to zero. The SAC_{t1} mean is the closest to zero of the SA means across type and time. However, SAC_{t3} shows (M = -2.70, SD=1.01) a return to underestimation at a point farthest from zero among all SAC means.

Self-awareness scores were categorized into the categories of overestimators, self-aware, and underestimators based on their congruency scores for each time point (Table 11). Those with scores above .5 were categorized as overestimators while those between .50 and -.50 were categorized as self-aware (Yammarino & Atwater, 1997). All those with scores below -.50 were categorized as underestimators. For the SAP variable, the numbers show a slight increase in self-awareness from 12.4% to 13.9% of the sample and a significant increase from 13.9% to 41.3% from time point two to three. The SAC variables show a decline in self-awareness with a trend towards underestimation with 35.3% self-awareness among the sample for the first wave and a decline to 26.4% at time two and 1% at time three. Both SAP_{t1} and SAC_{t3} possess large percentages of underestimation at 85.6% and 98.5% respectively. Both SAP_{t2} and SAC_{t2} show a substantial percentage of overestimators at 84.1% and 68.2% respectively.

The descriptive statistics for the IHS variables hold much less variation between time points than the SA variables. Prior to further reporting, a reminder that the IA variable is reverse coded so that the higher the number, the lower the IA and vice versa. Based on the varying minimum and maximum ranges, interpretations of variable means compared against time points to determine increase and decrease in patterns is challenged and will be addressed in greater detail in addressing hypotheses three and four. Overall, the distribution of data is normal across all time points for IH, IA, and IO variables and platykurtic. Outliers varied by number and

frequency based on variable and time point. Outliers did not replicate in further data waves within their own variable set. Three outliers within IHS variables of IO_{t1} and IO_{t2} also were among outliers within either the SAP or SAC variables. All outliers were retained given no pattern could be determined.

Pearson's r correlations ranged from small to large with significance at $p < .05$ or $p < .001$ levels only between same scale variables. There was no statistically significant relationship between IH or IA variables with either of the SA variables at any time point. This finding will be discussed in further detail in phase two analysis. The IHS variables showed strong correlations and were statistically significant with the same variable at different time points. For the IH variables, the correlations were all strong (r (200) > .520, $p < .001$) but the strongest relationship was between IH_{t2} and IH_{t3} (r (200) = .764, $p < .001$). For the IA variables, a similar pattern was present. The IA_{t1} variable held strong relationships between both IA_{t2} (r (200) = .742, $p < .001$) and IA_{t3} (r (200) = .615, $p < .001$) but the relationship between IA_{t2} with IA_{t3} was strongest (r (200) = .793 at $p < .001$). Within the SA variables, the SAP_{t1} variable held negative and insignificant relationships with SAP_{t2}, SAP_{t3}, and SAC_{t3}; a significant and negative relationship with SAC_{t2} (r (200) = -.165, $p = .019$); and its strongest relationship with SAC_{t1} (r (200) = .778, $p < .001$). The SAP_{t2} also had its strongest relationship with its SAC_{t2} counterpart (r (200) = .710, $p < .001$) as well as small and significant relationships with SAP_{t3} and SAC_{t3} (r (200) = .280, .231, $p <.001$). The SAC_{t3} had small and significant relationships with SAC_{t2} and SAC_{t3} (r (200) = .282, .222, $p < .001$). The aforementioned correlations represent the most significant among the variables, but further analysis is conducted and explained in the phase two analysis to address hypotheses one and two.

Phase Two

Hypotheses One and Two

Preliminary analysis utilizing the Pearson's r correlation coefficient shows no statistically significant linear relationship between the IHS variables and SA variables (Table 12). These correlations suggest a failure to reject the null hypothesis for both hypotheses one and two. The strongest relationships among the IH variables are IH_{t1} with SAC_{t2} (r (200) = .076, p = .284; IH_{t2} with SAC_{t1} (r (200) = .073, p = .304); and IH_{t3} with SAC_{t3} (r (200) = .078, p = 272. The IA variable has a small, non-statistically significant relationship with both SAP and SAC across all three time points. For IA_{t1} and IA_{t2}, their strongest relationships are with SAC_{t3} (r (200) = -.105, -.053, p = .137, .456 respectively). For IA_{t3}, its strongest relationship is with SAP_{t3} (r (200) = .047, p = 288). Despite the low correlation among IH and IA variables with the SA variables, the strong correlations between same type variable as well as the varying strength of correlation between IH and IA variables with the SAP and SAC variables at different time points suggest the presence of additional relationships which are identified through four cross-lagged path models.

Cross-lagged path models provide a method to explore the potential of multiple relationships among IH, IA and the SA variables. Path analysis provides the ability to assess a more complex and realistic model than what multiple regression can permit (Streiner, 2005); enables the identification of multiple dependent variables and ability to determine which predictor variables have stronger, weaker, or no relationships among multiple variables (Mendard, 2022). This characteristic is helpful given preliminary analysis results and the temporal difference in data collection between IHS and SA variables. Path analysis was conducted utilizing IH_{t1} as an exogenous variable with remaining IH_{t2}, IH_{t3} variables with $SAP_{t1,t2,t3}$ variables as endogenous variables (Figure 1a). This model was repeated, replacing

SAP variables with SAC variables (Figure 1b). Models were then repeated once more, replacing the IH variables with IA variables (Figures 2a, b).

The results of the cross-lagged path models identify multiple significant relationships among the variables not identified through Pearson's r correlation. Model fit measures for each of the four path analyses show good model fit (Table 13). For each model, the IHS variables, IH and IA, are strongly and positively correlated across time $\beta \geq .72$ at $p < .001$ (Figures 3a, b and 4a, b) with no meaningful difference between scores at each time point. Unlike the IHS variables, the SA variables do possess meaningful difference at each time point. Both the SAP and SAC variables at time one and time two share a negative relationship across all four models. Similarly, they share a positive relationship between time two and three. These similarities at the macro level are misleading when taking into account the presence of overestimators, self-aware, and underestimators at each time point for both SA variables (Table 11). In the upcoming paragraphs the IH models (Figure 3a, b) and the IA models (Figure 4a, b) are discussed in greater detail to address their ability to answer hypotheses one and two.

Table 11

Self-Awareness Variables Categorized by Overestimation, Self-Aware, and Underestimation

	SAP_{t1}		SAP_{t2}		SAP_{t3}		SAC_{t1}		SAC_{t2}		SAC_{t3}	
Self-Awareness Level	#	%	#	%	#	%	#	%	#	%	#	%
Overestimator	4	2	169	84.1	25	12.4	49	24.4	137	68.2	1	0.5
Self-Aware	25	12.4	28	13.9	83	41.3	71	35.3	53	26.4	2	1
Underestimator	172	85.6	4	2	93	46.3	81	40.3	11	5.5	198	98.5

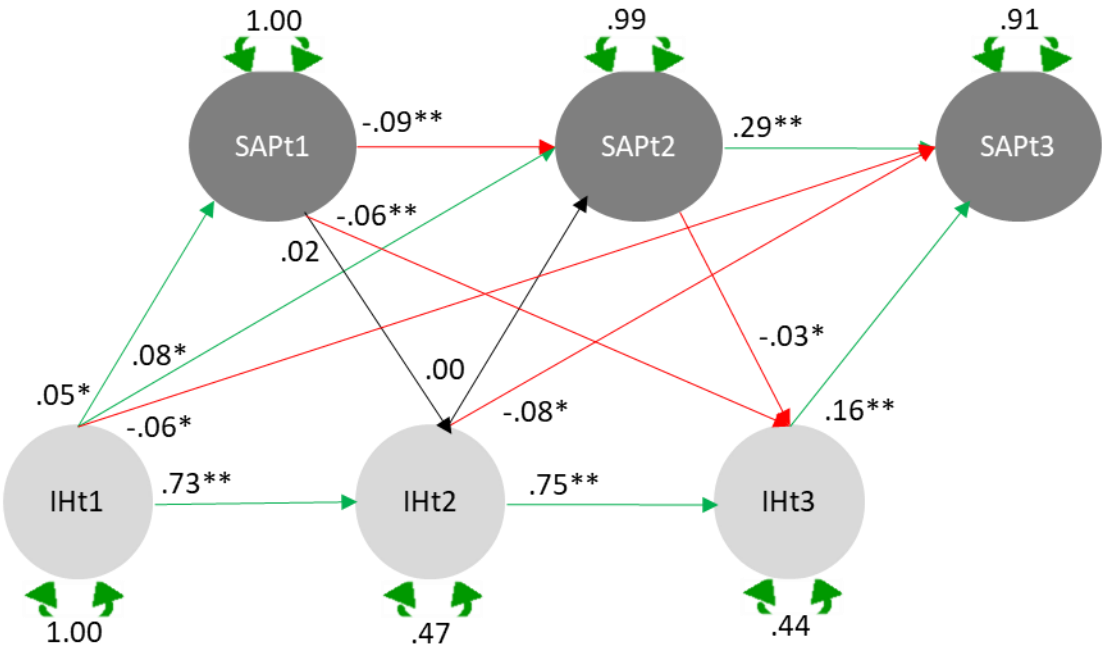
**N=201; Overestimator > .50, Self-Aware ≥ -.50, ≤ .50 ; Underestimator < -.50*

The cross-lagged path model results for IH and SAP provide inconclusive results based on the variations between time points (Figure 3a). The percentage of overestimators, self-aware, and underestimators collectively shape anticipated relationships between IH and the SA variables at each time point. Based on the increase in self-awareness over time, there should be an

associated increase in strength of relationship between IH and SAP. To a degree, the path analysis did show this. Both the IH_{t1} and IH_{t3} variables both hold small, positive, statistically significant relationships with SAP_{t1} and SAP_{t3}. Between IH_{t1} and IH_{t3}, IH_{t3} holds the stronger relationship with SAP_{t3} ($\beta = .16$, $p < .001$) than IH_{t1} with SAP_{t1} ($\beta = .05$, $p < .05$) which reflects the greater percentage of self-aware in SAP_{t3}. However, IH_{t2} holds no relationship with SAP_{t2} despite a slight increase in self-aware individuals from time point one to two. The dramatic increase in overestimators at time two, 84.1% of participants, could potentially play a role in the absence of an identified relationship between IH_{t2} and SAP_{t2}. The absence of an identified

Figure 3a

Results of Path Analysis with Intellectual Humility Time One as Exogenous Variable with Self-Awareness-Peer and Intellectual Humility Endogenous Variables



*Standardized Estimates used; *p < .05; ** p < .001*

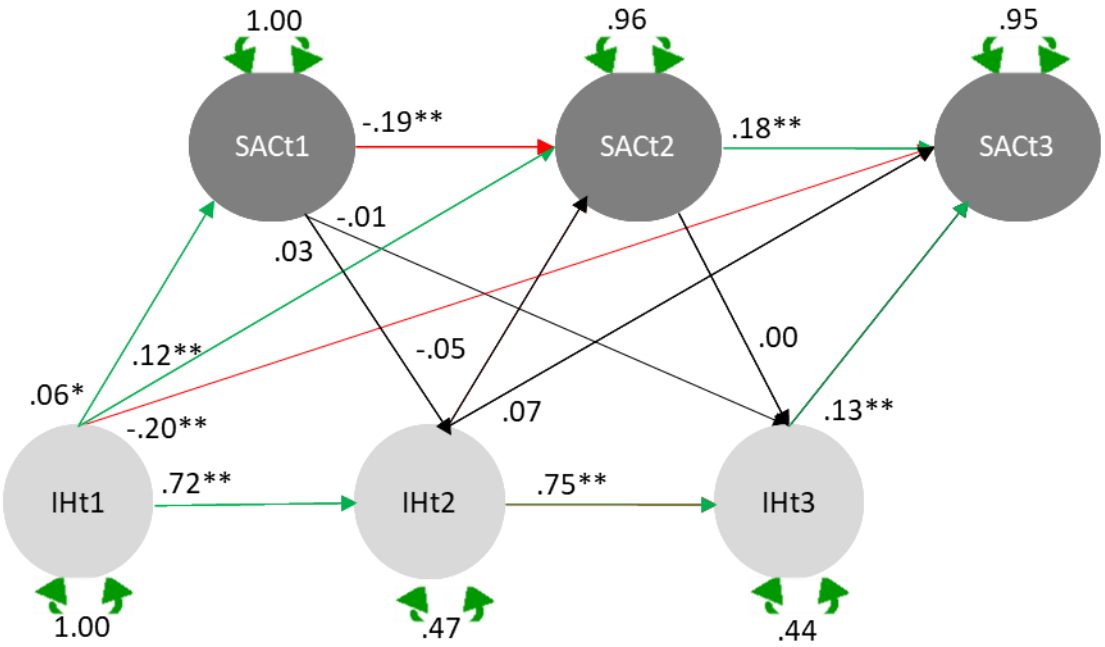
relationship between IH_{t2} and SAP_{t2} indicates a failure to reject the null hypothesis. Additional relationships which support the hypothesis one null are the negative relationships between IHt1

(β = -.06, $p < .05$) and IHt2 (β = -.08, $p < .05$) with SAP_{t3}. The SAP_{t3} variable holds the largest percentage of self-aware participants among the SAP time points and therefore should demonstrate a positive and strong relationship with the IH variables. The inconclusive results indicate an inability to reject the null hypothesis but before this can be done, results are needed from the IH and SAC model.

On the surface, the path model examining the relationships between IH and the SAC variables appear similar but are in fact much different when congruency levels are taken into account (Figure 3b). Like the IH / SAP model, the IH_{t1} and IH_{t3} variables hold small, positive, and statistically significant relationships with the SACt1 and SACt3. The difference between the two models is that SAC_{t1} presents 35.3% of participants are self-aware compared to the 12.4% in SAP_{t1}. This would suggest a stronger relationship between IH_{t1} and SAC_{t1} than what the data presents with β = .06, $p < .05$. Additionally, IH_{t3} has a significant and positive relationship with SAC_{t3} (β = .13, $p < .001$) which presents the lowest number of self-aware participants among all SA variables at all time points. The IHt1 variable offers additional contradicting support in its positive and significant relationship with SAC_{t2} (β = .12, $p < .01$). This relationship is stronger than the relationship between IH_{t1} and SAC_{t1} and the percentage of self-aware participants is higher in SAC_{t1} than SAC_{t2} (35.3% to 26.4%) and a much higher percentage of overestimators (68.2% compared to 24.4%). Yet, IH_{t1} does show a negative relationship with SAC_{t3} which reports a 98.5% of participants reporting underestimation which only shows 1% of participants with SA. When the results of the IH / SAP model are combined with the IH / SAC model, the overall conclusion is that neither hypothesis one nor its null can be fully supported.

Figure 3b

Results of Path Analysis with Intellectual Humility Time One as Exogenous Variable with Self-Awareness-CoC and Intellectual Humility Endogenous Variables

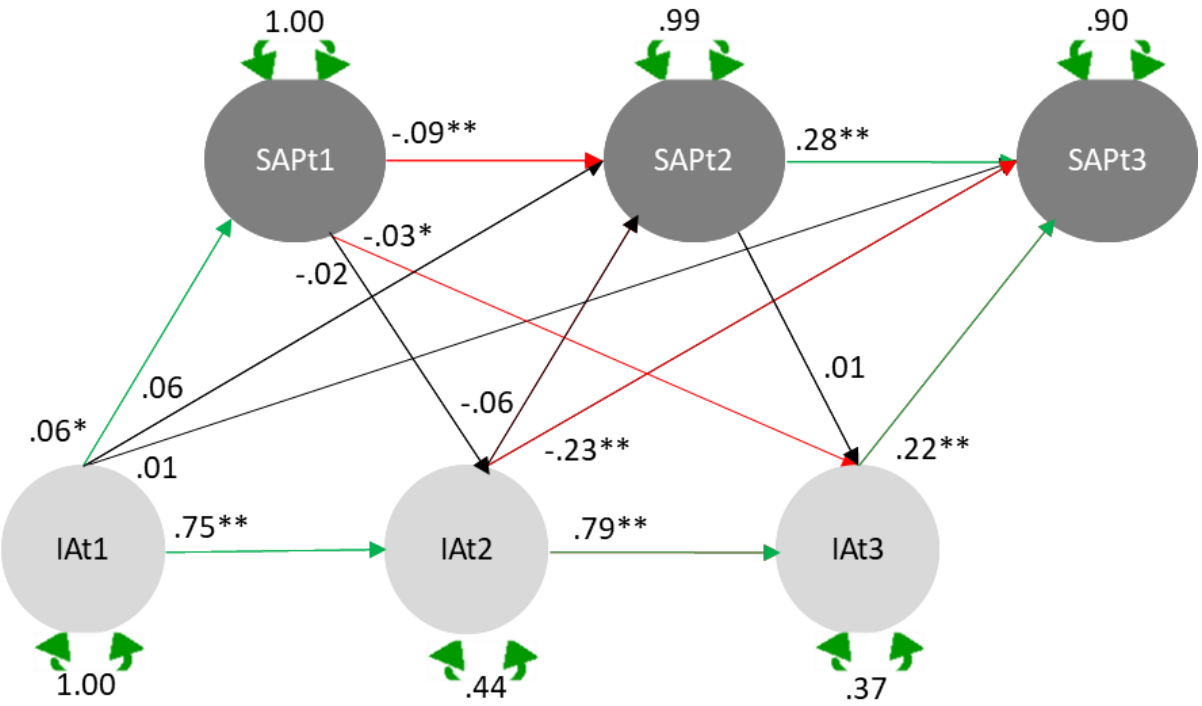


*Standardized Estimates used; *p < .05; ** p < .001*

The path analysis model between IA and SAP variables presents a series of significant relationships which, like the IH / SA models, challenge the ability to either support hypothesis two or conclusively fail to reject its null (Figure 4a). As a reminder based on reverse coding, the increase in IA reflects its decrease. Therefore, the small, positive, and statistically significant relationships between IA_{t1} and SAP_{t1} ($\beta = .06$, $p < .05$) as well as IA_{t3} and SAP_{t3} ($\beta = .22$, $p < .001$) do not support hypothesis two but also do not support the null. For SAP_{t1}, there is only 2% of participants who rate as overestimators which could explain the absence of a negative relationship between IA_{t1} and SAP_{t1}. The relationship between IA_{t3} and SAP_{t3} is more difficult to explain as the presence of overestimators is higher than at SAP_{t1} (12.4%) but the presence of SA is highest at the third time point (41.3%). The absence of IA may have a stronger relationship with SA than

Figure 4a

Results of Path Analysis with Intellectual Arrogance Time One as Exogenous Variable with Self-Awareness-Peer and Intellectual Arrogance Endogenous Variables



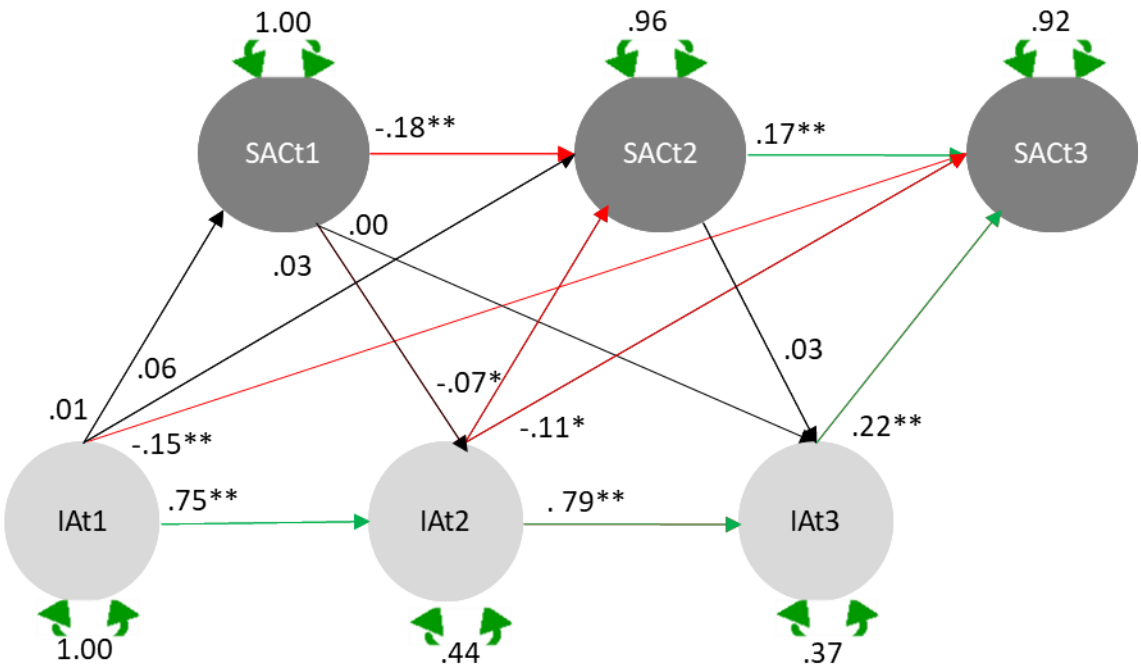
*Standardized Estimates used; *p < .05; ** p < .001*

IA with overestimation. Of the SAP variables, SAP_{t2} presents with the largest number of overestimators (84.1%) and therefore would be most likely to demonstrate a significant significant relationship with IA_{t1}, IA_{t2}, or IA_{t3}. In fact, there is no significant relationship between any IA variable with SAP_{t2}. Interestingly, the IA_{t2} and SAP_{t3} have the strongest relationship among the IA and SAP variables (β = -.23, p <.001). Of the IA variables, IA_{t2} shows the only negative mean which indicates a larger presence of reported IA at this time point. Because of this, the absence of a statistically significant relationship between IA_{t2} and SAP_{t2} supports the null hypothesis, yet the significant and negative relationship with SAP_{t3} lends

support to hypothesis two.

Figure 4b

Results of Path Analysis with Intellectual Arrogance Time One as Exogenous Variable with Self-Awareness-CoC and Intellectual Arrogance Endogenous Variables



*Standardized Estimates used; *p < .05; ** p < .001*

The path model between IA and SAC also suggests complexity in relationships between IA and SA variables. Before assessing the cross-lagged relationships, an overview of congruency levels provides an indication of where strong relationships between IA and SAC should be based on levels of overestimation. Overestimators are present in both SAC_{t1} (24.4%) and SAC_{t2} (68.2%) at much higher levels than SAC_{t3} (0.5%). However, IA_{t1} has almost no relationship with SAC_{t1} ($\beta = .01$, $p = .537$) while IA_{t2} does have a significant, negative but very small relationship with SAC_{t2} ($\beta = -.07$, $p < .05$). The strongest relationships among the IA and SAC variables are between IA_{t1}, IA_{t2}, and IA_{t3} with SAC_{t3}. Both IA_{t1} and IA_{t2} have negative relationships with

SAC_{t3} (β = -.15, $p < .001$; β = -.11, $p < .05$) while IA_{t3} holds a positive relationship (β = .22, $p <$ .001). None of the relationships supports hypothesis two, leading to a similar conclusion identified with IH. Neither hypothesis two nor its null are supported.

Phase Three

Hypotheses Three and Four

Hypotheses three and four were used to further assess the theorized relationships between IH / IA and SA. Based on data analysis for hypotheses one and two, conclusions for hypotheses three and four are indeterminable. Linear latent growth analysis was conducted to examine the intercepts and slope estimates to address hypotheses three and four. Utilizing slope and intercept models to compare the growth patterns between IH and SAP / SAC (Figures 5a, b) and IA with SAP / SAC (Figures 6a, b), linear latent growth models were conducted resulting in poor model fit for each model (Table 14). Contributing to this indication of an improper solution, each model also contained negative error variance. Improper solutions can result from a number of problems. Typical problems associated with improper solutions are underidentified models, serious problems with a data set, misspecification in data set, or empirical underidentification. In the case of the four LGM models for this study, there is a positive number of degrees of freedom, data has been analyzed and used in other models without problem, and the models were specifically selected, based on theory, to compare the slopes and intercepts of two variables across the minimum required time points for LGM (Newsom, 2020).

It is possible the negative error variance found in each of the four models is a result of empirical underidentification. Empirical identification can lead to nonconvergence when there is insufficient covariance information in a portion of the model (Newsom, 2020). The inability to identify covariance information leads to the inability to generate valid estimates. Negative

variance may also occur with smaller samples, low factor loadings, violations of regression. The sample size used in the LGM was N = 201 and reliability of factors was well above required minimums leaving sample size and factor as unlikely causes. It is possible the improper solution was a result of a violation of regression assumptions. Because outliers were retained initially, the four models were rerun with outliers removed (N=179) with no change in the status. The issue in running the latent growth model is more likely tied to the non-linearity, non-additive data set evidenced in the strong and significant changes among the SA variables.

Chapter 5: Discussion

The relationship between IH and SA variables do not support hypothesis one; neither could the relationships between IA and SA variables support hypothesis two. The inability to conclusively answer the hypotheses requires examination of data, methodology, and theory. In the upcoming section, study results are discussed. First, the characteristics of the IHS and SA variables along with potential interpretations which may offer insight into inconclusiveness of the data. Following the individual examination of each variable, the relationships between the two are discussed. The section is concluded with identification of study limitations and suggestions for future research.

The longitudinal invariance tests identified the instructor PDR could not be used based on its variance in all five categories across all time points (Table 7a). Instructor evaluations achieved strong fit with configural measurement in four of five categories (all but Lead) and metric at only one (Intellect). This finding was initially surprising. Most instructors are senior military who possess a minimum of 10 and up to 30 years of experience evaluating individuals against the 22 competencies and attributes included in the PDR. Upon further analysis, however, there are multiple factors which could contribute to this measurement variance. The first is related to the constraints of time and classroom environment on Cadets' ability to demonstrate the attributes and competencies and, therefore, the instructors' ability to observe them. This would explain why the category of intellect is the only category where metric measurement of invariance was acceptable. However, as a counter argument, it does not explain why instructors did not consistently assess this specific category well enough to attain strong measurement invariance. Relatedly, additional reasons could be differences among instructors and their belief that these attributes and competencies can be observed and / or demonstrated in the classroom.

Additionally, although training on the PDR varies among both Cadets and instructors, Cadets may be more likely to discuss completion of PDRs based on their relative inexperience with the attributes and competencies compared to more senior instructors who might feel more knowledgeable and less likely to confer with peers. Because the instructor PDR was removed based on variance, the relationship between IH and IA with SA determined through self / instructor congruency could not be assessed and should be an area of focus for future research.

The examination of IHS and SA variables separately helps understand subsequent relationships identified between the two groups through path analysis. Preliminary data analysis showed no significant mean change for the IH and IA variables across time. Between the time points for the IA variable, data collected at time one and three held identical means with small difference between their max and min scores. The IH means held constant between time point two and three, both small and negative. The largest change, albeit not significant, was at time two when the mean became negative for both IA and IH. Although the difference was not statistically significant, the transition from positive to negative shows an increase in IA and subsequent decrease in IH. Overall, the insignificant Cohen's d for the IHS data indicates slight change collectively, however, this does not necessarily indicate no individual or potential group growth or decrease within the data. Murray (2020, 2019) utilized growth mixture models in a larger sample from the same archival data to find two groups of trajectories, one in which IA increased insignificantly and one in which it decreased non-significantly. Although the means for this sample remained relatively stable, this does not discount the potential for increases or decreases of IH or IA within subgroups.

The SA variables both exhibited strong, statistically significant differences across all time points. Both SAP and SAC variables showed collective, on average, participant underestimation

at time points one and three and overestimation at time point two. Both SAP and SAC variables demonstrated a dramatic increase in overestimation from time point one to time point two. This increase could be explained by the significance of the time period in which the data was drawn. The first collection of SA data was gathered at the end of first term of the participants' first year. Based on academic rigor and highly constrained lifestyle, it is possible that most participants' may have been uncertain of themselves and their capabilities within a system still largely foreign and challenging. This uncertainty potentially may have influenced how participants felt about their own abilities and with only a couple months knowing peers, their ratings of others may have been more generous. Additionally, knowing they, too, were to receive feedback, participants may have been less inclined to provide unfavorable evaluations (Fletcher and Baldry, 2000). However, by the end of their first year when the second wave of SA data was collected, participants had likely adjusted more to their environment; grown in comfort and confidence; and perhaps possessed a sense of accomplishment for successfully completing their first year. Simultaneously, after spending a year doing almost everything together, participants' peers had more opportunity to gain better insight into their classmates and their abilities. Whether it was better insight into peers' capabilities or perhaps the intolerance which can accompany living in proximity in a more constrained lifestyle, peers and the CoC (older peers) rated participants lower than the participants rated themselves at the end of their first year. These factors may explain the difference in SA between time point one and time point two but not time point three.

The difference between SAP and SAC variables at time points one and three is significant and highlights concerns about accuracy of SOA as a measurement tool of SA. At time point one, SAP collectively displayed mostly a population of underestimation where SAC data at time point

one showed greater distribution between overestimators, self-aware, and underestimators. However, at time point three, these statistics were reversed with the time point three SAP variable showing distribution across overestimator, self-aware, and underestimator categories while the SAC variable at time point three presented with over 98.5% underestimators. Time point three data was collected from participants at the end of their sophomore year. At the conclusion of their sophomore year, participants have held two leadership positions as team leaders, which gives them responsibility of one other individual aside from themselves. At the end of their sophomore year, they are on the precipice of transitioning to much greater responsibilities as upper-class students. The difference between self-assessment and their CoC could reflect participants' overall uncertainty in their capabilities and preparedness to transition to the next level. The difference between self and CoC evaluations could also reflect a collective belief or expectation among the CoC who are responsible for facilitating the participants' growth and readiness to assume positions with greater responsibility. A lack of readiness on the participants' part could be attributed to a failure on the CoC. Therefore, the CoC may rate the participants as more prepared than the participants believe themselves to be.

The differences between SAP and SAC scores could be attributed to contextual factors but might also be related to the accuracy of the rater or their relationship with the participant. Multi-source feedback literature collectively suggests that that ratings from diverse groups are not necessarily more or less accurate but rather different perspectives which contribute to a better overall understanding of the individual. The tendency to compare the differences between SAP and SAC is intuitive but the evaluations which contributed to the SA variables are perspectives of the participant from different vantage points. In some research, supervisors were shown to be less lenient than peers on the evaluation of a colleague (Fletcher & Baldry, 2000). Although this

would seem the case at time point one for SAP and SAC variables, it does not appear applicable at time point three for either SAP or SAC.

The four models of path analyses identified no consistent pattern of relationship as theorized between IH and SA or IA and SA. Of the four models, the IH variable showed the most support for the relationship between IH and SA. However, the positive relationship between the two was not always present, the strength of that relationship varied, and sometimes contrary to the actual level of identified self-awareness present. For the SAP variable, the greatest presence of self-awareness was present at time point three. Therefore, the relationship between IHt3 and SAP_{t3} supports hypothesis one in its direction, and statistical significance. However, its sister variables, IH_{t1} and IH_{t2}, both have negative and significant relationships with SAP_{t3}. There are a number of factors which could explain this but none of which are currently identifiable. The negative mean at IH_{t2} may provide a small indicator of potential changes within the variable that relate to those in SAP_{t3}. Additionally, the small statistically significant relationship between IH_{t1} with SAC_{t1}, which presents the largest percentage of self-awareness among the SAC variables at 35.3%, is much smaller than the relationship between IH_{t3} and SAC_{t3} which only presents 1% of self-aware participants. The explanations for these differences are not contained within this study or data and suggest the need for further research.

The path analysis models for IA with SAP and SAC present more evidence to support the null of hypothesis two than what was found in the IH models. If hypothesis two was correct, the IA variables should have held a negative relationship with the SA variable when there was a strong presence of overestimators. This was not the case. For SAP_{t2} which has 84.1% overestimators, the IA_{t2} variable held a nonsignificant relationship. Both IA_{t1} and IA_{t3} had significant and positive relationships with SAP_{t1} and SAP_{t3}, both of which consisted mostly of

self-aware and underestimators. These results suggest a relationship between the absence of IA with the presence of either self-aware or underestimation rather than a relationship between IA and overestimators. Because SAP_{t1} and SAP_{t3} possess so few overestimators, there is no chance to assess the relationship between IA and overestimation at these time points. It underscores the importance of examination of relationships between the IA variables and SAP_{t2}. However, there is no statistically significant relationship between an IA variable at any time point with the SAP_{t2} variable. For the IA / SAC model, the SAC_{t2} variable does possess the highest percentage of overestimators and it does have a statistically significant relationship with IA_{t2}, albeit quite small. However, both IA_{t1} and IA_{t2} have negative and stronger relationships with SAC_{t3} which has almost no presence of overestimation. These results show an inability to support hypothesis two and reject the null hypothesis which also cannot be completely supported.

Limitations and Future Directions

Collectively, all four models show that the relationship between IH and IA with SA as measured through self / other congruency is inconclusive at best. There are innumerable factors which could influence the constructs of focus in this study, thereby challenging accuracy, interpretation, and generalizability. Contextual factors found within a hierarchical and constrained academic environment challenge not only the generalizability of the study but also potentially how participants respond at given time points. Study methodology may have also presented unnecessary challenges in the conclusive answering of hypotheses. In the upcoming section, some of these study limitations are explored along with recommendations for future research.

Sample

To begin, the sample and the population from which it comes challenge the generalizability of findings to other populations, especially those outside of the United States

Army. The United States Military Academy at West Point is a hierarchical, regimented, and values-based institution. Its students are highly competitive and driven, comparable to students at other elite institutions. However, a student's life at West Point varies dramatically from the life of an average college student. Strict and prescribed, the daily life of a Cadet is controlled from what they wear to class, how they keep their rooms, how late they can stay out and how far they can travel on their "own time". Although some restrictions relax as Cadets become upper class students, life as a Cadet is not abundant with choice. The institution is charged with building leaders of character who will serve the nation in its Army. Therefore, West Point emphasizes military, character, and physical development in addition to academic excellence. Students at West Point receive evaluations across these areas which contribute to the moral, civic, social performance, and leadership aspects for their character. Cadets are expected to personally uphold as well as enforce the Cadet Honor Code which states, "A Cadet will not lie, cheat, steal, or tolerate those who do." Institutional expectations and formalized roles influence how Cadets see both themselves and others. Overall, those who apply to and are accepted to West Point may collectively represent a different type of college student than found at other colleges and universities.

The fact that the sample used in this study is a college sample is another factor contributing to the limitations of this study. Those students in this study are in their late teens to early twenties. Research has shown that responses from college students tend to be more homogenous than non-college students and effect sizes derived from college student studies vary in direction and magnitude when compared to nonstudent studies (Peterson, 2001).
Adding to this, the participants of this study not only represent a very small age demographic, but the data was collected from one class during their first two years without capturing their

remaining two years of college or comparing across cohorts. Although there is no research which has identified IH growth limited to a specific time period in an individual's development, there is research which suggests that development, and specifically self-awareness, does evolve and develop over one's lifetime (Jung, 1996; Kegan, 1982; Laske, 1999). Therefore, both the limited age in the sample as well as the time period from which the data was collected are constraints.

Related and likely to compound this challenge, both the population at West Point and the subsequent study sample are disproportionately male and white (Table 1). When the study sample is compared against its available population at West Point, the sample is over-represented in women, whites, Asians, and other ethnic categories and under-represented in Blacks and Hispanics (collegefactual.com, 2022). This trend remains true when the study demographics are compared against U.S. population percentages for all categories except for gender (census.gov, 2022). The disparity between sample demographics and USMA student population or active duty, company grade, Army officers is relatively minor compared to the difference between sample population and the population of the United States. These differences suggest better representativeness of Army officers than general U.S. population. Based on demographics, the sample used for this study does not represent the larger population. The differences are likely to widen once entrance requirements for West Point are considered. Therefore, future research should diversify sample populations across age, gender, and race. Additionally, the time period to collect data should be lengthened across multiple age groups to determine if stage of life development is a determinant of IH growth and if this growth is predicted by or correlated with self-awareness.

Measurement

The IHS may not be the best measure of IH. As mentioned previously, there are a number of varying IH scales developed since the inception of IH as a psychological construct of interest. The IHS (McElroy et al., 2014) was one of the first IH scales and among the only available at the time of this study. It is psychometrically sound and captures IH at a general level even with the reduced items used for this study for both subscales. Potentially overly simplistic, the IHS may flatten the complexity of the theorized multi-dimensioned trait. However, within the past five years, a number of additional IH scales have been created which capture more dimensions of IH than the IHS. The newer scales may help to determine IH with greater specificity and nuance than the IHS. If these scales offered an improved method of measuring IH, they may also improve the linkage between IH and SA. Future research could include a comparative study using multiple IH scales of varying complexity with a single measure of SA to determine which, if any scale, presents a better measure of IH with associated improved relationship with SA.

The PDR as the base component of self-awareness is problematic for measurement and reason for caution in the interpretation of results for this study. To begin, the PDR does not use psychometrically determined scales for the 22 attributes and traits evaluated in the report. Each attribute is explained in fifteen words or less with some term and wording overlap with explanations used for other attributes. Without scaled behaviors of these attributes, interpretation becomes more subjective, increasing likelihood of variance between responders. To compound this problem, there was usually only one responder per type of PDR and the responders differed for peer, CoC, and instructors each term for data collection. The limitation in number completing type of PDR and the change in person evaluating from term to term only increase the chance for measurement variance across time periods. Relatedly, West Point published a PDR training

manual which qualitatively describes example behaviors along the scoring continuum. This publication serves as a guide for those completing the evaluation. However, there is no known empirically supported validation of the PDR publication as a training tool, therefore its efficacy in supporting or improving more accurate response rates is undetermined. Adding to the challenges of the PDR, there is a general level of cynicism among Cadets on the utility of the PDR as a measurement tool which may influence response bias across all three PDR types used for this study.

Overall, the PDR is a problematic measurement tool for longitudinal use. When combining all the challenges inherent within the PDR, it emerges as one of the greatest limitations of this study. If used to determine self-awareness in the future, an experimental or quasi experimental design with deliberate focus on PDR training and calibration of scoring as a part of the research may help ensure participants all share an equal understanding of the evaluation tool and how to similarly measure behaviors. Also, evaluators should remain the same over the course of an academic year or the number of evaluators should increase per evaluation type so that changes in score are more likely to reflect the change in participant behavior rather than the change in evaluator beliefs, perceptions, and / or attitudes. It may be best to use a different method to assess self-awareness which is, in itself, a challenging construct to measure.

Self-other agreement is one measure of SA among dozens which range in purpose and focus. The SOA measured through congruence-d versus scales focused on self-reflection, rumination, and other self-recognition measures more appropriately aligned with the intrapersonal and interpersonal processes which characterize IH (Morin, 2011). However, SOA utilizing difference scores to determine level of congruency as a measure of self-awareness has its critics. Edwards (1993) argues that it creates conceptual ambiguity by combining

conceptually distinct elements into a single construct. Because the SA variables used in this study combined five categories consisting of 21 attributes and competencies into one construct, the amount each category contributes to the score are implicitly assigned equality. This contributes to the failure of SOA method to reflect which elements of the variable may contribute to the difference between the evaluators as well as the differences between participants. Although the intent of the study was not to itemize differences between self and other evaluations based on category but rather to look at self-awareness as a holistic element, the combining of scores may mask important differences between self and others. These differences may arise from interpretations of how to evaluate a specific attribute or, more meaningfully, differences in perceptions of capabilities measured by the attribute.

The choice to use multiple imputation to address the planned missingness methodology comes with benefits and drawbacks. Proposed by Rubin (1987), multiple imputation is a supported technique to address missing data, especially in cases such as this study where casewise deletion was not an option. Single imputation takes multiple forms, and its associated assumptions are often unrealistic and considered a biased method (Dziura et al., 2013). Multiple imputation offers the advantage of reflecting missing data uncertainty over single imputation (Schafer & Graham, 2002). However, it is a multi-step method which occurs prior to data analysis and limits some analysis options as aforementioned in the plan of analysis. Like other statistical techniques, multiple imputation makes assumptions on the normality of missing data and can produce slightly different results depending on the statistical software package used to conduct the imputation. "Nonreplicable results reduce scientific openness and transparency, and the possibility of changing results by reimputing the data offers researchers an opportunity to capitalize on chance by imputing and reimputing the data until a desired result, such as $p < 0.05$,

is obtained" (Wang and Johnson, 2017, p. 81). Overall, multiple imputation is a supported statistical technique and may be an option for researchers who analyze the data from the Project Arete character and leadership survey in the future. However, it almost goes without saying that the method of using multiple imputation should not be a deliberate methodology at the outset of research but rather a viable option to address unintended or unavoidable data missingness.

Chapter 6: Conclusion

Geographical boundaries are becoming less significant as technology enables connection of diverse people and organizations across the world. The globalization across sectors has resulted in greater team diversification and need to remain open to new and different ideas. Simultaneously, the availability and ease of communication presents challenges to leaders when either they or their team members do not possess the humility and willingness to be open to others' ideas and perspectives. Since the advent of the positive psychology movement, psychologists have focused on the benefits of humility to organizational success. Within the last ten years, its subdomain of intellectual humility has gained traction as a construct of interest. Although research on the construct is still in its infancy, it holds promise as a desired leadership trait which could positively impact organizations and help build partnerships, especially in circumstances where conflict may exist.

To determine whether the IH has a place in leader development, organizational training and personnel selection programs, more research is needed to show its potential. To date, little is known about IH. Like its parent GH, IH is conceptualized as a multi-faceted trait consisting of both intrapersonal and interpersonal processes. Scholars do not have complete consensus on the construct or the components which make up these processes. However, scholars do agree that the presence of IH does mean the absence of IA and that an intellectually humble individual possesses the self-awareness that enables openness to and focus on others. To date, there is no study which specifically examines the relationship of IH to SA over a period of time.

The purpose of this study was to determine whether a relationship existed between IH / IA with SA as measured through the congruency between self and other reports. The study involved examination of data collected over a 22-month period time from 201 students attending

the United States Military Academy at West Point. The IHS (McElroy et al., 2014) was used to collect the IH and IA data while SA data was collected through the PDR. The PDR is completed every semester by each Cadet along with others who provide the Cadet feedback on their attributes and competencies. This data was cleaned, variable invariance measured, SA variables created, and categorized before undergoing preliminary data analysis and subsequent path analysis and latent growth modeling to answer four hypotheses. Based on data, there was no conclusive answer to hypothesis one or two which suggested that those high in IH also possess greater SA and those high in IA are low in SA. Hypotheses three and four were intended to further support positive affirmation of hypotheses one and two. Despite the inability to support the first two hypotheses, latent growth modeling was conducted to compare intercepts and slopes, but the data could not support these comparisons.

Overall, the study did not fully support the relationship between IH and IA with SA. The reasons for this can be attributed to any number of factors. Some of those factors include the homogenous sample and limited time period during which the data was collected. Both the IHS and the congruence-d SOA are imperfect measurement tools which could be potentially improved upon utilizing other methods. The PDR itself is also potentially a poor choice to measure self-awareness and comes with its own set of unique challenges which complicate its use for research. Future research should therefore consider increasing heterogeneity of sample by age, gender, and race as well as increase the length of study. Utilizing quasi-experiment or experimental design may improve the current methodology. However, at a minimum, the IHS and SOA should be compared against other tools to determine best method for measuring IH, IA, and SA. This study did not find a relationship between IH and IA with SA, however, it cannot be

used to definitely say that a relationship does not exist. Further exploration should be done on the relationship between these constructs.

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Tables

Table 1

Numbers and percentages of participants for Character & Leadership Survey for each data wave and final study sample

Data Collection Time	N	Mean Age	Women	White	Black	Asian	Hispanic	Other
Summer 2016 (JUL)	1255	19	22.1	64.8	12.7	9.6	9.5	3.6
Winter 2017 (MAR)	443		25.7	67.9	9.5	10.6	9.3	2.3
Winter 2018 (MAR)	428		22.9	65.9	10.5	11.4	8.6	2.8
Final Study Sample	201		26.9	67.7	9.0	10.9	9.0	3.4

Table 2

Intellectual Humility Scale Items by Character and Leadership Survey Version

Item	Subscale	IHSt1	IHSt2 / IHSt3 Survey Version		
			1	2	3
1. I often become angry when my ideas are not implemented	IA	X			
2. I value winning an argument over maintaining a relationship	IA	X			
3. I always have to have the last word in an argument	IA	X	X	X	X
4. I get defensive if others do not agree with me	IA	X	X		X
5. I become angry when my advice is not taken	IA	X		X	
6. I have little patience for others' beliefs	IA	X	X	X	
7. I act like a know-it-all	IA	X	X		X
8. I often point out others' mistakes	IA	X			
9. I make fun of people with different	IA	X			
10. I seek out alternative viewpoints	IO	X		X	X
11. I encourage others to share their viewpoints	IO	X	X	X	
12. I enjoy diverse perspectives	IO	X			
13. I am open to competing ideas	IO	X	X		X
14. I am good at mediating controversial topics	IO	X		X	X
15. I am good at considering the limitations of my perspective	IO	X	X	X	X
16. I am open to others' ideas	IO	X			

Table 3

PDR attributes and competencies and associated subcomponents

Attributes:	
Character	Army Values, Empathy, Warrior / Service Ethos, Discipline
Presence	Military and Professional Bearing, Physical Fitness, Confidence, Resilience
Intellect	Mental Agility, Innovation, Expertise, Sound Judgment, Interpersonal Tact
Competencies:	
Lead	Leads by Example, Leads Others, Builds Trust, Extends Influence, Communicates
Develops	Creates a Positive Environment, Prepares Self, Develops Others, Stewards the
Achieves*	Gets Results

***** *Achieves and its subcomponent of "Gets Results" are not included in this study*

Table 4

IHS Missing Data Collection by Item Across Three Waves (IHSt1, IHSt2, IHSt3)

Data collection Time Period		Intellectual Humility Scale (IHS) Items												
Summer 2016	N	10	11	13	14	15	3c	4c	5c	6c	7c	IA	IO	IH
Valid	207	207	207	207	207	207	207	207	207	207	207	207	207	207
Missing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Missing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Winter 2017	N	10	11	13	14	15	3c	4c	5c	6c	7c	IA	IO	IH
Valid	207	145	134	135	145	207	134	135	145	134	135	207	207	207
Missing	0	62	73	72	62	0	73	72	62	73	72	0	0	0
% Missing	0	30.1	35.3	34.8	30	0	35.3	34.8	30	35.3	34.8	0	0	0
Winter 2018	N	10	11	13	14	15	3c	4c	5c	6c	7c	IA	IO	IH
Valid	207	146	135	134	145	207	135	135	145	135	134	207	207	207
Missing	0	62	72	73	62	0	72	73	62	72	73	0	0	0
% Missing	0	30	34.8	35.3	30	0	34.8	35.3	30	34.8	35.3	0	0	0

Table 5

Periodic Development Report (PDR) Missing Data by Data Collection Time Period

		Data Collection Time Period		
Evaluation Type	N	DEC 16	MAR 17	MAR 18
PDR 1 "Self"				
Valid	207	207	207	207
Missing		0	0	0
% Missing		0	0	0
PDR 2 "Peer"				
Valid	207	206	207	206
Missing		1	0	1
% Missing		0.50%	0	0.50%
PDR 4 "CoC"				
Valid	207	207	204	207
Missing		0	3	0
% Missing		0	1.50%	0
PDR 7 "Instructor"				
Valid	207	205	200	201
Missing		2	7	6
% Missing		1%	3.40%	2.90%

Table 6

Cronbach's Alpha by PDR type and Data Collection Time Period

Data Collection Time Period	Cronbach's Alpha of Reliability			
	PDR 1	PDR 2	PDR 4	PDR 7
December 2016	0.949	0.952	0.917	0.881
March 2017	0.932	0.932	0.913	0.908
December 2017	0.917	0.917	0.908	0.904
March 2018	0.949	0.949	0.926	0.904

Table 7a

Initial Invariance Tests for PDR without model adjustments

		Character				Presence				Intellect				Lead				Develop			
PDR Type	Measure	CFI	TLI	RMSEA	SRMR	CFI	TLI	RMSEA	SRMR	CFI	TLI	RMSEA	SRMR	CFI	TLI	RMSEA	SRMR	CFI	TLI	RMSEA	SRMR
Self	Configural	0.977	0.971	0.038	0.058	0.962	0.952	0.048	0.051	0.975	0.971	0.034	0.053	0.962	0.954	0.040	0.054	0.980	0.974	0.036	0.061
	Metric	0.938	0.930	0.059	0.128	0.932	0.923	0.060	0.110	0.952	0.948	0.046	0.132	0.928	0.921	0.053	0.162	0.941	0.933	0.057	0.130
	Strong	0.926	0.922	0.062	0.145	0.914	0.911	0.065	0.120	0.950	0.949	0.045	0.139	0.922	0.921	0.053	0.161	0.915	0.911	0.059	0.103
	Model Fit	$\Delta\chi^2$ = 87.053 , df= 115 , p>5.178e				$\Delta\chi^2$ =89.895, df=115 , p<1.709e				$\Delta\chi^2$ =42.853 , df=186 , p<2.391e				$\Delta\chi^2$ =19.54 , df =186 , p>.077				$\Delta\chi^2$ = 2.069 , df= 115 , p> .9903			
Peer	Configural	0.983	0.979	0.030	0.050	0.978	0.971	0.027	0.056	0.989	0.987	0.022	0.046	0.961	0.953	0.040	0.049	1.000	1.016	0.000	0.042
	Metric	0.968	0.964	0.039	0.080	0.976	0.972	0.027	0.071	0.975	0.973	0.032	0.079	0.935	0.929	0.049	0.091	0.981	0.971	0.027	0.082
	Strong	0.752	0.741	0.105	0.116	0.797	0.788	0.075	0.096	0.891	0.889	0.064	0.102	0.753	0.748	0.093	0.111	0.898	0.894	0.060	0.088
	Model Fit	$\Delta\chi^2$ =121.49 , df=115 , p<2.2e-16				$\Delta\chi^2$ =100.742 , df=115 , p<2.2e-16				$\Delta\chi^2$ = 203.076, df=186 , p<2.2e-16				$\Delta\chi^2$ =204.354 , df=186 , p<2.2e-16				$\Delta\chi^2$ = 67.883, df=115 , p>3.955e-11			
Chain of Command	Configural	0.990	0.987	0.019	0.047	0.994	0.992	0.013	0.047	0.921	0.915	0.047	0.056	0.944	0.933	0.043	0.056	0.954	0.941	0.038	0.056
	Metric	0.973	0.969	0.030	0.063	0.948	0.942	0.035	0.079	0.886	0.875	0.054	0.084	0.899	0.89	0.055	0.093	0.897	0.833	0.053	0.082
	Strong	0.660	0.645	0.102	0.105	0.672	0.658	0.085	0.102	0.719	0.713	0.082	0.105	0.829	0.825	0.069	0.099	0.649	0.634	0.095	0.107
	Model Fit	$\Delta\chi^2$ =201.824 , df = 115, p<2.2e-16				$\Delta\chi^2$ =98.016 , df=115 , p<2.2e-16				$\Delta\chi^2$ =203.076 , df=186 , p<2.2e-16				$\Delta\chi^2$ =123.89 , df=186 , p<2.2e-16				$\Delta\chi^2$ =140.410 , df =115 , p<2.2e-16			
Instructor	Configural	0.969	0.961	0.038	0.049	0.973	0.965	0.028	0.049	0.966	0.959	0.039	0.049	0.868	0.843	0.069	0.060	0.957	0.945	0.050	0.050
	Metric	0.871	0.879	0.073	0.123	0.821	0.798	0.068	0.121	0.924	0.917	0.055	0.113	0.826	0.81	0.076	0.115	0.885	0.869	0.077	0.139
	Strong	0.122	0.084	0.182	0.341	0.296	0.265	0.129	0.149	0.671	0.664	0.111	0.139	0.653	0.645	0.103	0.129	0.402	0.376	0.168	0.225
	Model Fit	$\Delta\chi^2$ =609.44 , df=115 , p<2.2e-16				$\Delta\chi^2$ =418.96 , df= 115, p<2.2e-16				$\Delta\chi^2$ =307.285 , df= 186, p<2.2e-16				$\Delta\chi^2$ = 203.152, df=186 , p<2.2e-16				$\Delta\chi^2$ =359.90 , df=115 , p=p<2.2e-16			

Table 7b

Final Invariance Tests Without Empathy Included in Character and with Adjustments to Chain of Command PDR Model

		Character				Presence				Intellect				Lead				Develop			
PDR Type	Measure	CFI	TLI	RMSEA	SRMR	CFI	TLI	RMSEA	SRMR	CFI	TLI	RMSEA	SRMR	CFI	TLI	RMSEA	SRMR	CFI	TLI	RMSEA	SRMR
Self	Configural	0.994	0.991	0.024	0.037	0.962	0.952	0.048	0.051	0.975	0.971	0.034	0.053	0.962	0.954	0.040	0.054	0.947	0.932	0.052	0.055
	Metric	0.967	0.96	0.051	0.112	0.932	0.923	0.060	0.110	0.952	0.948	0.046	0.132	0.928	0.921	0.053	0.162	0.922	0.912	0.059	0.112
	Strong	0.966	0.963	0.050	0.110	0.914	0.911	0.065	0.120	0.950	0.949	0.045	0.139	0.922	0.921	0.053	0.161	0.915	0.911	0.059	0.106
	Model Fit CM	$\Delta\chi^2$ = 33.400 , df = 54, p < 0.0001				$\Delta\chi^2$ = 42.683, df = 106, p < 2.555e				$\Delta\chi^2$ = 42.014 , df = 174 , p < .0002				$\Delta\chi^2$ = 51.324 , df =174 , p < 7.303e				$\Delta\chi^2$ = 28.701 , df = 106, p < .004			
	Model Fit MS	$\Delta\chi^2$ = 7.258 , df = 60, p > .298				$\Delta\chi^2$ = 30.832, df = 115, p < .0003				$\Delta\chi^2$ = 15.214 , df = 186 , p > .230				$\Delta\chi^2$ = 19.504 , df =186 , p > .077				$\Delta\chi^2$ = 15.630 , df = 115 , p > .075			
Peer	Configural	1.000	1.005	0.000	0.038	0.978	0.971	0.027	0.056	0.989	0.987	0.022	0.046	0.961	0.953	0.040	0.049	1.000	1.016	0.000	0.042
	Metric	1.000	1.001	0.000	0.060	0.976	0.972	0.027	0.071	0.975	0.973	0.032	0.079	0.935	0.929	0.049	0.091	0.981	0.971	0.027	0.082
	Strong	0.741	0.716	0.130	0.110	0.797	0.788	0.075	0.096	0.891	0.889	0.064	0.102	0.753	0.748	0.093	0.111	0.759	0.748	0.093	0.107
	Model Fit CM	$\Delta\chi^2$ = 5.711 , df = 54, p > 0.768				$\Delta\chi^2$ =9.042 , df =106, p > .699				$\Delta\chi^2$ = 22.247, df = 174, p > .102				$\Delta\chi^2$ =30.532 , df = 174 , p < .010				$\Delta\chi^2$ = 25.684, df = 106 , p > .017			
	Model Fit MS	$\Delta\chi^2$ = 112.594 , df = 60, p < 2.2e-16				$\Delta\chi^2$ =109.932 , df =115, p<2.2e-16				$\Delta\chi^2$ = 203.076, df= 186, p <2.2e-16				$\Delta\chi^2$ = 204.354 , df= 186, p < 2.2e-16				$\Delta\chi^2$ = 151.109, df= 115 , p < 2e-16			
Chain of Command	Configural	0.989	0.983	0.027	0.040	0.994	0.992	0.013	0.047	0.979	0.974	0.025	0.052	1.000	1.001	0.000	0.051	0.981	0.974	0.025	0.054
	Metric	0.972	0.966	0.038	0.056	0.948	0.942	0.035	0.079	0.951	0.946	0.036	0.075	0.954	0.949	0.037	0.092	0.951	0.94	0.038	0.072
	Strong	0.653	0.619	0.127	0.106	0.672	0.658	0.085	0.102	0.747	0.736	0.079	0.100	0.864	0.858	0.062	0.108	0.647	0.618	0.097	0.107
	Model Fit CM	$\Delta\chi^2$ =12.752, df = 54, p > 0.174				$\Delta\chi^2$ =32.006 , df =106 , p < .001				$\Delta\chi^2$ =25.304 , df = 170, p < .0460				$\Delta\chi^2$ = 46.679 , df =170, p < 4.413e-05				$\Delta\chi^2$ = 29.472 , df = 102, p < .003			
	Model Fit MS	$\Delta\chi^2$ =277.917, df = 60, p<2.2e-16				$\Delta\chi^2$ =150.391 , df =115 , p<2.2e-16				$\Delta\chi^2$ =169.069, df = 182, p < 2.2e-16				$\Delta\chi^2$ = 98.022 , df =182, p < 1.358e-15				$\Delta\chi^2$ = 142.469 , df =107, p < 2.2e-16			

CM = Configural / Metric; MS = Metric / Strong

Table 8a

Initial Invariance Test for IHS Subscales

Variable	Measure	CFI	TLI	RMSEA	SRMR
IA	Configural	0.993	0.990	0.021	0.041
	Metric	0.981	0.975	0.034	0.080
	Strong	0.898	0.884	0.073	0.106
IO	Configural	0.998	0.996	0.012	0.038
	Metric	0.993	0.990	0.020	0.063
	Strong	0.980	0.977	0.032	0.067

Table 8b

Invariance Test for IHS and Subscales

Variable	Measure	CFI	TLI	RMSEA	SRMR
IA	Configural	0.996	0.993	0.020	0.038
	Metric	0.987	0.981	0.032	0.068
	Strong	0.941	0.930	0.063	0.084
IO	Configural	0.998	0.996	0.012	0.038
	Metric	0.993	0.990	0.020	0.063
	Strong	0.980	0.977	0.032	0.067

Table 9a

Paired Sample t-test for Self and Peer Evaluation Leader Variables

	Eval Type	Mean	SD	t	df	Sig (2-tailed)
Pair Time One	Self	-11.971	14.304			
	Peer	17.492	11.119	-22.801	200	<.001
Pair Time Two	Self	105.958	22.477			
	Peer	64.506	16.560	21.131	200	<.001
Pair Time Three	Self	93.965	13.284			
	Peer	104.816	25.830	-5.333	200	<.001

Table 9b

Paired Sample t-test for Self and CoC Evaluation Leader Variables

	Eval Type	Mean	SD	t	df	Sig (2-tailed)
Pair Time One	Self	-11.971	14.304			
	CoC	-8.384	4.092	-3.371	200	<.001
Pair Time Two	Self	105.958	22.477			
	CoC	78.691	15.993	14.747	200	<.001
Pair Time Three	Self	93.965	13.284			
	CoC	170.624	28.053	-37.674	200	<.001

Table 10a

Descriptive Statistics for Self Awareness Variables, n=201

					Skewness		Kurtosis	
Variable	Min	Max	M	SD	Statistic	Std. Error	Statistic	Std. Error
SAPt1	-4.15	1.20	-1.62	1.01	0.19	0.17	-0.22	0.34
SAPt2	-1.67	4.75	1.47	0.99	0.20	0.17	0.47	0.34
SAPt3	-3.01	3.44	-0.38	1.01	1.00	0.17	2.39	0.34
SACt1	-2.63	2.70	-0.24	1.01	0.11	0.17	-0.31	0.34
SACt2	-1.45	3.52	1.04	1.00	0.04	0.17	-0.41	0.34
SACt3	-5.63	0.59	-2.70	1.01	0.08	0.17	0.28	0.34

** Higher, positive number associates with Overestimation; Lower, negative number associates with Underestimation; close to zero associates with self-awareness*

Table 10b

Descriptive Statistics for IH, IA, IO Variables, n=201

					Skewness		Kurtosis	
Variable	Min	Max	M	SD	Statistic	Std. Error	Statistic	Std. Error
IAt1	-3.01	2.25	0.00	0.95	-0.18	0.17	0.08	0.34
IAt2	-3.32	2.15	-0.02	1.01	-0.42	0.17	0.18	0.34
IAt3	-3.04	2.40	0.00	1.08	-0.35	0.17	-0.07	0.34
IOt1	-2.84	2.46	0.00	0.96	0.02	0.17	0.31	0.34
IOt2	-3.34	2.36	0.01	1.05	-0.44	0.17	0.77	0.34
IOt3	-2.58	2.35	0.00	1.02	0.00	0.17	-0.03	0.34
IHt1	-4.47	3.72	0.01	1.50	-0.25	0.17	0.30	0.34
IHt2	-5.71	3.93	-0.01	1.71	-0.54	0.17	0.76	0.34
IHt3	-4.96	4.27	-0.01	1.77	-0.10	0.17	-0.06	0.34

**IA items are reverse coded (e.g. high number is associated with low IA)*

Table 11

Self-Awareness Variables Categorized by Overestimation, Self-Aware, and Underestimation

	SAPt1		SAPt2		SAPt3		SACt1		SACt2		SACt3	
Self-Awareness Level	#	%	#	%	#	%	#	%	#	%	#	%
Overestimator	4	2	169	84.1	25	12.4	49	24.4	137	68.2	1	0.5
Self-Aware	25	12.4	28	13.9	83	41.3	71	35.3	53	26.4	2	1
Underestimator	172	85.6	4	2	93	46.3	81	40.3	11	5.5	198	98.5

**N=201; Overestimator > .50, Self-Aware ≥ -.50, ≤ .50 ; Underestimator < -.50*

Table 12

Pearson's r Correlations for Intellectual Humility Scale Variables and Self Awareness Variables

	IAt1	IAt2	IAt3	IOt1	IOt2	IOt3	IHt1	IHt2	IHt3	SAPt1	SAPt2	SAPt3	SACt1	SACt2	SACt3
	1	0.742**	0.615**	0.152*	0.125	0.027	0.753**	0.524**	0.390**	0.056	0.007	-0.024	0.009	0.002	-0.105
IAt1		0.000	0.000	0.031	0.076	0.700	0.000	0.000	0.000	0.426	0.922	0.732	0.904	0.975	0.137
	0.742**	1	0.793**	0.190**	0.335**	0.249**	0.610**	0.810**	0.628**	0.021	-0.016	-0.052	0.039	-0.037	-0.053
IAt2	0.000		0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.767	0.819	0.467	0.579	0.602	0.456
	0.615**	.793**	1	.150*	.318**	.395**	.501**	.674**	.841**	-0.014	-0.003	0.047	0.025	-0.006	0.043
IAt3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.763	0.923	0.288	0.537	0.807	0.272
	.152*	.190**	.150*	1	.661**	.534**	.764**	.526**	.406**	0.032	0.107	0.003	0.081	0.113	0.014
IOt1	0.031	0.007	0.034		0.000	0.000	0.000	0.000	0.000	0.651	0.130	0.962	0.253	0.109	0.846
	0.125	.335**	.318**	.661**	1	.675**	.521**	.824**	.591**	0.064	0.097	0.059	0.079	0.065	0.105
IOt2	0.076	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.365	0.169	0.407	0.266	0.360	0.137
	0.027	.249**	.395**	.534**	.675**	1	.373**	.570**	.830**	-0.022	0.015	0.079	0.048	0.036	0.088
IOt3	0.700	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.760	0.832	0.263	0.499	0.612	0.213
	0.753**	.610**	.501**	.764**	.521**	.373**	1	.692**	.524**	0.058	0.076	-0.014	0.059	0.077	-0.059
IHt1	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.412	0.284	0.848	0.402	0.278	0.402
	0.524**	.810**	.674**	.526**	.824**	.570**	.692**	1	.746**	0.053	0.051	0.006	0.073	0.018	0.034
IHt2	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.458	0.473	0.936	0.304	0.798	0.633
	0.390**	.628**	.841**	.406**	.591**	.830**	.524**	.746**	1	-0.021	0.007	0.075	0.044	0.017	0.078
IHt3	1.046	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.763	0.923	0.288	0.537	0.807	0.272
	0.056	0.021	-0.014	0.032	0.064	-0.022	0.058	0.053	-0.021	1	-0.090	-0.051	.778**	-.165*	-0.025
SAPt1	0.426	0.767	0.841	0.651	0.365	0.760	0.412	0.458	0.763		0.204	0.472	0.000	0.019	0.721
	0.007	-0.016	-0.003	0.107	0.097	0.015	0.076	0.051	0.007	-0.090	1	.280**	-0.062	.710**	.231**
SAPt2	0.922	0.819	0.963	0.130	0.169	0.832	0.284	0.473	0.923	0.204		0.000	0.381	0.000	0.001
	-0.024	-0.052	0.047	0.003	0.059	0.079	-0.014	0.006	0.075	-0.051	.280**	1	0.041	.282**	.222**
SAPt3	0.732	0.467	0.508	0.962	0.407	0.263	0.848	0.936	0.288	0.472	0.000		0.564	0.000	0.002
	0.009	0.039	0.025	0.081	0.079	0.048	0.059	0.073	0.044	.778**	-0.062	0.041	1	-.186**	-0.041
SACt1	0.904	0.579	0.720	0.253	0.266	0.499	0.402	0.304	0.537	0.000	0.381	0.564		0.008	0.567
	0.002	-0.037	-0.006	0.113	0.065	0.036	0.077	0.018	0.017	-.165*	.710**	.282**	-.186**	1	.168*
SACt2	0.975	0.602	0.928	0.109	0.360	0.612	0.278	0.798	0.807	0.019	0.000	0.000	0.008		0.017
	-0.105	-0.053	0.043	0.014	0.105	0.088	-0.059	0.034	0.078	-0.025	.231**	.222**	-0.041	.168*	1
SACt3	0.137	0.456	0.548	0.846	0.137	0.213	0.402	0.633	0.272	0.721	0.001	0.002	0.567	0.017	

*Top line per variable is Pearson's r correlation; Bottom line is Significance (2-tailed) *p<.05, ** p<.001*

Table 13

Path Analysis Model Fit Measures for IHS and SA Variables

Variable Pair	CFI	TLI	RMSEA	SRMR
IH and SA Peer	0.998	0.981	0.046	0.008
IH and SA CoC	0.998	0.985	0.041	0.007
IA and SA Peer	0.998	0.984	0.045	0.007
IA and SA CoC	0.998	0.987	0.041	0.006

Table 14

Intercept Only, Single Dependent Variable with Time as Independent Variable

	Intercept	Std. Err	z-value	P (>|z|)
IH	-0.004	0.033	-0.109	0.913
IA	-0.007	0.020	-0.352	0.752
SAP	-0.176	0.013	-13.082	0.000
SAC	-0.327	0.200	-15.977	0.000

Table 15

Latent Growth Analysis Results for Intercept and Slope only Models for IH / SAP, IH / SAC, IA / SAP, and IA / SAC

								Intercept		Slope		Variance Intercept		Variance Slope	
	Parameters	df	Chi-square	CFI	TLI	RMSEA	SRMR	IH / A	SAP / C	IH / A	SAP / C	IH / A	SAP / C	IH / A	SAP / C
IH / SAP	20	15	p < .001	0.000	-0.536	0.416	0.791	0.001	-0.564	0.000	0.031	1.861	-6.361	0.003	-0.031
IH / SAC	20	15	p < .001	0.225	-0.056	0.342	0.468	0.001	1.531	0.000	-0.176	1.862	-3.705	0.003	-0.017
IA / SAP	20	15	p < .001	0.022	-0.333	0.414	0.790	-0.005	-0.564	0.000	0.031	0.731	-6.361	0.001	-0.031
IA / SAC	20	15	p < .001	0.336	0.094	0.339	0.467	-0.005	1.531	0.000	-0.176	0.732	-3.705	0.001	-0.017

Figures

Figure 1a

Path Analysis with Intellectual Humility Time One as Exogenous Variable with Self-Awareness Peer

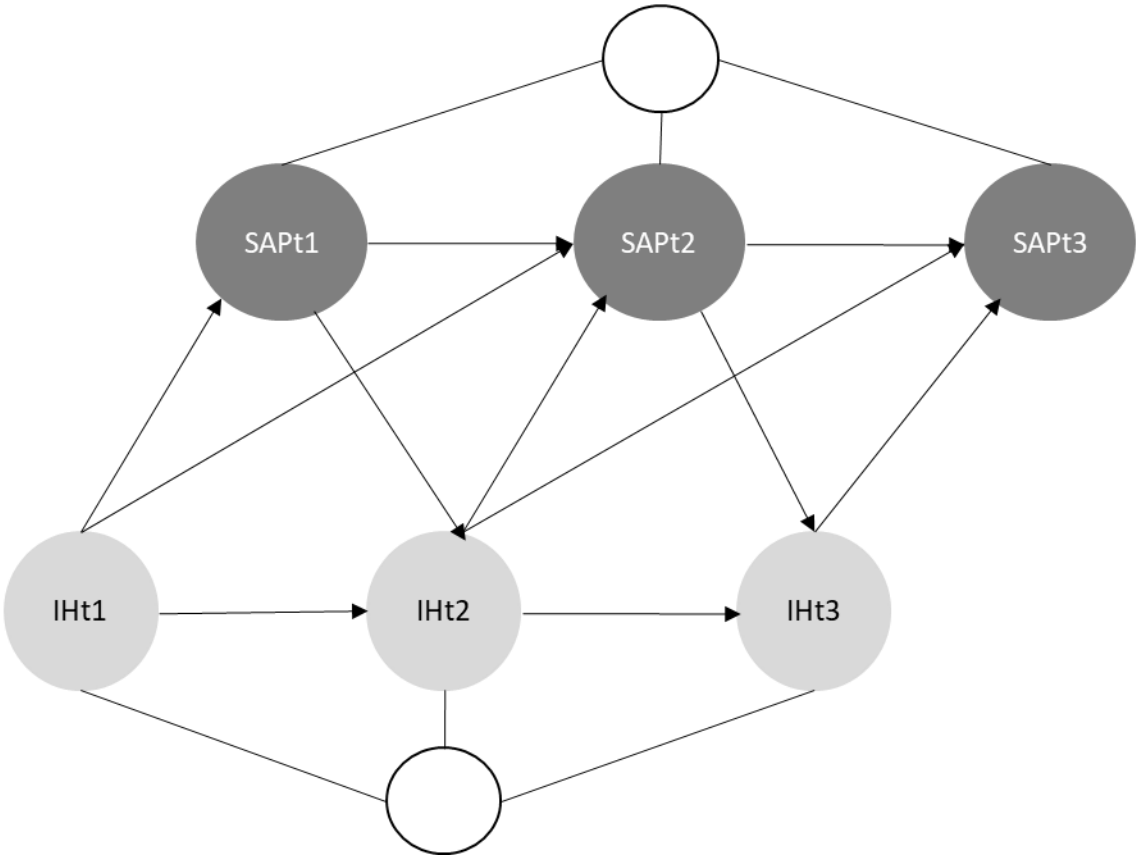


Figure 1b

Path Analysis with Intellectual Humility Time One as Exogenous Variable with Self-Awareness CoC

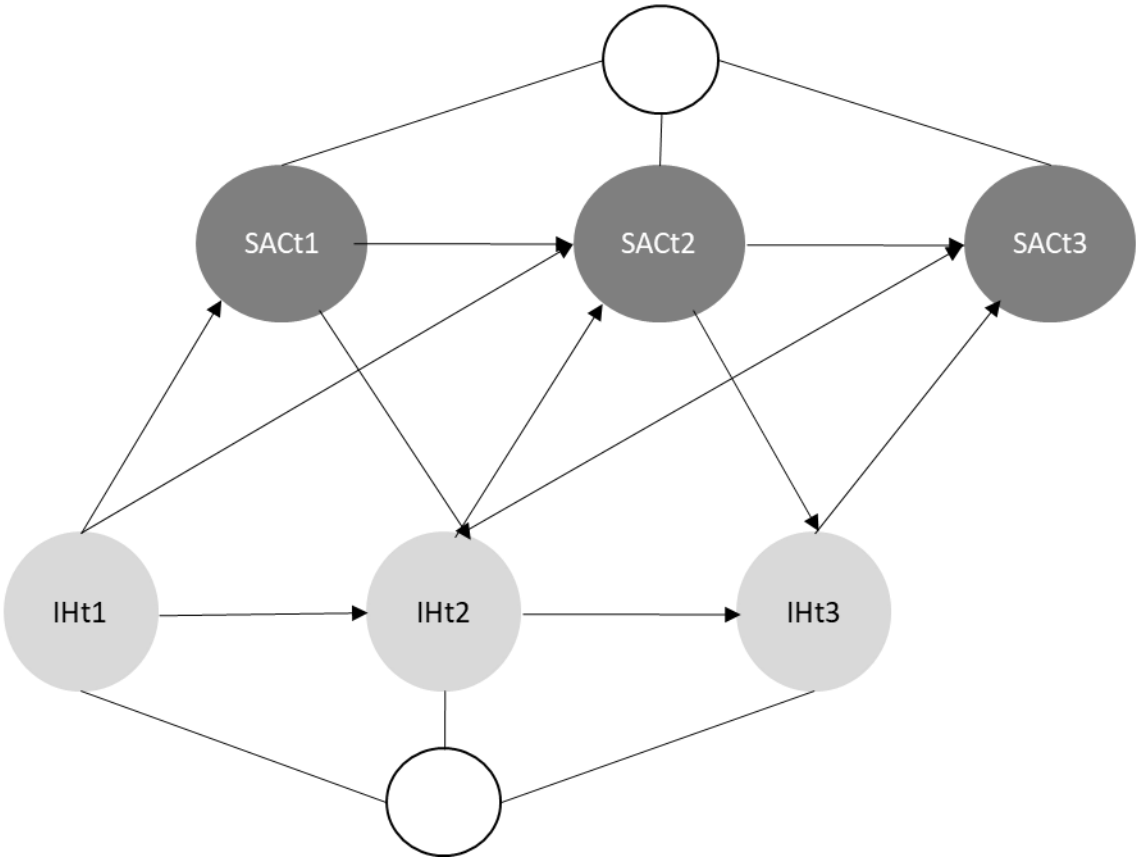


Figure 2a

Path Analysis Results with Intellectual Arrogance Time One as Exogenous Variable with Self-Awareness Peer

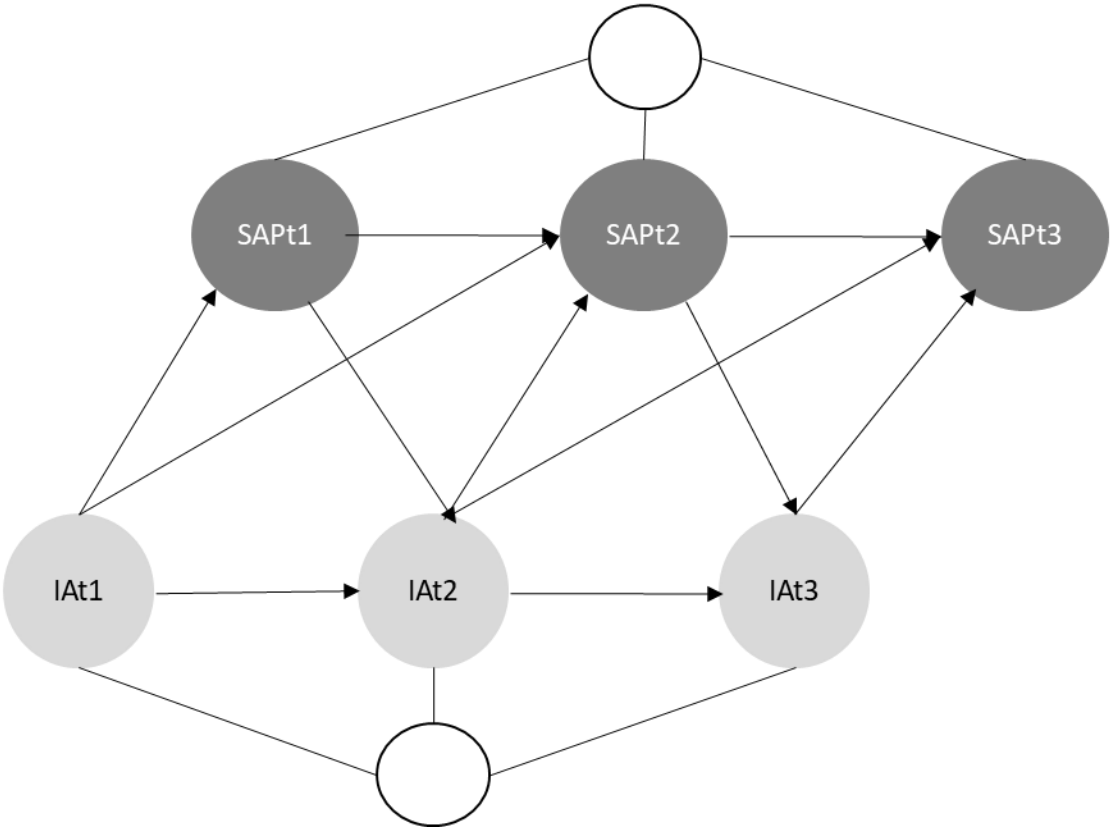


Figure 2b

Path Analysis Results with Intellectual Arrogance Time One as Exogenous Variable with Self-Awareness CoC

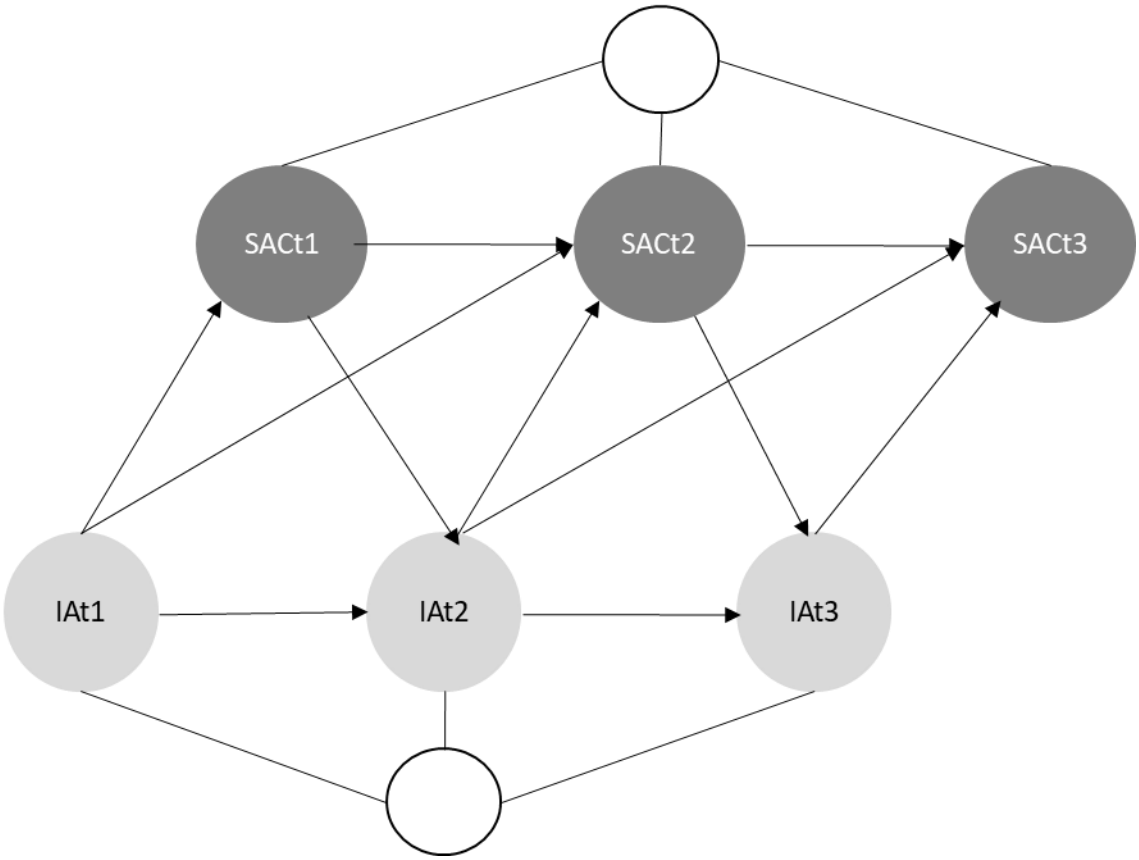


Figure 3a

Results of Path Analysis with Intellectual Humility Time One as Exogenous Variable with Self-Awareness-Peer and Intellectual Humility Endogenous Variables

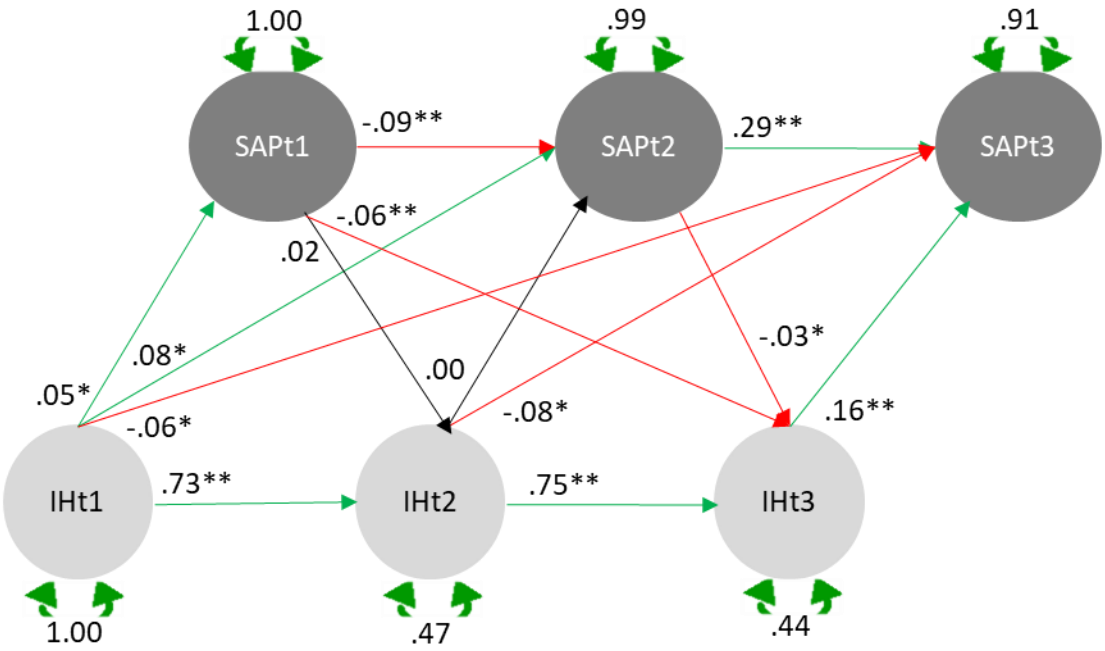


Figure 3b

Results of Path Analysis with Intellectual Humility Time One as Exogenous Variable with Self-Awareness-CoC and Intellectual Humility Endogenous Variables

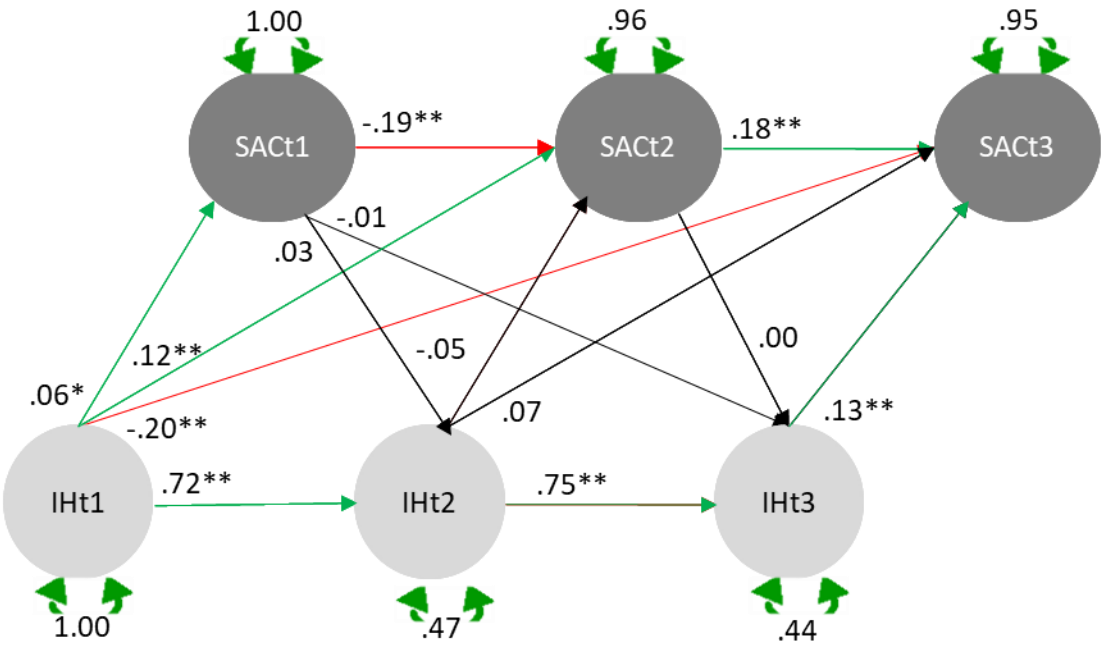


Figure 4a

Results of Path Analysis with Intellectual Arrogance Time One as Exogenous Variable with Self-Awareness-Peer and Intellectual Arrogance Endogenous Variables

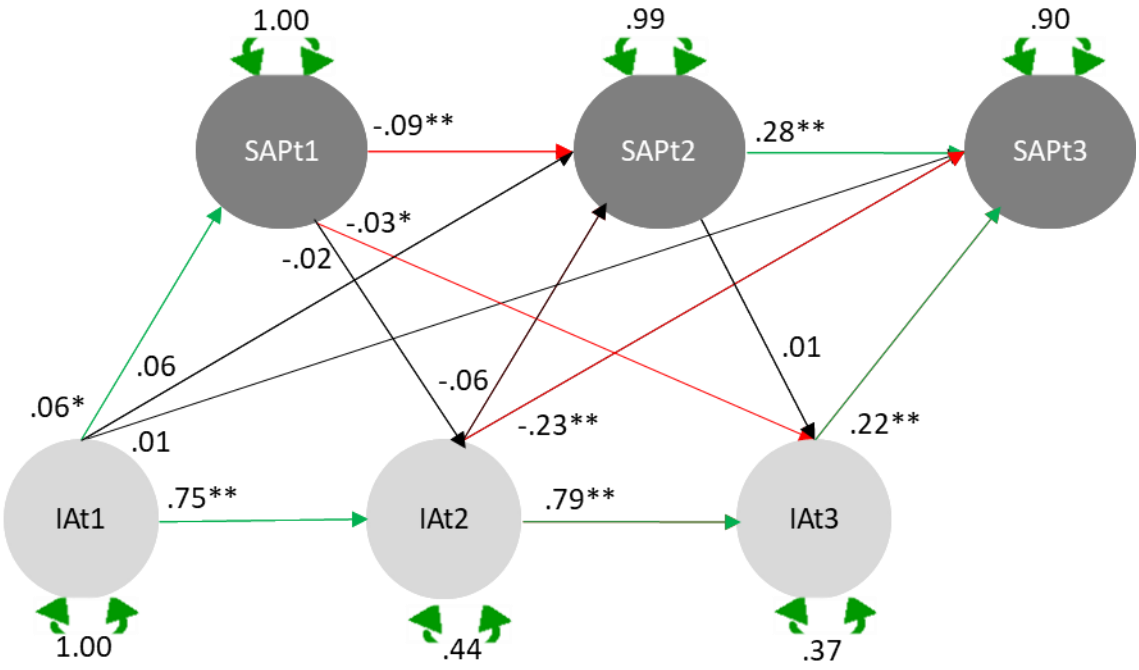


Figure 4b

Results of Path Analysis with Intellectual Arrogance Time One as Exogenous Variable with Self-Awareness-CoC and Intellectual Arrogance Endogenous Variables

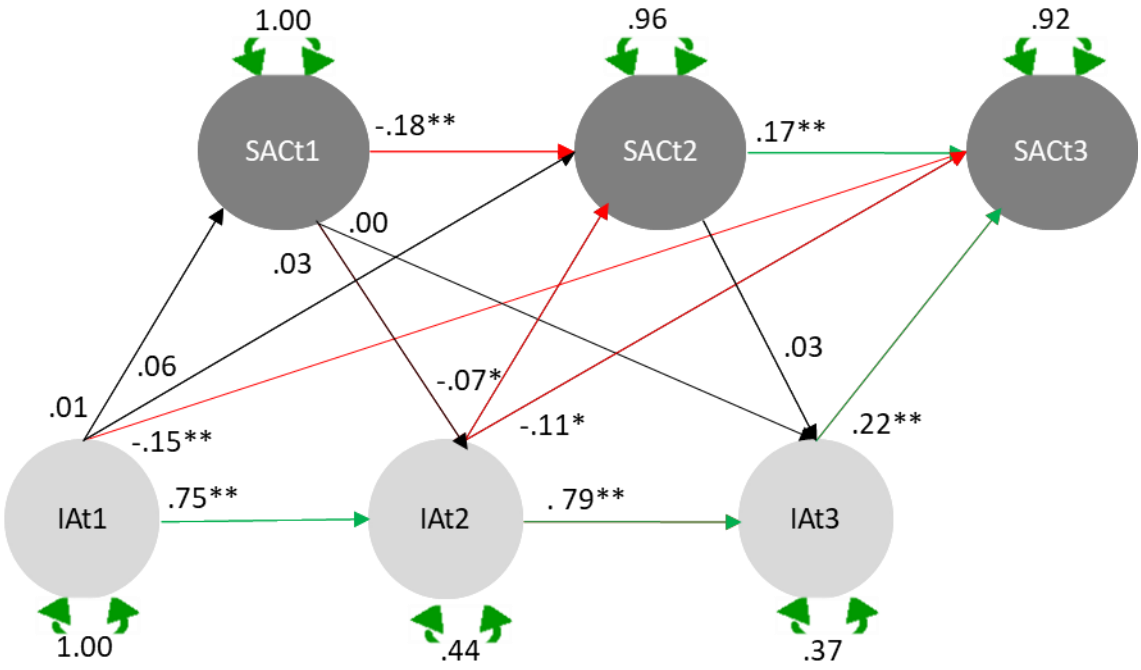


Figure 5a

Latent Growth Analysis, Intercept and Slope Only Model for IH / SAP

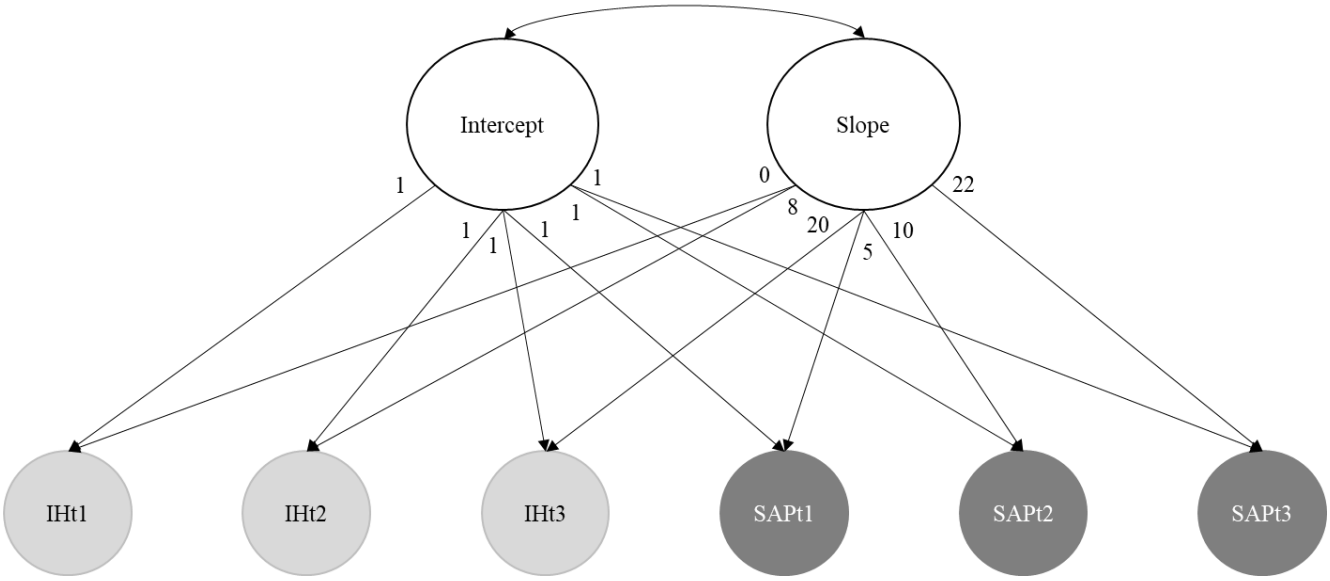


Figure 5b

Latent Growth Analysis, Intercept and Slope Only Model for IH / SAC

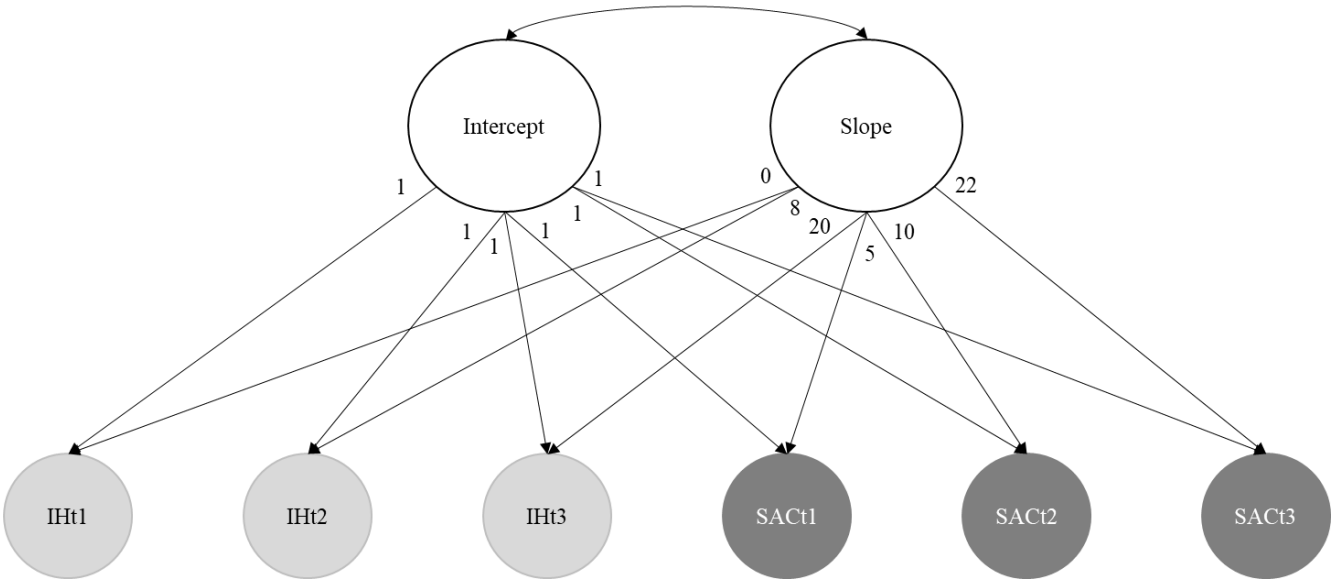


Figure 6a

Latent Growth Analysis, Intercept and Slope Only Model for IA / SAP

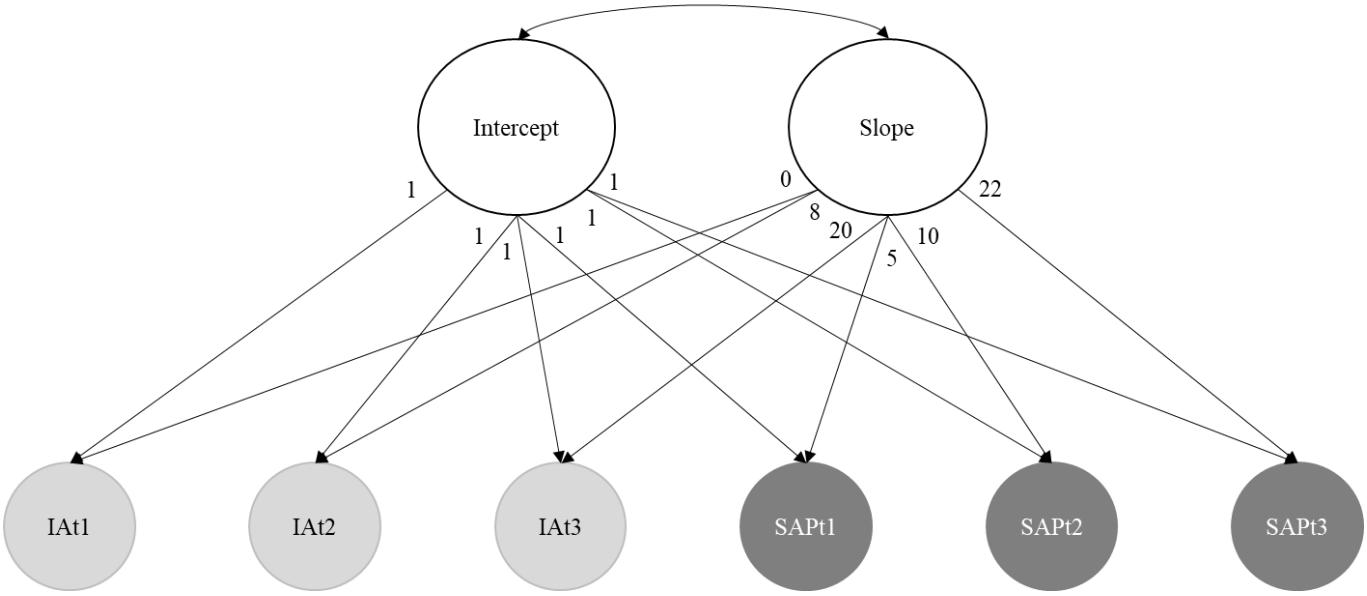
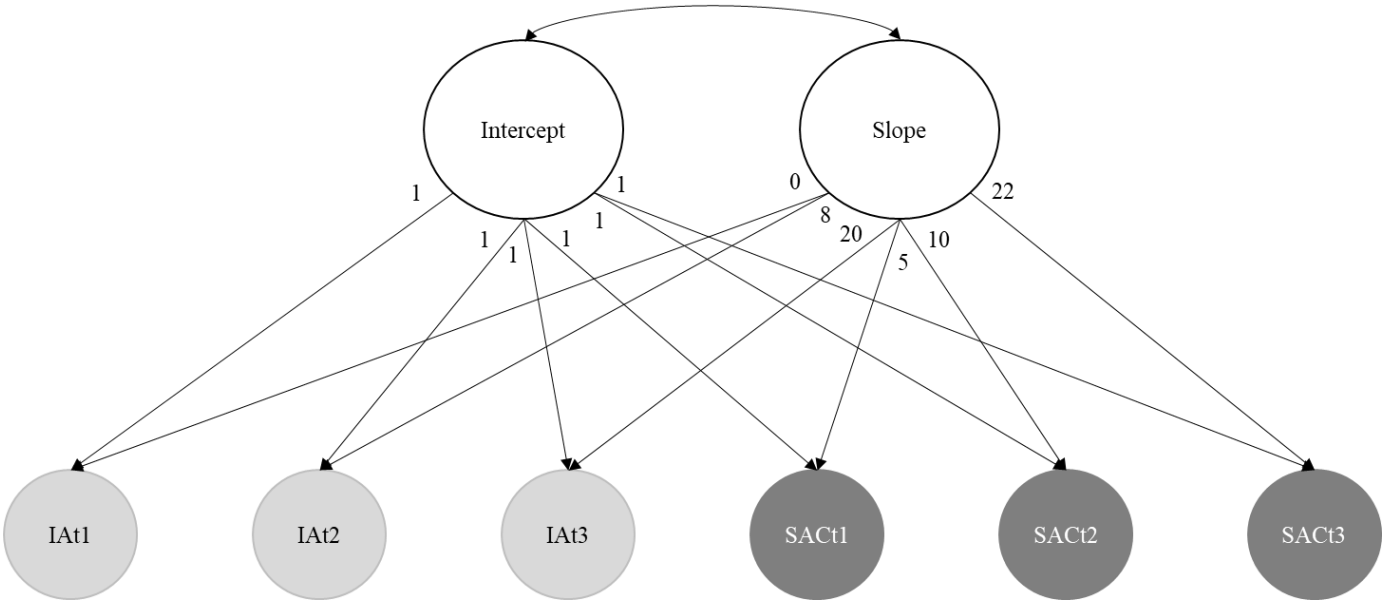


Figure 6b

Latent Growth Analysis, Intercept and Slope Only Model for IA / SAC



Appendix A

Revised 02/01/2022

AUBURN UNIVERSITY HUMAN RESEARCH PROTECTION PROGRAM (HRPP)

EXEMPT REVIEW APPLICATION

For assistance, contact: **The Office of Research Compliance (ORC)**
Phone: **334-844-5966** E-Mail: **IRBAdmin@auburn.edu** Web Address: **http://www.auburn.edu/research/vpr/ohs**
Submit completed form and supporting materials as one PDF through the IRB Submission Page
Hand written forms are not accepted. Where links are found hold down the control button (Ctrl) then click the link.

1. Project Identification **Today's Date: February 9, 2022**

Anticipated start date of the project: February 23, 2022 Anticipated duration of project: 1 Year

a. **Project Title: Project Arete Quantitative Analysis and Reporting**

b. **Principal Investigator (PI): Kate M. H. Conkey** Degree(s): Master of Art (enrolled for doctorate)
Rank/Title: Graduate Student Department/School: Psychology
Role/responsibilities in this project: **Data Analysis and Reporting**
Preferred Phone Number: **931-241-1318** AU Email: kmc0146@auburn.edu

Faculty Advisor Principal Investigator (if applicable): Dr. Dan Svyantek
Rank/Title: Professor Department/School: Psychology
Role/responsibilities in this project: **Advisor/Doctoral Committee Chair**
Preferred Phone Number: **334-844-6478** AU Email: svyandj@auburn.edu

Department Head: Dr. Dan Svyantek (acting) Department/School: Psychology
Preferred Phone Number: **334-844-6478** AU Email: svyandj@auburn.edu
Role/responsibilities in this project: Same as listed above

c. **Project Key Personnel** – Identify all key personnel who will be involved with the conduct of the research and describe their role in the project. Role may include design, recruitment, consent process, data collection, data analysis, and reporting. (To determine key personnel, see decision tree). *Exempt determinations are made by individual institutions; reliance on other institutions for exempt determination is not feasible. Non-AU personnel conducting exempt research activities must obtain approval from the IRB at their home institution.*

Key personnel are required to maintain human subjects training through CITI. Only for EXEMPT level research is documentation of completed CITI training NO LONGER REQUIRED to be included in the submission packet. NOTE however, **the IRB will perform random audits of CITI training records to confirm** reported training courses and expiration dates. Course title and expiration dates are shown on training certificates.

Name: Kate Conkey Degree(s): **Master of Arts (enrolled for doctorate**
Rank/Title: Graduate Student Department/School: Psychology
Role/responsibilities in this project: **Principal Investigator**
- AU affiliated? ☒ Yes ☐ No If no, name of home institution: Click or tap here to enter text.
- Plan for IRB approval for non-AU affiliated personnel? **No non-AU affiliated personnel are associated with this investigation.**
- Do you have any known competing financial interests, personal relationships, or other interests that could have influence or appear to have influence on the work conducted in this project? ☐ Yes ☒ No
- If yes, briefly describe the potential or real conflict of interest: Click or tap here to enter text.
- Completed required CITI training? ☒ Yes ☐ No If NO, complete the appropriate CITI basic course and update the revised Exempt Application form.
- If YES, choose course(s) the researcher has completed: Human Sciences Basic Course 4/13/2022
  Choose a course Expiration Date

Name: Dr. Dan Svyantek Degree(s): **Doctorate of Philosophy**
Rank/Title: Professor Department/School: Psychology
Role/responsibilities in this project: Advisor and Committee Chair
- AU affiliated? ☒ Yes ☐ No If no, name of home institution: Click or tap here to enter text.
- Plan for IRB approval for non-AU affiliated personnel? **No non-AU involvement in this investigation**
- Do you have any known competing financial interests, personal relationships, or other interests that could have influence or appear to have influence on the work conducted in this project? ☐ Yes ☒ No
- If yes, briefly describe the potential or real conflict of interest: Click or tap here to enter text.
- Completed required CITI training? ☒ Yes ☐ No If NO, complete the appropriate CITI basic course and update the revised EXEMPT application form.
- If YES, choose course(s) the researcher has completed: Refresher Course 3/27/2022
  Choose a course Expiration Date

Name: Click or tap here to enter text. Degree(s): Click or tap here to enter text.
Rank/Title: Choose Rank/Title Department/School: Choose Department/School
Role/responsibilities in this project: Click or tap here to enter text.
- AU affiliated? ☐ Yes ☐ No If no, name of home institution: Click or tap here to enter text.
- Plan for IRB approval for non-AU affiliated personnel? Click or tap here to enter text.
- Do you have any known competing financial interests, personal relationships, or other interests that could have influence or appear to have influence on the work conducted in this project? ☐ Yes ☐ No
- If yes, briefly describe the potential or real conflict of interest: Click or tap here to enter text.
- Completed required CITI training? ☐ Yes ☐ No If NO, complete the appropriate CITI basic course and update the revised EXEMPT application form.
- If YES, choose course(s) the researcher has completed: Choose a course Expiration Date
  Choose a course Expiration Date

d. Funding Source – Is this project funded by the investigator(s)? Yes ☐ No ☒
Is this project funded by AU? Yes ☐ No ☒ If YES, identify source Click or tap here to enter text.
Is this project funded by an external sponsor? Yes ☐ No ☐ If YES, provide name of sponsor, type of sponsor (governmental, non-profit, corporate, other), and an identification number for the award.
Name: **Templeton Religion Trust** Type:**Project** Grant #: **TRT0093**

e. List other AU IRB-approved research projects and/or IRB approvals from other institutions that are associated with this project. Describe the association between this project and the listed project(s):
There are no other AU IRB approvals associated with this project. There is an approved IRB (20-070), titled "Project Arete Quantitative Master IRB and Data Merge" which was approved on 24 April 2020 by Karen Peck, Human Protections Director at the United States Military Academy at West Point. Both her email as well as the submitted protocol are included. The Principal Investigator for this IRB is listed as an Associate Investigator with acknowledgement of Auburn University as the place of analysis and reporting.

2. Project Summary

a. Does the study *TARGET* any special populations? Answer YES or NO to all.

Minors (under 18 years of age; if minor participants, at least 2 adults must be present during all research procedures that include the minors)	Yes ☐ No ☒
Auburn University Students	Yes ☐ No ☒
Pregnant women, fetuses, or any products of conception	Yes ☐ No ☒
Prisoners or wards (unless incidental, not allowed for Exempt research)	Yes ☐ No ☒

Temporarily or permanently impaired Yes ☐ No ☒

b. Does the research pose more than minimal risk to participants? Yes ☐ No ☒

If YES, to question 2.b, then the research activity is NOT eligible for EXEMPT review. Minimal risk means that the probability and magnitude of harm or discomfort anticipated in the research is not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or test. 42 CFR 46.102(i)

c. Does the study involve any of the following? *If YES to any of the questions in item 2.c, then the research activity is NOT eligible for EXEMPT review.*

Procedures subject to FDA regulations (drugs, devices, etc.) Yes ☐ No ☒

Use of school records of identifiable students or information from instructors about specific students. Yes ☐ No ☒

Protected health or medical information when there is a direct or indirect link which could identify the participant. Yes ☐ No ☒

Collection of sensitive aspects of the participant's own behavior, such as illegal conduct, drug use, sexual behavior or alcohol use. Yes ☐ No ☒

d. Does the study include deception? Requires limited review by the IRB* Yes ☐ No ☒

3. MARK the category or categories below that describe the proposed research. Note the IRB Reviewer will make the final determination of the eligible category or categories.

☒ **1.** Research conducted in established or commonly accepted educational settings, involving normal educational practices. The research is not likely to adversely impact students' opportunity to learn or assessment of educators providing instruction. 104(d)(1)

☒ **2.** Research only includes interactions involving educational tests, surveys, interviews, public observation if at least ONE of the following criteria. (The research includes data collection only; may include visual or auditory recording; may NOT include intervention and only includes interactions). **Mark the applicable sub-category below (I, ii, or iii). 104(d)(2)**

☒ **(i)** Recorded information cannot readily identify the participant (directly or indirectly/ linked);
OR
- surveys and interviews: no children;
- educational tests or observation of public behavior: can only include children when investigators do not participate in activities being observed.

☒ **(ii)** Any disclosures of responses outside would not reasonably place participant at risk; **OR**

☐ **(iii)** Information is recorded with identifiers or code linked to identifiers and IRB conducts limited review; no children. **Requires limited review by the IRB.***

☐ **3.** Research involving Benign Behavioral Interventions (BBI)** through verbal, written responses including data entry or audiovisual recording from adult subjects who prospectively agree and ONE of the following criteria is met. (This research does not include children and does not include medical interventions. Research cannot have deception unless the participant prospectively agrees that they will be unaware of or misled regarding the nature and purpose of the research) **Mark the applicable sub-category below (A, B, or C).** 104(d)(3)(i)

☐ **(A)** Recorded information cannot readily identify the subject (directly or indirectly/ linked); **OR**

☐ **(B)** Any disclosure of responses outside of the research would not reasonably place subject at risk; **OR**

☐ **(C)** Information is recorded with identifies and cannot have deception unless participants prospectively agree. **Requires limited review by the IRB.***

☒ **4.** Secondary research for which consent is not required: use of identifiable information or identifiable bio-specimen that have been or will be collected for some other 'primary' or 'initial' activity, if one of the following criteria is met. Allows retrospective and prospective secondary use. **Mark the applicable sub-category below (i, ii, iii, or iv).** 104 (d)(4)

☐ **(i)** Bio-specimens or information are publicly available;

☒ **(ii)** Information recorded so subject cannot readily be identified, directly or indirectly/linked investigator does not contact subjects and will not re-identify the subjects; **OR**

☐ **(iii)** Collection and analysis involving investigators use of identifiable health information when us is regulated by HIPAA "health care operations" or "research" or "public health activities and purposes" (does not include bio-specimens (only PHI and requires federal guidance on how to apply); **OR**

☐ **(iv)** Research information collected by or on behalf of federal government using government generated or collected information obtained for non-research activities.

☐ **5.** Research and demonstration projects which are supported by a federal agency/department AND designed to study and which are designed to study, evaluate, or otherwise examine: (i)public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or service under those programs. (must be posted on a federal web site). 104.5(d)(5) (must be posted on a federal web site)

☐ **6.** Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives and consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture. The research does not involve prisoners as participants. 104(d)(6)

**Limited IRB review – the IRB Chair or designated IRB reviewer reviews the protocol to ensure adequate provisions are in place to protect privacy and confidentiality.*

***Category 3 – Benign Behavioral Interventions (BBI) must be brief in duration, painless/harmless, not physically invasive, not likely to have a significant adverse lasting impact on participants, and it is unlikely participants will find the interventions offensive or embarrassing.*

**** Exemption categories 7 and 8 require broad consent. The AU IRB has determined the regulatory requirements for legally effective broad consent are not feasible within the current institutional infrastructure. EXEMPT categories 7 and 8 will not be implemented at this time.*

4. Describe the proposed research including who does what, when, where, how, and for how long, etc.

a. Purpose

The Principal Investigator's proposed research intends to use archival data from two sources: 1. 5 year longitudinal survey and 2. demographic and performance data sourced from the participating university's (USMA) Office of Institutional Research (OIR) to examine the relationship between character and leadership data and subsequent performance. Data was collected from 2015 to 2020 by Project Arete Team Members who are listed as Associate Investigators on the USMA approved protocol. Those Project Arete members who gathered data, did so between 2015 and 2020 using a survey implemented by paper and pencil once a year in the summer and then electronically once a year in late winter for five years. Data obtained through OIR is archived from normal institutional activity throughout the academic year. The Principle Investigator intends to analyze the concurrent and predictive validity of the character attributes captured in the survey to measure and assess their relationship to cadet performance during. This analysis will be conducted in the spring of 2022 as a part of the Principle Investigator's doctoral dissertation.

b. Participant population, including the number of participants and the rationale for determining number of participants to recruit and enroll. Note if the study enrolls minor participants, describe the process to ensure more than 1 adult is present during all research procedures which include the minor.

Because this protocol is using archival data, there is no recruitment of participants. There are approximately 9500 participants who span the graduating classes of 2016 to 2023. The participants are Cadets (college students) and Active Duty Military Members serving in leadership and instructor positions at the United States Military Academy at West Point, New York.

c. Recruitment process. Address whether recruitment includes communications/interactions between study staff and potential participants either in person or online. *Submit a copy oall recruitment materials.*

This protocol involves using archival data. There will be no recruitment. The qualitative data collection from the character and leadership survey is de-identified (do not contain either cadet names or Cadet IDs) and thus cannot be linked to the archival data. The demographic data was not gained from participants but rather secondary data from other USMA sources

d. Consent process including how information is presented to participants, etc.

This protocol involves the use of archival data.

e. Research procedures and methodology

Research involves analyzing data from two sources. The first source is the character and leadership survey. The survey assesses character strengths, social support, identity, and personal values, attitudes and behaviors regarding gender stereotypes. The second archival data source is USMA maintained data. The USMA maintained data is needed for two basic variables: outcomes and covariates. Using the survey data and the USMA maintained data, appropriate descriptive and inferential statistical analyses. The Principle Investigator intends to merge the two datasets to conduct a multi-cohort, longitudinal analyses of character strengths and their relationship to performance and leadership at West Point. Additional methodologies which may be used include structural equation modeling, multi-level modeling, and latent growth modeling.

f. Anticipated time per study exercise/activity and total time if participants complete all study activities.

Data was collected over a five-year period from 2015 to 2020 and is now complete. This protocol is intended to be complete in spring 2022.

g. Location of the research activities.

Research data was gathered at the United States Military Academy at West Point over a five-year period of time. Survey data collection occurred twice a year: once in the summer and once in the late winter, every year for five years. Each data collection occurred on campus.

h. Costs to and compensation for participants? If participants will be compensated describe the amount, type, and process to distribute.

Protocol is using archival data. When data was collected, participants completed survey on a volunteer basis and received no compensation.

i. Non-AU locations, site, institutions. *Submit a copy of agreements/IRB approvals.*
Research and data was conducted and collected from the United States Military Academy at West Point and the IRB protocol and subsequent approval are included in this application.

j. Additional relevant information.
The demographic and performance data gained from the OIR at USMA which provides academic, military and physical performance data was extracted from the academy student personnel database by an Institutional Research and Analysis Branch Information Technology Specialist, and coded with a Cadet ID. The survey and secondary data are merged by Project Arete team members who do not have direct access to Cadet ID numbers and therefore cannot directly identify participants who make up the archived data set.

5. Waivers
Check applicable waivers and describe how the project meets the criteria for the waiver.

☒ Waiver of Consent (Including existing de-identified data)

☐ Waiver of Documentation of Consent (Use of Information Letter, rather than consent form requiring signatures)

☐ Waiver of Parental Permission (in Alabama, 18 years-olds may be considered adults for research purposes)

a. Provide the rationale for the waiver request.
Study request will use only archival data with de-identified data.

6. Describe the process to select participants/data/specimens. If applicable, include gender, race, and ethnicity of the participant population.

Archival data. Participants volunteered to complete the character and leadership survey while attending the United States Military Academy. Participants were first introduced to the opportunity during administrative in-processing of their matriculation year (Summer 2015-2019). They were provided another opportunity late winter, every year. Participants include both genders and range of ethnic backgrounds. Participation across all surveys is estimated at approximately 9500.

7. Risks and Benefits

7a. Risks - Describe why none of the research procedures would cause a participant either physical or psychological discomfort or be perceived as discomfort above and beyond what the person would experience in daily life (minimal risk).

Participants have already completed participation. Procedures included one self-report survey which involved self-assessment on character and leadership attributes, opinions, and behaviors. The secondary data was gathered through traditional collegiate administration responsible for tracking participant performance (academic, military, leadership performance measured through courses, events, and programmed activities). The greatest risk to participants for this protocol would be the breach of confidentiality. This risk has already been mitigated through the deidentification of data. The Principle Investigator does not have access to identifiable data.

7b. Benefits – Describe whether participants will benefit directly from participating in the study. If yes, describe the benefit. And, describe generalizable benefits resulting from the study.

There are no direct benefits to participants other than the surge of endorphins knowing they helped a group of researchers in their pursuit to further knowledge. Research efforts from this data set has already resulted in various documents providing benefit to the USMA community, stakeholders, and scholars interested in character and leadership field. This study specifically should contribute to organizational development, specifically as it relates to leadership development, training, and personnel selection.

8. Describe the provisions to maintain confidentiality of data, including collection, transmission, and storage. Identify platforms used to collect and store study data. *For EXEMPT research, the AU IRB recommends AU BOX or using an AU issued and encrypted device. If a data collection form will be used, submit a copy.*

Cadet survey data contained no PII and were coded using a Cadet ID by a member of the Office of Institutional Research (OIR) at USMA. Survey and secondary data were merged by Project Arete Team Members by Cadet ID. Data was downloaded to and is stored in a protected Tufts University server, only accessible by Project Arete team members.

a. If applicable, submit a copy of the data management plan or data use agreement.

9. Describe the provisions included in the research to protect the privacy interests of participants (e.g., others will not overhear conversations with potential participants, individuals will not be publicly identified or embarrassed).

No demographic information was collected in the survey. Survey and secondary data are linked by participant ID only. No Project Arete team member possesses access to participant identification or means to contact. Researchers never had physical contact with participants. Surveys were administered by third party individuals for summer collection periods and through email from third party individuals associated with Tufts University for the electronic survey data collection which occurred during late winters.

10. Additional Information and/or attachments.

In the space below, provide any additional information you believe may help the IRB review of the proposed research. If attachments are included, list the attachments below. Attachments may include recruitment materials, consent documents, site permissions, IRB approvals from other institutions, data use agreements, data collection form, CITI training documentation, etc.

Included with this application:1. E-mail Protocol Approval (Control Number 20-070) from Karen Peck, Human Protections Director, United States Military Academy (USMA) 2. USMA Human Research Protection Program (HRPP) Request for Determination for "Project Arete Quantitative Master IRB and Data Merge" 3. CITI Training Certificates for PI Kate Conkey 4. CITI Training Certificate for PI Advisor/Committee Chair – Dr. Daniel Svyantek

5. Leadership and Character Survey

Required Signatures *(If a student PI is identified in item 1.a, the EXEMPT application must be re-signed and updated at every revision by the student PI and faculty advisor. The signature of the department head is required only on the initial submission of the EXEMPT application, regardless of PI. Staff and faculty PI submissions require the PI signature on all version, the department head signature on the original submission)*

Signature of Principal Investigator: _____ **Date:** 2/11/2022

Signature of Faculty Advisor (If applicable): _____ **Date:** 2/11/2022

Signature of Dept. Head: _____ **Date:** 2/11/2022

Version Date: 2/9/2022

From: **Peck, Karen Y CIV** karen.peck@westpoint.edu
Subject: 20-070 Exempt Determination
Date: April 24, 2020 at 10:53
To: Kobylski, Gerald gerald.kobylski@westpoint.edu
Cc: Human Research Protection Program HRPP@westpoint.edu, Farina, Andrew G LTC andrew.farina@westpoint.edu

After a careful review of your protocol, "Project Arete Quantitative Master IRB and Data Merge," I have determined that this is human subjects research according to 32CFR219 and meets the requirements of exempt status under 32CFR219.104(d)(4)(ii) because this is research involving secondary analysis of data from previous Project Arete protocols and AMS. The approved variables to be used are listed as an appendix to the Request for Determination form.

The data will be recorded by merging all data collected in accordance with previous Project Arete protocols using the subjects' C-numbers. The investigators merging the data will not access the code linking the C-number with identifiers. After the data has been successfully merged, the C-number will be removed creating a permanently de-identified data set. There will be two copies of this data set – one will be housed at USMA and one will be housed at Tufts University. The identity of the subjects cannot readily be ascertained directly or through identifiers linked to the subjects, the investigator cannot contact the subjects, and the investigator will not re-identify subjects.

Confidentiality will be maintained by only using C-numbers to complete the data merge and deleting the C-numbers immediately after successfully created the data set. During the process of merging data, investigators will use standard electronic data security measures to protect the data to the greatest extent possible.

Your project control number is 20-070.

The data belong to USMA and may not be shared, transferred, or exchanged with anyone outside of the research team without prior authorization except in accordance with associated agreements. If any aspect of your study should change or be altered, please contact this office.

Data collection may begin upon receipt of this notice of determination.

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Appendix B

Cadet Character Strengths

Relational Humility

The following statements ask about humility. There may be many definitions of humility, but we will define it here as 1) the ability to act modestly by not bragging or showing too much pride in your accomplishments; and 2) having an accurate view of yourself that is not overly positive or negative. Please keep this definition in mind as you respond to the following items:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am a humble person hum02	o	o	o	o	o
My close friends would consider me to be humble. hum04	o	o	o	o	o
Even strangers would consider me to be humble. hum05	o	o	o	o	o

Intellectual Humility

How much do you agree or disagree with the following statements?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I often become angry when their ideas are not implemented. ih01	o	o	o	o	o
I value winning an argument over maintaining a relationship. ih02	o	o	o	o	o
I always have to have the last word in an argument. ih03	o	o	o	o	o
I get defensive if others do not agree with them. ih04	o	o	o	o	o
I become angry when their advice is not taken. ih05	o	o	o	o	o
I have little patience for others' beliefs. ih06	o	o	o	o	o
I act like a know-it-all. ih07	o	o	o	o	o
I often point out others' mistakes. ih08	o	o	o	o	o

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I make fun of people with different viewpoints. ih09	o	o	o	o	o
I seek out alternative viewpoints. ih10	o	o	o	o	o
I encourage others to share their viewpoints. ih11	o	o	o	o	o
I enjoy diverse perspectives. ih12	o	o	o	o	o
I am open to competing ideas. ih13	o	o	o	o	o
I am good at mediating controversial topics. ih14	o	o	o	o	o
I am good at considering the limitations of their perspective. ih15	o	o	o	o	o
I am open to others' ideas. ih16	o	o	o	o	o

Honesty

How much do you agree or disagree with the following statements?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I tell the truth. hon01	o	o	o	o	o
I never cheat. hon02	o	o	o	o	o
I am a very honest person. hon03	o	o	o	o	o
I sometimes take things that do not belong to me. hon04	o	o	o	o	o
I would feel OK about cheating on a test as long as I did not get caught. hon05	o	o	o	o	o
I have never stolen anything of consequence. hon06	o	o	o	o	o

Optimism

How much do you agree or disagree with the following statements?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
In uncertain times, I usually expect the best. lotr01	o	o	o	o	o
If something can go wrong for me, it will. lotr02	o	o	o	o	o
I'm always optimistic about my future. lotr03	o	o	o	o	o
I hardly ever expect things to go my way. lotr04	o	o	o	o	o
I rarely count on good things happening to me. lotr05	o	o	o	o	o
Overall, I expect more good things to happen to me than bad. lotr06	o	o	o	o	o

Intentional Self-Regulation (SOC)

How do you decide which things in life are important for you? How do you go about accomplishing what you want in life?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I consider exactly what is important for me. isr01	o	o	o	o	o
I keep trying as many different possibilities as are necessary to succeed at my goal. isr02	o	o	o	o	o
When something does not work as well as before, I get advice from experts or read books. isr03	o	o	o	o	o
For important things, I pay attention to whether I need to devote more time or effort. isr04	o	o	o	o	o
I think about exactly how I can best realize my plans. isr05	o	o	o	o	o
I make every effort to achieve a given goal. isr06	o	o	o	o	o
When I have started something that is important to me, but has little chance at success, I make a particular effort. isr07	o	o	o	o	o
When I decide upon a goal, I stick to it. isr08	o	o	o	o	o
When things don't work the way they used to, I look for other ways to achieve them. isr09	o	o	o	o	o
When something doesn't work as well as usual, I look at how others do it. isr10	o	o	o	o	o
I always pursue goals one after the other. isr11	o	o	o	o	o

Grit

Please use the following response options to indicate how much the statements below are like you. There are no right or wrong answers. Answer honestly how much each statement applies to you.

	Not like me	A little like me	Somewhat like me	Mostly like me	Very much like me
1. I have overcome setbacks to conquer an important challenge. grit1	○	○	○	○	○
2. New ideas and new projects sometimes distract me from old ones. grit2	○	○	○	○	○
3. My interests change from year to year. grit3	○	○	○	○	○
4. Setbacks don't discourage me. grit4	○	○	○	○	○
5. I have been obsessed with a certain project for a short time but later lost interest. grit5	○	○	○	○	○
6. I am a hard worker. grit6	○	○	○	○	○
7. I often set a goal but later choose to pursue a different one. grit7	○	○	○	○	○
8. I have difficulty maintaining my focus on projects that take more than a few months to complete. grit8	○	○	○	○	○
9. I finish whatever I begin. grit9	○	○	○	○	○
10. I have achieved a goal that took years of work. grit10	○	○	○	○	○

	Not like me	A little like me	Somewhat like me	Mostly like me	Very much like me
11. I become interested in new pursuits every few months. grit11	o	o	o	o	o
12. I am diligent. grit12	o	o	o	o	o

Hardiness

Below are statements about life that people often feel differently about. Please show how much you think each one is true. Give your own honest opinions…There are no right or wrong answers.

	Not at all true	A Little True	Quite True	Completely True
1. Most of my life gets spent doing things that are worthwhile. hard1	o	o	o	o
2. Planning ahead can help avoid most future problems. hard2	o	o	o	o
3. I don't like to make changes to my regular activities. hard3	o	o	o	o
4. I feel that my life is somewhat empty of meaning. hard4	o	o	o	o
5. Changes in routine are interesting to me. hard5	o	o	o	o
6. By working hard, you can nearly always achieve your goals. hard6	o	o	o	o
7. I really look forward to my work activities. hard7	o	o	o	o
8. If I'm working on a difficult task, I know when to ask for help. hard8	o	o	o	o

	Not at all true	A Little True	Quite True	Completely True
9. I don't think there's much I can do to influence my own future. hard9	o	o	o	o
10. Trying your best at work is really worth it in the end. hard10	o	o	o	o
11. It bothers me when my daily routine gets interrupted. hard11	o	o	o	o
12. Most days life, is really interesting and exciting for me. hard12	o	o	o	o
13. I enjoy the challenge when I have to do more than one thing at a time. hard13	o	o	o	o
14. I like having a daily schedule that doesn't change very much. hard14	o	o	o	o
15. When I make plans, I'm certain I can make them work. hard15	o	o	o	o

Empathy

How well does each of these statements describe you?

	Not well	Slightly Well	Well	Fairly Well	Very Well
1. I don't feel sorry for other people when they are having problems. emp01	o	o	o	o	o
2. When I see someone being taken advantage of, I want to help them. emp02	o	o	o	o	o
3. It bothers me when bad things happen to good people. emp03	o	o	o	o	o
4. It bothers me when bad things happen to any person. emp04	o	o	o	o	o
5. When I see someone being treated unfairly, I don't feel sorry for them. emp05	o	o	o	o	o
6. I feel sorry for other people who don't have what I have. emp06	o	o	o	o	o
7. When I see someone being picked on, I feel sorry for them. emp07	o	o	o	o	o
8. It makes me sad to see a personal who doesn't have friends. emp08	o	o	o	o	o
9. When I see another person who is hurt or upset, I feel sorry for them. emp09	o	o	o	o	o

Generosity

How often do you perform these various tasks?

	Never				Very often	N/A
1. Share my belongings with people who need them. gen01	o	o	o	o	o	o
2. Donate my time to people or organizations that need my help. gen02	o	o	o	o	o	o
3. Loan money to people who need it. gen03	o	o	o	o	o	o
4. Help make my community a better place for people to live. gen04	o	o	o	o	o	o
5. Help out at my church, synagogue, or other place of worship. gen05	o	o	o	o	o	o
6. Help a neighbor. gen06	o	o	o	o	o	o
7. Help someone you do not know. gen07	o	o	o	o	o	o

Gratitude

How much do you agree with the following statements?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. I have so much in life to be thankful for. grat01	o	o	o	o	o
2. If I had to list everything that I feel grateful for, it would be a very long list. grat02	o	o	o	o	o
3. When I look at the world, I don't see much to be grateful for. grat03	o	o	o	o	o
4. I am grateful to a wide variety of people. grat04	o	o	o	o	o
5. As I get older, I find myself more able to appreciate people, events, and situations that have been a part of my life history. grat05	o	o	o	o	o
6. Long amounts of time can go by before I feel grateful to something or someone. grat06	o	o	o	o	o

Purpose

How much do you agree or disagree with the following statements?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. I understand my life's meaning. purp01	O	O	O	O	O
2. My life has a clear sense of purpose. purp02	O	O	O	O	O
3. I have a good sense of what makes my life meaningful. purp03	O	O	O	O	O
4. I have discovered a satisfying life purpose. purp04	O	O	O	O	O
5. My life has no clear purpose. purp05	O	O	O	O	O

Love

Please indicate the degree to which these statements apply to you.

	Very much unlike me	Unlike me	Neutral	Like me	Very much like me
I always feel the presence of love in my life. love06	O	O	O	O	O
I can express love to someone else. love07	O	O	O	O	O
I can accept love from others. love08	O	O	O	O	O

Perceived Social Support

	Very Strongly Disagree	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Very Strongly Agree
My family really tries to help me pss03	O	O	O	O	O	O	O
I can count on my friends when things go wrong. pss07	O	O	O	O	O	O	O
There is a special person in my life who cares about my feelings. pss10	O	O	O	O	O	O	O
I can count on my friends to care and celebrate with me when things go well for me. pss11	O	O	O	O	O	O	O

CIP Leadership Scale

Subscales of Leader Identity, Nature of Goals Sought, Targets of Influence, and Nature of Appeals

Below are a series of statements. Rate each response as to how it most accurately defines you as a leader.

In thinking about who I am as a leader...

	1 *MINOR* part of my identity	2	3	4 *PART* of my identity	5	6	7 *COMPLETELY* defines my identity
I define myself as someone who sees the best in things. cip01	O	O	O	O	O	O	O
I define myself as someone who focuses on a brighter future. cip02	O	O	O	O	O	O	O
I define myself as someone who focuses on the positive. cip03	O	O	O	O	O	O	O

	1 *MINOR* part of my identity	2	3	4 *PART* of my identity	5	6	7 *COMPLETELY* defines my identity
I define myself as someone who maintains a fundamental set of beliefs. cip04	O	O	O	O	O	O	O
I define myself as someone who stays true to my beliefs. cip05	O	O	O	O	O	O	O
I define myself as someone who protects key values. cip06	O	O	O	O	O	O	O
I define myself as someone who can fix issues that arise. cip07	O	O	O	O	O	O	O
I define myself as someone who provides solutions to problems. cip08	O	O	O	O	O	O	O
I define myself as someone who solves problems. cip09	O	O	O	O	O	O	O

Rate each statement for each item as to how it most accurately captures how you set goals.
When I set goals...

	1 How I would *LIKE* things to be	2	3	4 How I think the world *SHOULD* be	5	6	7 The way the world *MUST* be
I focus my goals on a brighter future cip10	o	o	o	o	o	o	o
I focus my goals on creating a better tomorrow cip11	o	o	o	o	o	o	o
I focus my goals on the promise of a better future cip12	o	o	o	o	o	o	o
I focus my goals on a return to old values cip13	o	o	o	o	o	o	o
I focus my goals on maintaining tradition cip14	o	o	o	o	o	o	o
I focus my goals on the traditional way of doing things cip15	o	o	o	o	o	o	o
I focus my goals on accomplishing the mission at hand cip16	o	o	o	o	o	o	o
I focus my goals on getting problems solved cip17	o	o	o	o	o	o	o
I focus my goals on getting things done cip18	o	o	o	o	o	o	o

When trying to convince others to accomplish my goals...

	1 How I think things *CAN* get done	2	3	4 *IMPORTANT* to how things get done	5	6	7 The *ONLY* way I can get things done
I tailor my message to as many people as I can cip19	○	○	○	○	○	○	○
I tailor my message to a wide array of individuals cip20	○	○	○	○	○	○	○
I tailor my message to reach large groups cip21	○	○	○	○	○	○	○
I tailor my message to only those that share my beliefs cip22	○	○	○	○	○	○	○
I tailor my message to only those that also have the same values I do cip23	○	○	○	○	○	○	○
I tailor my message to only individuals that believe the same things I do cip24	○	○	○	○	○	○	○
I tailor my message to individuals with the important skillsets cip25	○	○	○	○	○	○	○
I tailor my message to people who will get things done cip26	○	○	○	○	○	○	○
I tailor my message to reach people who can solve tough problems cip27	○	○	○	○	○	○	○

Rate each response as to how it most accurately captures how you communicate your message to others. When trying to convince others to work towards goals I've set...

	1 What I think followers *MAY* respond to	2	3	4 What I think motivates followers *AT TIMES*	5	6	7 What I know will *ALWAYS* motivate followers
I focus on creating a positive message of hope cip28	○	○	○	○	○	○	○
I focus on offering a message and image of promise cip29	○	○	○	○	○	○	○
I focus on a positive message of potential and what can be cip30	○	○	○	○	○	○	○
I focus on reminding others what can happen if we fail to stick to our values cip31	○	○	○	○	○	○	○
I focus on making others aware of the harm that can come if we do not stay true to our beliefs cip32	○	○	○	○	○	○	○
I focus on the negative repercussions of straying from our core values cip33	○	○	○	○	○	○	○
I focus on promoting rational thinking to solve problems cip34	○	○	○	○	○	○	○
I focus on encouraging calm consideration of relevant information cip35	○	○	○	○	○	○	○
I focus on promoting levelheaded decision-making cip36	○	○	○	○	○	○	○

Identity and Personal Values

Army Values

	I can articulate or define what these values mean. ava01-ava03					These values are important for how I live my daily life. avp01-avp03					These values are consistent with my own values. avc01-avc03				
	Strongly Disagree 1	2	3	4	Strongly Agree 5	Strongly Disagree 1	2	3	4	Strongly Agree 5	Strongly Disagree 1	2	3	Strongly Agree 4	5
Army professionals are expected to live by certain ethics.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
"Duty, Honor, Country" are important concepts for Army professionals.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
The Army expects officers to be "leaders of character."	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O

Officer Identity

	Strongly Disagree	Disagree	Neither Agree nor Disagree	A
Becoming an officer will help me satisfy deeply personal goals. icc01	O	O	O	
Becoming an officer will allow me to become the person I dream to be. icc02	O	O	O	
Becoming an officer will allow me to remain true to my values. icc03	O	O	O	

Self-Concept Clarity

How much do you agree or disagree with these statements?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
My beliefs about myself often conflict with one another. scc01	O	O	O	O	O

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
On one day I might have one opinion of myself and on another day, I might have a different opinion. scc02	o	o	o	o	o
I spend a lot of time wondering about what kind of person I really am. scc03	o	o	o	o	o
Sometimes I feel that I am not really the person that I appear to be. scc04	o	o	o	o	o
When I think about the kind of person I have been in the past, I'm not sure what I was really like. scc05	o	o	o	o	o
I seldom experience conflict between the different aspects of my personality. scc06	o	o	o	o	o
Sometimes I think I know other people better than I know myself. scc07	o	o	o	o	o
My beliefs about myself seem to change very frequently. scc08	o	o	o	o	o
If I were asked to describe my personality, my description might end up being different from one day to another day. scc09	o	o	o	o	o
Even if I wanted to, I don't think I would tell someone what I'm really like. scc10	o	o	o	o	o
In general, I have a clear sense of who I am and what I am. scc11	o	o	o	o	o
It is often hard for me to make up my mind about things	o	o	o	o	o

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
because I don't really know what I want. scc12					

Key Character Strengths

Below is a list of 24 personal strengths. Please indicate the degree to which each strength is important for your success at West Point.

	Not at all Important 1	2	3	4	Extremely Important 5
Appreciation of Beauty and Excellence: awe, wonder, elevation **via01**	o	o	o	o	o
Bravery: valor, speaking up for what's right **via02**	o	o	o	o	o
Love: valuing close relations with others **via03**	o	o	o	o	o
Prudence: careful, not taking undue risks **via04**	o	o	o	o	o
Teamwork: social responsibility, loyalty **via05**	o	o	o	o	o
Creativity: originality, adaptivity **via06**	o	o	o	o	o
Curiosity: interest, novelty-seeking **via07**	o	o	o	o	o
Fairness: just, not letting feelings bias decisions about others **via08**	o	o	o	o	o
Forgiveness: mercy, accepting others' shortcomings **via09**	o	o	o	o	o
Gratitude: expressing thanks, feeling blessed **via10**	o	o	o	o	o
Honesty: authenticity, integrity **via11**	o	o	o	o	o
Hope: optimism, future-mindedness **via12**	o	o	o	o	o
Humor: playfulness, lightheartedness **via13**	o	o	o	o	o
Industry: perseverance, persistence **via14**	o	o	o	o	o
Judgment: critical thinking, open-mindedness **via15**	o	o	o	o	o

	Not at all Important 1	2	3	4	Extremely Important 5
Kindness: generosity, care, compassion **via16**	o	o	o	o	o
Leadership: encouraging a group to get things done **via17**	o	o	o	o	o
Love of learning: mastering new skills and topics **via18**	o	o	o	o	o
Modesty: humility **via19**	o	o	o	o	o
Perspective: wisdom, providing wise council **via20**	o	o	o	o	o
Self-control: self-regulation, discipline **via21**	o	o	o	o	o
Social intelligence: being aware of the motive/feelings of self/others **via22**	o	o	o	o	o
Spirituality: faith, purpose **via23**	o	o	o	o	o
Zest: vitality, enthusiasm **via24**	o	o	o	o	o

Machiavellian Attitudes/Behaviors

Machiavellianism Scale – Four Subscales: Morality, Control, Status, Distrust of Others (Dahling, Whitaker, & Levy, 2008)

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I believe that lying is necessary to maintain a competitive advantage over others. mach01	O	O	O	O	O
The only good reason to talk to others is to get information that I can use to my benefit. mach02	O	O	O	O	O
I am willing to be unethical if I believe it will help me succeed. mach03	O	O	O	O	O
I am willing to sabotage the efforts of other people if they threaten my own goals. mach04	O	O	O	O	O
I would cheat if there was a low chance of getting caught. mach05	O	O	O	O	O
I like to give the orders in interpersonal situations. mach06	O	O	O	O	O
I enjoy having control over other people. mach07	O	O	O	O	O
I enjoy being able to control the situation. mach08	O	O	O	O	O
Status is a good sign of success in life. mach09	O	O	O	O	O
Accumulating wealth is an important goal for me. mach10	O	O	O	O	O
I want to be rich and powerful someday. mach11	O	O	O	O	O
People are only motivated by personal gain. mach12	O	O	O	O	O
I dislike committing to groups because I don't trust others. mach13	O	O	O	O	O
Team members backstab each other all the time to get ahead. mach14	O	O	O	O	O

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
If I show any weakness at work, other people will take advantage of it. mach15	O	O	O	O	O
Other people are always planning ways to take advantage of the situation at my expense. mach16	O	O	O	O	O

Buss-Perry Aggression Questionnaire (Short Form)

Use the scale below to indicate how well the following statements describe you.

	A ----1---- Extremely Characteristic of Me	B -----2-----	C ----3----	D -----4-----	E ----5----	F ----6---- Extremely Uncharacteristic of Me
1. I often find myself disagreeing with people. **bpag01**	O	O	O	O	O	O
2. At times I feel I have gotten a raw deal out of life. **bpag02**	O	O	O	O	O	O
3. I have threatened people I know. **bpag03**	O	O	O	O	O	O
4. I wonder why sometimes I feel so bitter about things. **bpag04**	O	O	O	O	O	O
5. I have trouble controlling my temper. **bpag05**	O	O	O	O	O	O
6. My friends say that I'm somewhat argumentative. **bpag06**	O	O	O	O	O	O
7. I flare up quickly but get over it quickly. **bpag07**	O	O	O	O	O	O
8. Given enough provocation, I may hit another person. **bpag08**	O	O	O	O	O	O
9. I can't help getting into arguments when people disagree with me. **bpag09**	O	O	O	O	O	O
10. Other people always seem to get the breaks. **bpag10**	O	O	O	O	O	O
11. There are people who pushed me so far that we came to blows. **bpag11**	O	O	O	O	O	O

12. Sometimes I fly off the handle for no good reason. **bpag12**	o	o	o	o	o	o

UNITED STATES MILITARY ACADEMY
WEST POINT.

Periodic Development Review

Not Observed (N/O) | Unsatisfactory(1) | Developing (2) | Effective (3) | Exceptional (4)

Graduating Class	AY Co	Course / Detail	Unit [ie. CO/PLT/SQD]	Position	CDT's Last Name, First Name	Acad Year/Term
Report Type	Initial / Mid-Term / Final	Evaluator Unit / Department	Evaluator Position	Evaluator Rank	Evaluator (Last Name,First Name)	Report Date

Attributes: Traits that enable the core leader competencies to be performed with greater effect	Competencies: Traits that provide a clear and consistent way of conveying expectations					
Character: Factors internal to a leader that constitute an individual's core.	Rating					Sustain and Improve comments - Minimum one Sustain and one Improve; Justify with demonstrated action and plan of action
Army Values (AV): Lives, acts and teaches Loyalty, Duty, Respect, Selfless-Service, Honor, Integrity, Personal Courage	N/O	1	2	3	4	
Empathy (EM): Able to see something from another person's point of view; identifies with and enters into another person's feelings and emotions	N/O	1	2	3	4	
Warrior Ethos/Service Ethos (ET): Shares attitudes and beliefs that embody the spirit of the Army profession for Soldiers and Army Civilians alike.	N/O	1	2	3	4	
Discipline (DI): Controls own behavior according to Army values; obeys and enforces good orderly practices; does what is morally, legally and ethically right	N/O	1	2	3	4	
Presence: Leader's outward appearance, demeanor and actions	Rating					Sustain and Improve comments - (Minimum one Sustain and one Improve; Justify with demonstrated action and plan of action
Military and Professional Bearing (MB): Projects a commanding presence and professional image of authority	N/O	1	2	3	4	
Physical Fitness (PF): Has sound health, strength, and endurance that supports one's emotional health and conceptual abilities under stress	N/O	1	2	3	4	
Confidence (CN): Projects self-confidence and certainty; demonstrates composure and poise; calm and collected; possesses self control of emotions	N/O	1	2	3	4	
Resilience (RE): Shows a tendency to recover quickly from setbacks, shock, adversity, stress or injury while maintaining a mission and organizational focus	N/O	1	2	3	4	
Intellect: Leader's conceptual abilities and effectiveness	Rating					Sustain and Improve comments - Minimum one Sustain and one Improve; Justify with demonstrated action and plan of action
Mental Agility (MA): Flexible of mind; anticipates or adapts to ever-changing conditions; improvises; able to apply multiple perspectives and approaches	N/O	1	2	3	4	
Innovation (IN): Able to introduce new ideas based on opportunity or challenging circumstances; original in thoughts and ideas; creative	N/O	1	2	3	4	
Expertise (EX): Possesses facts, beliefs, and logical assumptions in relevant areas; technical, tactical, cultural and geopolitical knowledge	N/O	1	2	3	4	
Sound Judgment (SJ): Assesses situations and draws feasible conclusions; makes sound and timely decisions	N/O	1	2	3	4	
Interpersonal Tact (IT): Has capacity to understand interactions with others; aware of how others see you and how to interact with them effectively	N/O	1	2	3	4	
Lead: Application of character, presence, intellect and abilities toward a common goal	Rating					Sustain and Improve comments - Minimum one Sustain and one Improve; Justify with demonstrated action and plan of action
Leads by Example (LE): Provides the example to others; serves as a role model; maintains high standards in all aspects of behavior and character	N/O	1	2	3	4	
Leads Others (LO): Motivates, inspires, and influences others to take initiative, work toward a common goal, and accomplish critical tasks and missions	N/O	1	2	3	4	
Builds Trust (BT): Empowers subordinates, encourages initiative, reinforce accountability and allows open communication	N/O	1	2	3	4	
Extends Influence Beyond CoC (EI): Influences others outside CoC; involves indirect means of influence: diplomacy, negotiation, conflict resolution and coordination	N/O	1	2	3	4	
Communicates (CM): Clearly expresses ideas to ensure understanding, actively listens to others, and employs effective communication techniques	N/O	1	2	3	4	
Develops: Fosters team work, initiative, and accepts personal responsibility	Rating					Sustain and Improve comments - Minimum one Sustain and one Improve; Justify with demonstrated action and plan of action
Creates a Positive Environment (PE): Establishes and maintains positive expectations/attitudes to support effective work behaviors, relationships and organization	N/O	1	2	3	4	
Prepares Self (PS): Conducts self-study; aware of their limitations and strengths and seek self-development; continues to improve and prepare for leadership roles	N/O	1	2	3	4	
Develops Others (DO): Encourages and supports others to grow as individuals and teams; prepares others for success; makes the organization versatile and productive	N/O	1	2	3	4	
Stewards the Profession (SP): Acts to improve the organization beyond their own tenure and supports developmental opportunities for subordinates	N/O	1	2	3	4	
Achieves: Sets objectives / focuses on mission accomplishment	Rating					
Gets Results (GR): Consistently produces results; develops and executes plans while providing direction, guidance and clear priorities towards mission accomplishment	N/O	1	2	3	4	

General Comments (Optional)	Most Qualified / Qualified / Not Qualified	Evaluator Signature	Rated Cadet Signature

Reference ADRP 6-22, Army Leadership, August 2012