Making Feedback Compelling: Examining the Format of Written Development Feedback to Promote Feedback Insight and Retention

A DISSERTATION SUBMITTED TO THE FACULTY OF
UNIVSITY OF MINNESOTA
BY

Jana Lynn Higdem

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

Dr. Nathan Kuncel, Advisor

November 2013

Acknowledgements

Throughout my formal education, I have received support and encouragement from a great many individuals. First and foremost, I would like to thank Dr. Nathan Kuncel for providing opportunity and direction to an eager undergraduate student, serving as my advisor during graduate school, and imparting wisdom while offering and encouraging independence. His guidance made this a thoughtful and rewarding journey.

I would like to thank the members of my dissertation committee, Dr. John Campbell, Dr. Aaron Schmidt, and Dr. Michelle Duffy, for their effort and feedback throughout the process. I would also like to thank the other faculty of the University of Minnesota I/O psychology program, Dr. Paul Sackett and Dr. Deniz Ones, for providing rigorous and enriching learning opportunities.

Finally, I would like to thank the fellow students in my cohort and in those cohorts surrounding me with whom I shared the many challenges of life as a graduate student. I feel honored to be a part of the Minnesota I/O family.

Dedication

To my parents, Randy and Nancy Rigdon, for their unwavering love, support, and encouragement throughout all of my years.

To my dear friend, Jenna Stowe, who served as one of my greatest confidants and ensured I had enough fun in my life during graduate school.

To my husband, Cody Higdem, who demonstrates unyielding love and empowerment, and challenges me to always connect my knowledge to the bigger picture.

Abstract

Individual assessment for development reflects a large and growing investment by organizations in their leaders and high potential personnel. A critical component in effectively directing leader development is providing feedback based on assessment results. This study examines the effect of including two features in written developmental feedback, namely a graphical display and development suggestions, on important feedback outcomes. A 2x2 experimental design was utilized randomizing the inclusion of graphs and development suggestions as conditions. 311 undergraduate students completed personality scales relevant to leadership and received feedback in a leader development context. They also completed general personality questionnaires and provided their ACT scores as a measure of cognitive ability. Participants then responded to items addressing important feedback reactions, including feedback acceptance, gaining insight, and intentions to improve. They also drafted free response behavioral plans to improve their leadership based on the feedback they received for each of four leader characteristics. One week later, participants responded to items which assessed the accuracy of their feedback recall. Results indicate that graphical displays of results promote more accurate recall of one's standing relative to meaningful referent groups and may help illuminate important goal-state discrepancies. Additionally, the results showed a positive effect of development suggestions on gaining insight from the feedback and driving the direction of behavioral development intentions. Thus both of these features can be useful for driving behavior change following developmental assessment and feedback. Personality and cognitive ability were also found to impact the reception and

retention of feedback. These results can inform how practitioners should communicate written personality feedback to recipients to ensure maximum value. Such implementation would be particularly beneficial for participants of psychological assessment in business contexts where subsequent development is often considered a critical outcome.

Table of Contents

List of Tables

List of Figures

Preface

This study is an expansion of a research framework examining how people make decisions based on data and how psychologists can influence those decisions. Previous research I have conducted focused on statistical format and graphical display and their impact on decision making (Rigdon & Kuncel, 2012; Kuncel & Rigdon, 2012). Such research sheds light on which types of statistical and graphical formats decision-makers find most accessible and compelling when making decisions about adoption or alteration of a personnel selection system. The previous research focused primarily on communicating data when the recipient was making decisions for the organization. The current project seeks to extend this research and theoretical framework to personal decisions about individual development. Specifically, this project examines whether the inclusion of graphic and developmental suggestion features in written feedback causes increases in feedback acceptance, self-insight, intentions to improve, and retention of the feedback

Introduction

The actions of leaders (influencing others, setting strategy, initiating structure) have serious consequences for stakeholders. As such it is not surprising that the questions of "who makes a good leader?" and "how do we make a good (or potentially good) leader even better?" have been frequently studied. The voluminous literature examining leader characteristics can inform how to improve leader performance or close leader performance gaps. Practice focuses on assessing the individual's job relevant knowledge, skills, abilities, and other characteristics (KSAOs) and then providing both feedback and training and development interventions. Feedback focuses on the mismatch between the individual's current set of KSAOs and those required to perform effectively at the current or more advanced levels of leadership. Together with the leader, a development coach or supervisor would then create a development plan based on the feedback to close these gaps. The sponsoring organization would ideally provide opportunities to practice such development on the job. Finally, over the course of some allotted time, a development coach or supervisor would ideally provide regular feedback regarding progress toward goals set in the development plan and assist in modifying goals as necessary.

The current project examines the initial feedback stage. This part of the process is a critical component in effectively directing leader development. Assuming accurate assessment, a critical factor in the effectiveness of the entire process is that the leader accepts and integrates the feedback into his or her current self-concept as a leader. Clear, memorable, and compelling methods of providing assessment feedback should be used. Clear feedback is more readily understood by its recipients. Memorable feedback

methods help to ensure the messages of the feedback will be retained by the recipient. Compelling feedback within a developmental context will be more likely to promote accepting the feedback, integrating it into one's own self-concept, and acting upon the feedback to create change. These outcomes of feedback are all imperative for moving forward in the development process.

The current project examines the effects of including two key features in written feedback on measures of feedback acceptance, gained insight, intentions to improve, and retention. Specifically, I compare the effects of incorporating graphical feedback and development suggestions versus text-only feedback on the participant's attitudinal reactions to the feedback, behavioral intentions, and recall accuracy. Presenting information in graphical format can enhance understanding of basic themes as well as recall of specific trends in data (Wilcox, 1964). Additionally, providing readers with suggestions for how they may utilize the information presented could aid in the integration of the information into the reader's real-world context, thus supporting feedback acceptance and retention. Given the importance of the written feedback format, there is a glaring dearth of research pertaining to optimal formatting of assessment feedback to ensure key outcomes which ultimately lead to leader development. Determining such information would have clear applied implications for developmental assessment and feedback contexts by promoting the efficacy of developmental interventions.

In summary, the present study will examine the effect of characteristics of written assessment feedback on feedback outcomes which are important and necessary for leader development. Together, these findings should extend the developmental feedback

literature, provide clarity around altering feedback communication to promote data receptivity, and contribute to more efficacious leader development practices overall.

Leader Assessment and Development

Since the current study is focused on providing feedback that is consistent with real leadership development, it is warranted to review the characteristics that 1. have been found to be associated with leadership and 2. are frequently assessed in leadership assessments. Much of the practice in leader development and coaching is based on the notion that many of the leadership qualities and skills and the characteristics associated with them can be developed. Leader development interventions exist in the form of development programs, multisource feedback, developmental assessment centers, executive coaching, action learning, and mentoring (McCauley, 2008). Companies invest both time and money to identify and develop strong leaders and build them into their leadership pipeline. Companies atop the Hay Group (2012) list of companies demonstrating the best leadership practices are all substantially investing in leadership development within their organizations, many housing their own universities that they pair with deliberate experience, such as rotational job assignments and mentoring. The leader of this list, General Electric Company, invests one billion dollars annually (General Electric Company, 2009) into its leader development efforts.

To examine whether leadership development efforts actually generate the value in which these companies are investing, Avolio, Reichard, Hannah, Walumbwa, and Chan (2009) conducted a comprehensive meta-analysis of the experimental leadership development literature including both laboratory and field studies. All included studies incorporated some form of leadership intervention manipulated by the researcher,

explicitly excluding correlational and survey methods, and measured the effects of the leadership intervention quantitatively. Aggregating over 13,656 participants across 140 independent effect sizes, the authors found that leadership interventions on the whole have a moderate positive effect in improving leader work outcomes (e.g. ratings of leadership performance) with an effect size of .65 corrected for sampling error and unreliability in the dependent measure. The sample included a preponderance of leadership interventions that were training based (as opposed to other types of interventions), lasted less than one hour, conducted within educational laboratory settings, and rated by the authors as moderate to low in research quality (Reichard & Avolio, 2005). The type of intervention, leadership theory, experimental setting, type of organization, outcome measure, and leadership level were all found to moderate the effect size. Thus it is clear that a great number of factors can affect the efficacy of a leadership development intervention. Taken over a broad range of leadership intervention types, styles, and settings, as well as a heterogeneous group of outcome measures, these results lend some support to the practice of leadership interventions to promote positive change in leader behaviors and secondarily to broader organizational outcomes.

In addition to interventions focused on improving aspects of leader skills and behaviors, research efforts have also been directed toward understanding the characteristics of those who make effective leaders. Recent research examining the well-known debate as to whether leaders are born or made has clearly indicated that the true state of affairs is never so simple, but that there is great room for the development of a leader. Arvey, Rotundo, Johnson, Zhang, and McGue (2006) compared pairs of identical twins with fraternal twins to examine the influence of genes and specific personality

characteristics, namely social potency, achievement, and social closeness, on their occupancy of leadership roles in work settings. Such characteristics are the focus of the feedback in the current study. Comparing identical twins, sharing 100 percent of their genetic make-up, with fraternal twins, who share roughly 50 percent of their genetic make-up allows for the unique contributions of genes, shared environments, and non-shared environments to be determined. Arvey et al. (2006) found that 30 percent of the variance in occupying a leadership role was attributable to genetic factors, and the remaining 70 percent was attributable to environments and experiences that were not shared between the twins (non-shared environments). These results are quite telling toward both the genetic contribution and experiential role relating to holding leadership roles. The non-shared environmental and experience contribution indicates that there is most definitely room for the development of leaders. The genetic contribution, which was found to be related to the personality characteristics of social potency and achievement, is consistent with the findings of the vast literature on the relationship between individual differences and leader behavior. Taken together, the results of this combination of research suggest that people's innate predispositions appear to incline them toward leadership roles; however, the skills of those occupying leadership roles can be developed to a meaningful degree.

Aspects of what specific characteristics, skills, and abilities are related to occupying leadership positions and demonstrating leadership behaviors have a long research history. The trait approach to examining leaders focuses on the personal attributes of leaders and was the focus of hundreds of studies throughout the 1930s and 1940s (Yukl & Van Fleet, 1992). Stogdill (1948, 1974) reviewed hundreds of trait

studies, many comparing leaders to non-leaders or examining the characteristics of emergent leaders, to determine the characteristics of persons most likely to be effective leaders. Based on this work, Yukl (2010) summarized 22 traits and skills found to be important across leadership research, which is reproduced in Table 1. Among them are various skills, abilities, and personality and cognitive attributes.

Advances in research on leader traits have resulted both from improved research methods and a change of focus on abstract personality and cognitive characteristics to more specific abilities and traits that can be more directly linked to behaviors constituting effective leadership performance (Yukl & Van Fleet, 1992). Moreover, several meta-analyses have empirically summarized the literature on leader characteristics. Lord, De Vader, and Alliger (1986) meta-analytically determined that cognitive ability, as well as adjustment, extraversion, masculinity, and dominance all relate to leader emergence. Another meta-analysis by Judge, Bono, Ilies, and Gerhardt (2002) found that the Big Five personality traits, including emotional stability, extraversion, agreeableness, openness, and conscientiousness all positively and meaningfully related to leader effectiveness, and all but agreeableness related meaningfully to leader emergence. Their analysis of narrower traits suggests that self-esteem, sociability, dominance, achievement, and dependability are also important to leadership (Judge et al., 2002). These aggregations across several studies clearly indicate that individual characteristics are important to who both emerges as a leader and serves as an effective leader.

In addition to a blend of personal characteristics, a leader also clearly needs specific skills, which may broadly include technical skills, conceptual skills, and interpersonal skills (Yukl & Van Fleet, 1992). To address this, Mumford, Zaccaro,

Harding, Jacobs, and Marks (2000) created a capability model of leadership which is designed to describe the knowledge and skills which underlie effective leader performance. Broadly, the model suggests that three types of skills, namely complex problem solving, solution construction, and social judgment, coupled with domain specific knowledge and expertise directly impact leader performance. These skills are seen "as a function of the interaction between traits and experience" and are positioned as a critical mediator between individual difference characteristics and performance (Mumford, Zaccaro, Connelly, & Marks, 2000, p. 156). This model is generally consistent with the direct and indirect determinants of job performance articulated by Campbell, McCloy, Oppler, and Sager (1993), with the exception of placing motivation as an indirect determinant of performance.

Taken together, research constituting this vast literature arena suggests that a wide variety of skills, abilities, and personal characteristics are related to both who becomes a leader and how such individuals perform as leaders. Measuring the presence of these characteristics and skills within individuals provides the foundation for leadership assessment. Of course, many organizations utilize more elaborate formal assessment processes to evaluate such qualities in prospective and current employees. Individual psychological assessment and assessment centers are both processes whereby a candidate is evaluated, using multiple tools, exercises, and/or simulations, on several KSAOs deemed critical for a particular job or role, such as leadership roles.

These processes are often utilized for high-stakes decision making such as hiring or promotion decisions, particularly at the leadership level. Meta-analysis of studies examining individual assessment's prediction of job performance suggests moderate

predictive validity with coefficients being stronger for those in manager positions (r=.47) than for professional (r=.24) or other occupational (r=.16) positions (Roller & Morris, 2008, as cited by Silzer & Jeanneret, 2011). Though these processes do show criterion-related validity, it is important to note that these are estimates of the validity of a method of measurement, not a construct, thus the validity of any given assessment center or individual assessment process will greatly depend on the constructs that are measured.

Individual Psychological Assessment and Assessment Centers are often viewed as separate but highly similar assessment processes. Silzer and Jeanneret (2011) point out that individual assessment and assessment centers both evaluate similar constructs, have similar objectives, and are generally viewed as equally effective by both practitioners and their clients. In both Individual Assessment and Assessment Centers, acceptance and integration of feedback on the part of the candidate is imperative for subsequent behavior changes. For the purposes of this examination, the two practices will be treated as interchangeable and the feedback provided within each context will be referred to as assessment feedback.

Assessment can be used for many purposes, including recruitment, selection, placement, training and development, performance appraisal, succession planning, promotion and transfer, and restructuring events (Thorton & Byham, 1982). Most often, it is used for selection, promotion, and development purposes (Ryan & Sackett, 1992), particularly among high stakes leadership roles within a company.

The use of assessment for development was one of the most common purposes reported in Ryan and Sackett's (1992) survey of psychologists practicing individual assessment and the use of assessment centers for development appears to be growing

(Hollenbeck, 1990; Kudisch, 1996). Surveys of organizations which use assessment centers indicate that approximately 40 percent of assessment center usage by organizations is for the purposes of personnel development (Ballantyne & Povah, 2004; Spychalski, Quinones, Gaugler, & Pohley, 1997). This is likely a product of the continuous change in many aspects of work which requires companies and their employees to continually adapt as well as develop themselves (Hall & Mirvis, 1995). Businesses are increasingly adopting the belief that a well-trained and professionally-developed workforce is critical for competitive and financial success (Blickstein, 1996). In particular, leadership skills are viewed as vital for thriving in competitive and complex business environments (McCauley, 2008).

Developmental assessment can have a range of objectives, such as simply identifying current training needs or gaps in needed characteristics to succeed at the next level of leadership (Thornton & Byham, 1982), generating tailored development plans (Engelbrecht & Fischer, 1995; Jones & Whitmore, 1995), or providing continued feedback on development progress, as in the case of executive coaching. Participants perceive benefits of participating in a developmental assessment center to include enhancing self-awareness, identifying training needs, and initiating further development of leadership skills (Fletcher, 1990; Young & Dixon, 1996).

Review of CPI and Leadership

Regardless of the purpose and perceived benefits of developmental assessment, they generally focus on using tools to assess the characteristics, abilities, and skills that are salient to the work context (e.g. sales, leadership). Given the role of individual differences in the emergence and performance of leaders (Judge et al., 2002), personality

assessment, including the use of the CPI, has become a core tool used in individual assessment (Ryan, Brutus, Greguras, & Hakel, 2000) and will therefore be the instrument used in this study. The CPI is a measure of personality based around interpersonal dispositions that are understood within the social environment (Gough & Bradley, 1996; Gough, 1969). Much research has examined links between the CPI and various aspects of leadership. In this section the extensive literature on the relationship between CPI scales and leadership is reviewed to support and inform their use in the current study.

Early studies of the CPI and leadership compared leaders to non-leaders in college samples. The first of these by Johnson and Frandsen (1962) found significant differences between the college leaders and non-leaders for the vast majority of the scales (sixteen of the eighteen scales). Moreover, based on the CPI norms by Gough (1957), leaders' mean score was above the general mean for each of the scales, and for many of the scales, they were one half to a full standard deviation (or more) higher. In contrast, scale means for non-leaders were largely at or below the general CPI mean. Johnson and Frandsen (1962) also found similarity between male and female profiles and that of the combined data.

A second study of the CPI and college student leaders found that leaders and non-leaders significantly differed in their scores on Dominance, Self-Acceptance, and Achievement via Independence (Carson & Parker, 1966). Flaherty (1967) also found strong differences between college leaders and non-leaders on Dominance and Self-Acceptances, as well as slightly more modest differences on Capacity for Status, Sociability, and Social Presence. Though each of these studies was based on a modest

sample size, together they provide evidence for the usefulness of the CPI in discriminating among people on characteristics associated with being a leader.

In his initial research on predicting leadership with the CPI, Gough (1969) determined an equation for assessing social leadership in high school students which included positive weights for Dominance, Self-Acceptance, Well-Being, and Achievement via Independence, and a negative weight for Good Impression. Hogan (1978) cross-validated this equation on a sample of 50 male college football players with leadership ratings from their coaches, with a cross-validated correlation of .62. Though encouraging, both of these studies' equation coefficients were no stronger than using the Dominance scale on its own. Hogan's (1978) sample produced a coefficient of .62 for Dominance alone and .49 for Self-Acceptance alone. Based on these data, it was unclear whether an index based on a weighted composite of scales could improve upon the predictive value of the individual CPI-Dominance scale (Gough, 1990).

Across these studies of students and leadership, leadership was operationalized as either other's ratings of possessing or displaying the qualities of leaders or as participating in certain extra-curricular or elected positions of leadership. Other research was also conducted on persons occupying organizational leadership positions, using the CPI to both discriminate among leaders and non-leaders as well as predict ratings of leader performance (e.g., Goodstein & Schrader, 1963; Rawls & Rawls, 1968; Orpen, 1972; Mahoney, Jerdee, & Nash, 1960; Brown, Grant, & Patton, 1981).

Goodstein and Schrader (1963) found 206 of the CPI items to effectively discriminate between managers and non-managers as well as three different levels of management, including top management, middle management, and first-line supervision.

Additionally, they found the set of items to predict ratings of managerial success. Gough (1984) cross-validated this set of items against performance ratings in a sample of 200 military officers and used the data to reduce the number of items to 34, currently known as the Managerial Potential (MP) Scale.

In 1986, Empathy and Independence were added to the CPI as folk scales (Gough & Bradley, 1996). Carrying out new regression analyses to predict possession of leadership characteristics including these two scales, Gough (1990) found that spouses' ratings of leadership were predicted by positively weighting Dominance, Independence, and Empathy, and negatively weighting Social Presence. Also, predicting leaderless group discussion (LGD) leadership ratings of male and female college students using individual CPI scales, Gough (1990) found a high similarity between the most predictive scales for males and for females, supporting the "notion of a common core of characteristics pertinent to leadership for both sexes" (p.367). Dominance and Independence were found to be among the most predictive for males, and Self-Acceptance, Empathy, and Independence were among the most predictive for females (Gough, 1990). Taking the sample as a whole, Dominance, Self-Acceptance, and Independence had the strongest coefficients with LGD leadership ratings (Gough, 1990). Across studies, this CPI research in the context of leadership shows a relevance of the Class 1 scales to status, emergence, and impact as a leader. It would follow that these characteristics would be emphasized during individual leadership assessment in both selection and development contexts.

Review of Relevant Behavior Change Theories

Providing assessment feedback for the purposes of development, such as the CPI feedback provided in the current study, is rooted in the larger context of driving behavioral change. There exist a vast array of theoretical models which articulate various constructs and components involved in driving and disrupting behavior change. The theoretical basis for a behavioral change intervention depends on whether it aims to affect the person(s) (i.e. through a psychological construct), the environment, or both. Reviewed here are those theories thought to be most relevant to the context of developmental feedback.

Theory of Reasoned Action and Theory of Planned Behavior

Ajzen's set of planned behavior and reasoned action theories focus on individual attitudes and beliefs as drivers of behavior. The theory of reasoned action (Fishbein & Ajzen, 1975) argued that intentions to act are the best predictors of subsequent actions or behaviors. Intentions are understood as "the motivational factors that influence behavior" (Ajzen, 1991, p. 181) which indicate the level of effort an individual plans to expend in direction and execution of the behavior. Intentions are in turn influenced by an individual's attitudes toward the behavior, including his or her beliefs about the outcomes of the behavior and their perceived value. Intentions are also influenced by the individual's subjective norms of the behavior which include his or her beliefs of what others believe he or she should do. Finally, intentions cannot be expressed as behaviors without the volitional control of the behavior in question.

From the theory of reasoned action, Ajzen (1985, 1991) developed the theory of planned behavior which adds the component of *perceived* behavioral control. Indeed,

volitional control will still dictate whether or not intentions are able to manifest into actions; however, the emphasis of control shifted to an individual's beliefs or perceptions of whether he or she is able to perform the intended behavior. Together, perceived behavioral control and intentions, given the presence of volitional control, are posited to directly predict performed actions.

The theory of planned behavior has been supported by meta-analytic research examining behavior change (Ajzen, 1991; Armitage & Connor, 2001; Godin & Kok, 1996; Hausenblas, Carron, & Mack, 1997). Intention has been found as the most critical variable in predicting behavior change (Godin & Kok, 1996). The theory of planned behavior is a useful framework for developing and evaluating leader development initiatives. Promoting and measuring intentions to behave in a certain way or make a behavior change is a critical part of ensuring a successful change initiative and diagnosing issues in such an initiative. In the context of developmental feedback, this theory suggests that intentions to improve or change one's behaviors based on the feedback is an intermediate state between receiving the feedback and demonstrating behavioral changes (representing development). Thus the current study examines the influence of varying developmental feedback on behavioral intentions by manipulating the type of feedback through the inclusion of graphs and development suggestions to the written feedback and measuring subsequent intentions to change. The study will also examine the impact of development suggestions on open-ended development plans which indicate specific behavioral intentions that result from the feedback provided.

Control Theory

Prior to inducing the intention to change one's behavior, developmental feedback, such as that provided in this study, must first indicate a disparity between the recipient's current state and some ideal or desired state (e.g. a goal). In response to the conflicting states, control theory would suggest that an individual would alter their behavior in order to close the gap between the current state and the desired state.

As a general approach to self-regulation, control theory utilizes a negative feedback loop determining discrepancies between current behavior and a given behavioral standard (Carver & Scheier, 1982; Powers, 1973). The feedback loop is considered to be negative because its aim is to reduce or ultimately eliminate discovered deviation from a comparison behavior or state (Carver & Scheier, 1982). The loop is relatively straightforward, whereby one senses a present condition and then compares it against some point of reference. If a discrepancy is discovered between the two then a behavior is performed to reduce it. This behavior would change the present condition, creating a different perception to compare to the referent (Carver & Scheier, 1982).

In the context of feedback, the recipient is directing attention toward him- or her-self. Carver & Scheier (1982) suggest that self-directed attention results in a greater propensity to compare one's current state with pertinent reference values and in increased self-regulation through conformity with such referent values. They also point out that, much like that proposed in the theory of planned behavior (Ajzen, 1991), the expectancy for the behavior to lead to a desired outcome (i.e. reduce or remove the discrepancy) will impact whether or not the behavior is ultimately performed.

Control theory is relevant to leader development as an outside intervention, particularly in the context of one-on-one coaching in which explicit development goals are formed, often referred to as executive coaching. By providing feedback directed at the progress toward development goals (demonstrating remaining discrepancies), coaches can direct client's attention to these goals and closing the performance-goal gap which may otherwise fall to the wayside of other, more urgent or proximal responsibilities (Beck, Gregory, & Carr, 2009). This negative feedback loop can be repeated any number of times throughout the development relationship and the behavioral standards (or goals) can be adjusted to reflect the achievement of any subgoals. This conceptualization of control theory within the goal setting and performance feedback process was initially discussed and also empirically supported in a longitudinal study by Campion and Lord (1982).

In the initial part of a best practice driven executive coaching process and in more general developmental feedback contexts, the feedback serves as an initial comparison between one's current state and a given behavioral standard (e.g. a comparison group of typical leaders). Consistent with control theory, the discrepancies that emerge from such a comparison can guide the direction and extent of behavioral changes. More specifically, in the current study, the developmental leadership feedback is an attempt to create an accepted discrepancy for the participants between their current leadership characteristics and that of a well-performing leader. Manipulating the feedback format through the addition of a graph and development suggestions may enhance the retention and perceptibility of such discrepancies. For instance, literally visualizing the gap between their own and typical or ideal leader scores in the graphical feedback may create a

discrepancy and motivate the recipient's efforts toward change or at least the intentions necessitated by the theory of planned behavior (Ajzen, 1991). Together, the theory of planned behavior and control theory suggest discrepancy feedback and behavioral intentions to be an integral part of behavior change and development.

Developmental Feedback

Generating large quantities of data, developmental assessment processes are a source of rich developmental feedback which should illuminate important discrepancies and lay the foundation for developing behavioral intentions and goals. The focus of this study is to examine two opportunities to optimize the written feedback provided to the candidate in promoting acceptance, awareness, behavioral improvement intentions, and memory of the information.

Although there is a vast literature examining the provision of feedback; much of it focuses on providing feedback regarding performance on a specific task or set of tasks (see Kluger & Denisi, 1996 for a review). Receiving substantially less attention is developmental feedback for the purposes of leadership or personnel development which is neither necessarily very task based nor job-specific (Ryan et al., 2000). In particular, Ryan et al. (2000) highlight that job performance feedback and leadership development feedback differ in several key aspects including the goal of the feedback, the focus of the feedback information, the broader context to which the feedback pertains, who gives the feedback, and finally, the nature of how the feedback was initially derived. Job performance feedback is focused on a particular task with the goal of improving performance in a current job and is typically provided by a supervisor. The nature of gathering the feedback information is typically based on job performance ratings. In

contrast, assessment based developmental feedback is focused on the candidate with the general goal of self-improvement across the span of one's career and is typically provided by a professional outside of one's work environment. The feedback is based on data gathered from assessment instruments and simulations and often includes discussion of personality, interpersonal style, and preferences. In these respects, performance and developmental feedback represent relatively discrete focuses within the feedback research literature.

Particularly in a developmental context, feedback on a candidate's current characteristics is a critical early step in the process of making meaningful change and development. The ultimate goal of feedback in the developmental context is that the recipient makes meaningful developmental progress after receiving that feedback.

Several key events must take place during and as a result of the feedback process to promote development in the recipient. Ilgen, Fischer, and Taylor (1979) argue that it is critical to clarify the intermediate psychological process taking place between receiving feedback and the recipient's behavioral response to that feedback. Key psychological events taking place between receiving feedback and subsequent behaviors include feedback acceptance, increasing self-insight, intentions to improve based on the feedback, and retention of the feedback information.

Feedback acceptance and an increase in self-insight are indicated by accepting the feedback as true and integrating it into one's self-concept, respectively. Intentions to improve suggest that the feedback recipient plans to close the gap between his or her current state and that which is more ideal. In a leadership context, intentions to improve would mean that the leader intends to alter his or her behaviors through various means to

achieve better leadership. Finally, retention of feedback information is the recipient's ability to accurately recall the feedback information after some period of time. Together, these events determine whether and to what extent the recipient's subsequent actions will be directed toward development. Understanding how incorporating graphs and development suggestions into written feedback affect these events, as examined in the current study, is important for optimally constructing written feedback to achieve developmental objectives.

Feedback acceptance.

Feedback acceptance refers to the belief by the recipient that the feedback is accurate in its portrayal of what it is evaluating about him or her (Ilgen, Fischer, & Taylor, 1979; Bell & Arthur, 2008). Ilgen et al. (1979) argued that acceptance is dependent on three factors, which are feedback source characteristics, recipient characteristics, and the characteristics of the feedback itself. Since then, there has been considerable research on feedback acceptance. Much of the feedback acceptance research has focused on features with greater relevance to job performance feedback such as contextual variability (e.g. frequency), feedback sign, and delivery style. Given that developmental assessment feedback is often fairly structured in timing, deliberately addresses both strengths and weaknesses, and is provided by trained feedback providers, variability in these factors may have less of an influence in the professional developmental context (Ryan et al., 2000).

In an examination of a developmental assessment center, Kudisch (1996) found that perceived job-relatedness was the substantial contributor to feedback acceptance among other measured variables, including perceptions of assessor expertise, favorability

of feedback, enjoyment of the overall assessment process, and recipient cognitive and personal characteristics. These results are not surprising, as face validity has been found to correlate with candidates' reactions to assessments overall (Ryan & Ployhart, 2000). From an applied perspective, Kudisch's (1996) results are favorable, in that job-relatedness is a critical feature of a well-designed assessment process, thus good practice is likely to lead to the critical event of feedback acceptance.

The acceptance of the feedback is likely to be the critical gatekeeper to progress such that it likely serves as a necessary condition to subsequent development and behavior change. The premise that the utility of developmental assessment depends on the occurrence of feedback acceptance (Engelbrecht & Fischer, 1995; Jones & Whitemore, 1995) inherently suggests that it is as critical as the empirical accuracy of the assessment, if not more critical.

Ilgen et al. (1979) proposed that a recipient's feedback acceptance would mediate the effect of the feedback on his or her subsequent actions. Anseel and Lievens (2009) found support for this proposition. Acceptance of feedback mediated the relationship between feedback and attitudinal and job performance outcomes. Acceptance has also been found to be positively related to employee's intentions to utilize the feedback they received for improving their job performance (Brett & Atwater, 2001). Thus optimizing feedback format to increase the likelihood of these outcomes is critical to the success of development interventions.

Self-insight.

An increase in self-insight refers to the effect of gaining a better understanding of one's own strengths and weaknesses as well as reconciling this new information with

previous self-concepts. Raising self-insight is included as an important step in integrating and acting upon feedback (Ilgen et al., 1979; Ryan et al., 2000), though it is not often studied as compared to feedback acceptance.

The development of self-insight or awareness and acceptance are likely to co-occur in response to feedback, evidenced by a moderate to strong relationship between the two responses (Boudrias, Bernaud, & Plunier, 2012); however, they do appear to be meaningfully distinct reactions to feedback. This distinction is evidenced by the presence of the Barnum effect, whereby feedback recipients accept feedback composed of general characterizations or high base-rate traits as uniquely applicable to themselves (Johnson, Cain, Falke, Hayman, & Perillo, 1985; Meehl, 1956). The Barnum effect suggests that feedback accuracy, and thereby the opportunity to gain real self-insight, is not necessary for acceptance. Numerous studies have demonstrated that individuals will accept spurious personality feedback as readily as they will accurate feedback (Dickson & Kelly, 1985; Dmitruk, Collins, & Clinger, 1973; Standing & Keays, 1986). These studies provide evidence that recipients can accept feedback without meaningfully learning about themselves. Conversely, they cannot learn without implicitly accepting (to some degree) that information from which they are learning. For instance, highly conscientious individuals may receive performance feedback that they consistently follow through in the completion of their responsibilities. If they already have self-awareness around this conscientious characteristic, they will indeed accept the feedback as accurate but may not gain much in the way of expanding their self-understanding or insight. If, however, this feedback challenges their current self- understanding, then in order for the recipients to believe they have learned something about themselves and their behaviors from the

feedback, they must accept the information as accurate (to some degree). Consistent with this distinction, Boudrias, Bernaud, and Plunier (2012) found that challenging interventions which attempt to point out inconsistencies in a recipient's thoughts and behaviors or challenge his or her partial views, significantly influenced the development of awareness but not acceptance.

Thus developing self-insight from feedback is important for directing focus toward relative strengths and development opportunities. Boudrias, Bernaud, and Plunier (2012) suggest that increasing self-insight is likely a 'second key' to producing behavioral changes in response to feedback. They found that increases in candidate self-insight inspired greater motivation to develop than did feedback acceptance.

Research in the multisource feedback literature has found improved self-understanding as a result of receiving feedback, indicated by improved agreement between self and others' ratings following feedback (Atwater, Ostroff, Yammarino, & Fleenor, 1998; Atwater &Yammarino, 1992; Van Velsor, Taylor, & Leslie, 1993). Over-raters in self-ratings tend to lower their self-ratings and under-raters tend to raise their self-ratings as a result of insight gained from feedback (Atwater, Roush, & Frichthal, 1995). These findings suggest that after receiving feedback individuals' self-concepts change to accommodate the feedback messages.

Intention to improve.

The intention to improve or act upon assessment feedback is a necessary condition between the acceptance and awareness gained from the feedback and the necessary behaviors required to benefit from that feedback (Boudrias et al., 2012). It is present in Ilgen et al.'s (1979) original process model of feedback effects, fit between the

acceptance of feedback and the ultimate response to the feedback. Intention to improve is a motivational intention, which indicates an intention to respond in a certain way distinct from the actual response itself (Ajzen, 1985; Ajzen & Fishbein, 1980; as discussed by Campbell & Kuncel, 2001). Intention to give a high level of effort is useful in determining whether a recipient will actually engage in developmental activity. Studying developmental assessment centers, Jones and Whitmore (1995) found that career motivation directly predicted developmental activities and ultimate career advancement. This indicates that intention to improve is necessary for crossing the bridge between gaining insight about where to develop and actually engaging in behaviors that will bring about such development.

Feedback retention.

A recipient's retention of his or her assessment feedback is critical for continued development in the right direction. If the assessment feedback serves as the compass for development, then a maintained accurate knowledge of that feedback is imperative for successful navigation of behavior change. Individuals need to retain feedback in their memory in order to continue to develop the necessary KSAOs that are most important to their performance. Even if available for reference in written feedback, the cognitive representation or recall of the feedback a recipient carries with him or her will be the stronger determiner of developmental behaviors. It is most important then that recipients maintain an accurate representation of the nature of the feedback such as the meaning and interpretation of specific assessment data points (e.g. test scores). One caveat to the greater importance of retaining general impressions over precise values is accurately recalling one's own feedback relative to important reference groups. For example,

retaining how much higher or lower a leader falls on measures of important leadership skills or traits than other typical leaders and high performing leaders can be important for informing appropriate developmental activities.

Retention of feedback has received attention in the education literature (e.g. immediate or delayed feedback for development and retention of mathematics skills), but remains relatively unexamined within the developmental assessment literature. To aid in accurate retention of feedback, it has been argued that best practice in extended developmental interventions, such as executive coaching, involves regularly assessing progress toward goals which are based on assessment feedback. These practices are largely based on experienced-based success rather than evidence based practice. Assessment of progress not only refreshes and reorients the recipient toward his or her goals, but also affords the explicit opportunity to review feedback details if needed to provide renewed clarity.

Presentation Format of Developmental Assessment Feedback

Given the importance of feedback for promoting ultimate development, understanding the features of clear, memorable, and compelling feedback reports can improve practice. Written feedback reports are often provided to assesses and frequently include a summary of strengths and limitations (82.3%), suggestions for development (82.3%), and any relevant test score interpretations (60.3%; Ryan & Sackett, 1992).

The design of written developmental feedback is an area in which practice, in some regards, has come before research. Providing a written feedback report allows for participants to refer back to the feedback information after an initial debrief or oral feedback session. During oral feedback sessions, the volume of information may push

the recipient's information processing limits, which may make it hard to retain such information. Proving a written report could mitigate this issue by serving as reference in order to maintain an accurate memory and understanding of the feedback received. Though assessors or coaches may explicitly review the written information in person, participants may pour over the information many times after the feedback session without in-person guidance. Therefore, it is critical that feedback reports are optimally structured to promote the key psychological events necessary for engaging in developmental behaviors in response to feedback. Two features of a written report that merit specific examination include supplementing written feedback information with graphical representations of the feedback data and with directed development suggestions.

Graphical representations.

Research indicates that learning occurs faster with pictures as stimuli than with words (Jenkins, Neale, & Deno, 1967). Larkin and Simon (1987) suggest this is because pictorial representations are more directly linked with semantic processing. That is, diagrammatic or graphical representations of information are indexed by locations on a plane, rather than sequentially as in narrative representations. Thus pictorial representations more directly convey information that is often implicit within narrative representations and must be reconstructed by the reader (Larkin & Simon, 1987).

Recent research on cognitive processing of different presentation formats for information has shown that pictorial representations of objects produce greater recall, recognition, and long-term memory than those same objects represented as printed words (Goolkasian, 2000; Goolkasian & Foos, 2002; Foos & Goolkasian, 2008). Such findings

bear relevance to determining effective approaches to communicating more technical or complex data and processes.

Though no form of presenting data is more effective in every respect than all other forms (Washburne, 1927), there is substantial evidence suggesting that well-designed graphical representations of statistical data promotes increased interpretability. Examining the effectiveness of presenting statistics in news stories, Wilcox (1964) compared three presentation formats, namely bar graph, table, and narrative. The text leading up to the data presentation was the same for all three conditions, at which point the reader was directed to a graph or a table or was presented with more text. The results indicated that the inclusion of a graph or table produced superior understanding of basic themes and recall of specific data trends.

Similarly, Feliciano, Powers, and Kearl (1963) compared the usefulness of several data communication formats both alone and in combination with text for achieving comprehension. More specifically, the conditions included a long detailed table; a short, simple table containing only key messages; a horizontal bar graph; a four-to-six paragraph text; and a combination of the text form with each of the other three forms individually. The results indicated that the horizontal bar chart consistently produced better comprehension than the table formats or the text format. Table formats were superior to text alone, and simpler tables were superior for samples with little to no recent formal education but not superior for high school and college student samples. Text paired with either the bar graph or the simple table was superior to all of the formats alone with the graphical combination being the most advantageous for promoting comprehension. The superiority of the combination formats suggests a benefit via

reinforcement effect whereby the same key information presented twice promotes better comprehension. It also indicates that graphical reinforcement of text is likely a more optimal format than tabular reinforcement.

Providing visual reinforcement of concepts that are also presented in text has been found to increase both comprehension of main ideas and recall of interrelations among concepts compared with original or elaborated text alone (Guri-Rozenblit, 2001). Supporting this visual argument, Robinson and Kiewra (1995) found that graphic organizers, which contain the content of tables laid out in a more visually engaging way, like that of a graph, promoted greater learning and application of knowledge about the interrelations among concepts when given enough time to study the material.

Despite some of the clear findings about communicating numerical and statistical information in general, relatively little has been done to examine the value of supplementing text with graphical representations of the data presented in developmental feedback settings. Atwater and Brett (2006) examined the influence of 360 degree feedback in text versus numeric format on leaders' reactions. Both of the conditions labeled strengths and development needs in the same way but the numeric condition also provided normative data (mean scores) for all leaders who had participated in the study. The data showed a more favorable reaction from leaders who received the numeric/normative feedback, which allowed a more direct comparison of oneself to others. It is not clear from this study whether the leaders preferred the numeric/normative condition because they have a preference for viewing numbers over descriptive labels or whether it was because more information was provided, or a combination of the two. Atwater and Brett (2006) also found that those reporting more

negative reactions to their feedback had more development needs reported by subordinate at time two, controlling for feedback format and the number of development needs at time one. These results suggest that those who react more positively to their feedback are more likely to make improvement gains.

In addition to the positive impact of graphical representation of data on comprehension and retention, the graphical display of feedback may also promote behavior change. A graph depicting a feedback recipient's score along side of salient referent groups would provide an inherent comparison among the scores. In this way, graphical display of feedback is appropriate for promoting behavior change according to Control Theory (Carver & Scheier, 1982) discussed previously. Individual feedback promotes self-directed attention which in turn promotes the comparison of "one's present state with relevant and salient reference values" (Carver & Scheier, 1982, p. 120). Indeed, individuals experiencing high levels of self-focus have been found to seek out concrete information, such as a referent image or performance norms, more so than those with lower levels of self-focus (Scheier & Carver, 1983). A graphical score representation including normative scores provides a clear indication of any discrepancies between a feedback recipient's score and the normative score of a valued referent group, such as leaders.

Increased self-focus also drives enhanced self-regulation if a discrepancy is revealed (Carver, 1974, 1975; Carver & Scheier, 1981). Thus if feedback recipients have discrepant scores from leaders, the key referent group in leader development feedback, which is visually highlighted in a graphical score display, they should be more likely to

self-regulate based on the given leader characteristic in order to counter or diminish the deviation.

Suggestions for development.

Developmental feedback attempts to direct the recipient's attention to his or her standing on evaluated skills and characteristics relative to others with the aim of illuminating what to develop, be it developing towering strengths, ameliorating weaknesses, or some combination of the two. Providing targeted development suggestions that follow from descriptive feedback could help to realize this objective. Development suggestions are commonly used in practice as part of assessment feedback (Ryan & Sackett, 1992); however there is a paucity of research examining the value of incorporating them as a written feedback feature.

Assessing the impact of 360 feedback on management skills development, Hazucha, Hezlett, and Schneider (1993) used a feedback tool that provided development suggestions of at-work activities for each area in most need of development as part of a developmental planning guide. The study examined 48 managers who completed the 360 instrument a second time after receiving 360 feedback. Results indicated that the total number of developmental activities undertaken was correlated with self- and other-ratings of skills at year 2 as well as self-ratings average skill change. Development activities, however, appear to have been measured as fairly broad activities such as reviewing results and preparing a development plan, and not explicitly utilizing content in the specific development suggestions. Though the study does provide evidence for meaningful gains in manager skill development after participating in a 360 feedback

program, it does not speak specifically to the inclusion of development suggestions nor was it necessarily intended to do so.

In a similar investigation Nowack (2005) longitudinally evaluated a 360 feedback program with 47 managers and 127 raters participating in a corporate leadership program. As part of a summary feedback report to managers, development suggestions were provided for each of twenty competencies that were evaluated. Managers reported an increased understanding of their strengths and weaknesses and reported being likely to make changes in their management behavior. Raters also reported observing improvement in behaviors as a result of the mangers' participation in the feedback program. It is possible that the development suggestions in part promoted these outcomes, though there was no specific focus on this feature of the feedback. Additionally, neither of these two studies provided a control group by which to compare the results, nor did they experimentally manipulate any of the feedback features individually, thus they cannot speak to the individual contribution of development suggestions to beneficial outcomes of developmental feedback. Apart from these studies which indirectly address the benefit of development suggestions, this author knows of no research explicitly examining the use or benefit of their incorporation within written feedback.

The use of development suggestions to support leader development through feedback can be supported by theories of behavior change. By providing an action tailored to the feedback recipient's current skill or trait level, development suggestions should both aid in conceptualizing the 'what to do' to improve or develop as well as be considered a manageable amount of change for the recipient. Thus development

suggestions would be appropriate based on the theory of planned behavior (Ajzen, 1991) whereby the suggestions would direct the behavioral intentions of the recipients and also be within their perceived behavioral control by providing a behavior for which the individual should have sufficient self-efficacy to perform.

Current Study and Hypotheses

In the current project, the inclusion of graphs and development suggestions as feedback features will be experimentally manipulated as independent variables. Based on the research reviewed, I hypothesize that reinforcing narrative feedback with a graphical representation of participant and normative data will increase participant's perceptions of gained awareness from the feedback and will lead to better retention of the feedback presented, measured one week later. Additionally, I hypothesize that by orienting recipients of feedback to developmental areas and how to approach them, they will have greater intentions to develop themselves as leaders. Development suggestions may also help in directing what recipients plan to do to actually improve.

In summary, feedback features such as supplementing feedback text with graphical elements and development suggestions should increase the strength of key psychological events resulting from feedback and necessary for developmental action in response to feedback. Boudrias et al. (2012) found that increased self-insight from developmental feedback strongly predicted the motivation to act upon the feedback. It would follow that any feedback-format condition that improves awareness would also increase a recipient's intention to improve. Thus, it is hypothesized that feedback formats that include graphical data display, development suggestions, or both will increase self-insight and intention to improve over those that do not.

H1: Increased self-insight will be greater for the graph, developmental suggestion, and combined conditions than for the control feedback condition.

H2: Intention to improve will be greater for the graph, developmental suggestion, and combined conditions than for the control feedback condition.

Additionally, by reinforcing the information presented in the text, it is likely that formats that include a graphical display will improve retention of the information, measured one week after the feedback presentation.

H3: Retention will be greater for the graph and combined conditions than for the non-graph feedback conditions.

Method

Study Design

The current study examined the usefulness of two features of personality feedback on critical feedback outcomes, including acceptance, increased self-insight, intention to improve, and information retention. Personality is a common characteristic of individuals captured during the assessment process. Approximately 80 percent of assessors use personality inventories as part of their assessment methods (Ryan & Sackett, 1992).

The two aspects of format that were manipulated were 1. adding a graphical representation of the respondent's personality results in addition to standard text feedback, and 2. incorporating development suggestions into the feedback report. Thus a 2x2 design was utilized, in which participants were randomly assigned into the following conditions: 1. No Suggestions, No Graph (Control); 2. Suggestions, No Graph

(Suggestions only); 3. No Suggestions, Graph (Graph only); and 4. Suggestions, Graph (Suggestions + Graph).

Main effects and interaction effects between the two format conditions will be examined for each outcome. Additionally, supplemental analyses will examine individual difference (five-factor personality traits, cognitive ability) main effects on each of the outcome variables and interaction effects with the feedback report condition. Finally, a content analysis of the specific behavioral improvement intentions will be conducted to examine if development suggestions direct the behavior of intended subsequent development. The behavioral intentions are free responses which require considerable effort on the part of the participant by applying the feedback to actions and scenarios that are personally relevant. This is significant in that developing intentions begins to explore the process of development, which is an extension beyond reactions to feedback. A correspondence between the presence of development suggestions and the content of the written behavioral intentions would show that suggestions direct action, a main objective of developmental feedback.

Sample

College students were recruited to participate and were awarded extra-credit in their psychology courses for their participation. This sample was selected based on both the ease of access and the ability to structure the study with a high level of control in the manipulation of the feedback report conditions. A total of 378 students participated in the time 1 data collection and 324 participants for time 2 data collection. This represents a retention rate of 86 percent.

Measures

Leader personality measurement.

For the current study, leader personality was measured by select scales from the California Psychological Inventory (CPI, Gough & Bradley, 1996). The CPI is a 434 item personality inventory measuring 20 folk scales based around interpersonal dispositions that are understood within the social environment (Gough & Bradley, 1996; Gough, 1969).

For the current study, the following scales were selected: Dominance, Self Acceptance, Independence, and Empathy. This set of scales was selected due to their consistent and sizeable correlation with multiple leadership assessment and performance measures (Gough, 1990). All of these scales are a part of the first class of CPI scales which measures poise, self-assurance, and interpersonal proclivities (Gough & Bradley, 1996). Implications of high and low scores on each of these four scales are presented in Table 2.

Data from high school leaders and general high school students were used as normative data for this study (Gough & Bradley, 1996) and are presented in Appendix A. These data represent the closest approximation to college student leaders, including both male and female respondents, that is available for the current versions of the CPI scales. These values show reasonable alignment with prior examinations of college leader and average college student values based on older versions of the CPI (Carson & Parker, 1966; Johnson & Frandsen, 1962). These normative values were presented to participants as referent values in order to aid in the interpretation of their own scores and feedback.

Individual Differences.

Data were also collected on participants' general personality and cognitive ability. Individual differences are beyond the main scope of this project's hypotheses; however supplemental examinations of the effects of the feedback recipient's personal characteristics (personality and cognitive ability) on feedback outcomes as well as how they moderate the effects of feedback format on feedback outcomes serve as a useful extension of the current investigation. It is also consistent with the Ilgen et al. (1979) model which indicates an effect of recipient individual difference characteristics on each intermediate psychological process after receiving feedback.

The five-factor model of personality has a robust structure describing the most prominent aspects of personality (Digman, 1990; Costa & McCrea, 1992; McCrea & John, 1992) and was used to examine participants' general personality characteristics. Personality were measured using a 50-item inventory of Conscientiousness, Agreeableness, Openness to Experience, Extraversion, and Emotional Stability (10 items per scale) drawn from the International Personality Item Pool (Goldberg, 1999).

Cognitive ability was measured by self-reported overall score on the ACT, a national standardized ability test covering English, mathematics, reading, and science used for college admissions. Kuncel, Credé, and Thomas (2005) found a strong meta-analytic correlation (r=.82) between self-report and actual standardized test scores indicating that self-reported scores tend to be a valid representation of actual standardized test scores. Given their imperfect relationship, however, self-reported ACT scores represent a less-reliable measure of cognitive ability and thus are likely to attenuate any relationships found in the study (Kuncel et al., 2005).

Feedback format.

All participants received written feedback based on their leader personality scores. The feedback contained in the text was determined by score ranges and based on descriptions both adapted from McAllister (1996) and Gough and Bradley (1996). Two aspects of format were manipulated. One was the incorporation of development suggestions into the feedback. Development suggestions articulated both what effective leader behavior is for the given trait and an action more proximal to the recipient's current state that he or she could do to move toward effective leader behavior. Using the same score ranges as the text, suggestions were based on the range in which the participant's score fell.

The other feedback manipulation was the addition of a graphical representation of the respondent's personality results in addition to standard text feedback. The graphs were bar charts constructed to minimize extraneous text or lines to ensure optimal comprehension and learning (Culbertson, Flores, Powers, & Sarbaugh, 1959; Kuncel & Rigdon, 2012). The graph versus non-graph condition was balanced by imbedding normative numerical information that was available in the graph into the text of both the graph and the non-graph condition to ensure that neither condition is providing any more substantive information than the other. The written feedback, development suggestions, and examples of graphs are presented in Appendix B.

Feedback evaluation.

Three scales were developed to measure initial key events that take place in the development process after receiving feedback, namely feedback acceptance, increased self-insight, and intention to improve. *Feedback acceptance* addresses the extent to

which the respondent views the feedback as reflective of his or her personality. This assessment of feedback acceptance is consistent with Ilgen et al.'s (1979) definition of feedback acceptance as "the recipient's belief that feedback is an accurate portrayal of his or her performance" (p.356). *Increased self-insight* indicates the degree to which the respondent has gained an increased understanding or awareness of his or her personality characteristics. As previously discussed, it is distinguished from acceptance in that learning from the feedback and integrating it into one's self-schema requires one to accept the feedback to some degree, though learning is not required for acceptance. Thus a measure of gain in self-insight provides additional color to the examination of feedback reactions. Finally, *intention to improve* measures the respondent's intent to further develop his or her leadership characteristics.

Each scale consists of three items with a four-point likert response scale indicating the extent to which the respondent agrees or disagrees with the item. The responses to items within each scale were added together to create a total scale score. Each scale has a possibility of 3 to 12 points. Greater points indicate greater feedback acceptance, increased self-insight, and greater intention to improve. The items for each scale are presented in Appendix C.

To supplement the intention to improve scale, a one-item measure of commitment toward improving based on the feedback was administered. Additionally, the participant was asked to indicate what he or she specifically intended to do to improve his or her leadership in an open-ended response format. These items address factors that may affect their behavioral intentions to improve (Ajzen & Fishbein, 2005). Such factors include commitment to the goal, which should strengthen the intention-performance relationship,

and compatibility, which should orient the recipient toward the exact actions they will take when carrying out the behaviors (Ajzen & Fishbein, 2005).

Delayed recall accuracy was measured for the participant's assessment data (leadership personality scores) in two ways. The first approach was to ask the participant where he or she stood relative to college leaders and general college students (relative recall) for each of the four CPI scales on which he or she received feedback. This measurement addresses the salience of discrepant feedback for the participant which is critical for promoting behavior change (Carver & Scheier, 1982). It also shed light on whether the participant had retained an accurate understanding of his or her leadership characteristics between receiving the feedback at time 1 and providing his or her recall at time 2, at least seven days later. Measurement of relative recall was measured for each of the four leader personality scales via a 5-point likert scale. The response options included: (1) "Below both leader and general student", (2) "About the same as a general student", (3) "Between leader and general student", (4) "About the same as a student leader", and (5) "Above both leader and general student".

Based on the participants' actual scores for each scale, an 'accurate' comparison response was calculated using the general student and student leader norms ± five percentile points as "about the same" scores, respectively. Scores outside of these percentile ranges were easily placed into above both, between, or below both for 'accurate' comparison responses for each scale. The difference between their actual relative response (the response they provided) and the accurate response was calculated. The absolute value of this difference was then calculated and served the indicator for recall accuracy for each scale. Greater values indicate less accurate recall. The average

across the four recall accuracy scores served as the index of overall relative recall accuracy.

One consideration to note for this index of recall accuracy is that the maximum possible recall value (less recall) for a given participant is determined by his or her score on each leader personality scale. For instance, if a participant scored in between the leader and typical college students norms on Dominance, the largest relative recall value he or she could receive is 2 (i.e. |3-5| or |3-1|); however, if this participant scored above the student leader norm or below the general student norm the largest relative recall value he or she could receive is 4 (i.e. |1-5| or |5-1|) for the Dominance scale. Since the average across the four relative recall scores was taken, these differences in possible upper bound (less accuracy) are likely to be of less consequence. Additionally, given the experimental design of the study whereby the feedback conditions were randomized, this characteristic should bear no impact on any relative recall accuracy differences between the feedback conditions.

The second approach to measuring recall of assessment data was to ask the participant to provide his or her percentile score for each of the four CPI scales on which he or she received feedback. The student leader and typical student norms were provided for each scale for reference. The absolute value of the difference between the actual score and the score the respondent provided was the indicator for absolute recall accuracy for each scale. As with the relative recall scores, greater values indicate less accurate recall. The average across the four recall accuracy scores served as the index of overall recall accuracy. The order of collection between recall of the relative standing and recall of the specific score was randomized.

Procedure

Participation and data collection took place via a computer-based collection and delivery system (online using Qualtrics survey software) in order to efficiently provide feedback based on the results of the participant's personality data. Specific rules were developed which the computer program used to produce feedback based on personality item responses.

Data collection time one.

Participants were first provided with a consent form which provided the parameters of the research study. Upon indicating their agreement to participate, participants were prompted by an introductory message describing the increasing emphasis of organizations on demonstrating leadership throughout all levels of the company. The message further indicated that they would be given an inventory measuring personal characteristics that are relevant to leading others, would receive feedback based on their results, and would be prompted to respond to questions about the feedback they received.

Participants then responded to the 114 true-false items comprising four scales of the CPI, namely, Dominance, Self Acceptance, Independence, and Empathy. The items themselves were presented in the order consistent with the CPI instrument, not arranged by scale. Participants then provided their overall ACT scores and respond to a series of 50 IPIP items measuring Conscientiousness, Agreeableness, Openness to Experience, Extraversion, and Emotional Stability. Once the inventories were completed, participants received written feedback in one of the four feedback formats based on random assignment. The feedback conditions were 1. No Suggestions, No Graph (Control); 2.

Suggestions, No Graph (Suggestions only); 3. No Suggestions, Graph (Graph only); and 4. Suggestions, Graph (Suggestions + Graph).

The responses to the CPI items were autoscored by the survey software and the participants' raw scores were converted to percentile scores based on pre-inserted normative data. These percentile scores were then used by the survey program to auto-select and present the correct written feedback selection and development suggestion (for corresponding conditions) based on the score ranges discussed previously and presented in Appendix B. The percentile scores were also used to populate the participant's score in the presented graph (for corresponding conditions).

In the conditions including development suggestions, these phrases were placed under the core feedback text. In the conditions including a graph, one graph per scale containing the participant's percentile score along with the normative scores for student leaders and general students was presented below the text feedback and any development suggestion. Participants were given time to review their feedback and indicated when they were ready to respond to the feedback items by clicking a button to proceed.

Finally, participants responded to items measuring their feedback acceptance, increase in awareness, and intentions to improve. They also were prompted to draft open-ended statements pertaining to the actions they intend to take in order to improve on each leadership characteristic. They then received an indication that they had completed the first portion of the study and will receive an email prompting them to return to the study one week later to complete the remaining portion.

Data collection time two.

Seven days after completing the first portion of the study participants were sent an email prompt indicating that they could complete the second portion of the study. Participants re-entered the online platform and responded to items regarding their absolute and relative recall of their personality scores for each of the four leadership personality scales. The order of presentation for absolute versus relative recall items was randomized. After completing these items, participants were thanked for their participation.

Results

Data Cleaning

The initial data set was cleaned according to several criteria. Cases that did not have a complete set of responses for at least the first portion of the study were removed. Then responses to five attention check items collected during part one of the study were examined. These items were presented as simple actions to indicate proper attention and thoughtful responding (e.g. if you are reading this, mark false). Respondents who incorrectly responded to two or more attention check items were removed from the data set. Additionally, respondents who took fewer than 14 minutes to respond to the first part of the study were removed. The 14 minute minimum threshold was determined based on a combination of consideration of the appropriate time required to navigate and respond to all of the content and time data from pilot testing with people who possess strong reading skills. These individuals were considered as a lower-bound estimation of the time required for one to legitimately read and move through the content. The final data

set contained 311 cases for the first portion of the study and 272 cases for the second portion of the study.

Descriptive Results

The feedback attitudinal outcomes, namely, Feedback Acceptance, Gained Insight, and Intentions to Improve were each measured via three-item scales (see Appendix B). Each of the four-point items were summed to create a total score for each scale, thus there was a possible score range of three to 12 with higher scores indicating greater agreement or endorsement.

Correlations among the three scales are consistent with prior theory and research findings. Specifically, Feedback Acceptance and Intentions to Improve are both more strongly correlated with Gained Insight (r=.42 and .50, respectively) than with each other (r=.26). This pattern is consistent with findings from Boudrias et al. (2012). In general, participants across feedback conditions indicated being accepting of the feedback they received ($\bar{x}$= 9.15, sd=1.56). They also reported gaining some insight about their leader personality ($\bar{x}$=.8.83, sd=1.67) and showed some intentions to improve ($\bar{x}$=9.33, sd=1.62). The Feedback Acceptance, Gained Insight, and Intentions to Improve scales also showed reasonable levels of internal consistency (α = .87, .81, & .81, respectively).

The recall scores derived from participants' time two recall of their feedback were somewhat strongly correlated (r=.70) and do show reasonable accuracy. When asked about their specific percentile scores for each scale, participants, on average, recalled their personality scores as 12 percentile points ($\bar{x}$=.11, sd=.07) away from their actual percentile score when averaged across the four leadership personality characteristics. When asked to recall their scores relative to student leader and general college student

norms, participants tended to either respond accurately or one category away from accurate (e.g. score was >5 percentiles above leader norm but indicated same as leader norm; $\bar{x}$=.55, sd=.53).

Relationship between the attitudinal outcomes and delayed recall variables were very modest and slightly negative (r's= -.08 to -.14), indicating those who had more positive reactions to the feedback had somewhat more accurate recall of their feedback a week later. Correlations among the study's dependent variables (feedback outcome measures) are displayed in Table 3. A summary of descriptive statistics and scale reliability values across feedback conditions is presented in Table 4. Additionally, a summary of descriptive statistics separated by feedback condition is provided in Table 5.

Inferential Results

Graph main effects.

To test this study's hypotheses, independent samples t-tests were conducted between graph and non-graph conditions and between suggestion and non-suggestion conditions to test main effects of including graphs or development suggestions, respectively in the feedback. These results are presented in Table 6. For the graph conditions, the t-test results were not significant for any of the feedback attitudinal outcomes. The results for graph and non-graph conditions were approximately the same for gained insight ($\bar{x}$=8.84 vs. 8.82, respectively), failing to support Hypothesis 1. For intentions to improve, the graph condition was actually slightly lower than the non-graph condition ($\bar{x}$=9.24 vs. 9.43, respectively), failing to support Hypothesis 2. The t-test results for the retention variables were mixed. The average percentile score recall accuracy was one percent lower (more accurate) for the graph conditions than the non-

graph conditions ($\bar{x}$=.11 vs. .12, respectively) showing results in the right direction but not strong enough to reach statistical significance; however participants were significantly more accurate in terms of relative recall accuracy for the graph conditions than the non-graph conditions (t=-2.06, p<.05; $\bar{x}$=.49 vs. .62, respectively), showing partial support Hypothesis 3.

Development suggestion main effects.

For the development suggestion conditions, the t-test result was significant for the gained insight feedback attitudinal outcome (t=2.84, p<.05) indicating that those receiving development suggestions were more likely to indicate that they had gained insight about themselves from the feedback that they received than those who did not receive development suggestions ($\bar{x}$= 9.10 vs. 8.56, respectively), in partial support of Hypothesis 1. For intentions to improve, the mean score for the development suggestion condition was somewhat higher than that of the non-suggestion condition ($\bar{x}$=9.48 vs. 9.18, respectively), showing results in the right direction but not strong enough to support Hypothesis 2. These results are presented in Table 7.

Graph×Suggestion interactions.

To evaluate the interaction of feedback conditions component of the hypotheses, a series of two-way ANOVAs were conducted, one for each of the five dependent variables. Table 8 displays the results arranged by dependant variable. Consistent with the results of the t-tests examining main effects, the ANOVA results were significant only for relative recall accuracy, showing a main effect for the inclusion of graphs, and for gained insight, showing a main effect for the inclusion of development suggestions and a marginally significant interaction between graphs and development suggestions

(F=3.86, *p*=.05). The means for graph×suggestion interaction effect are plotted in figure 1. The data indicate that gained insight is lowest when the feedback contains no graphs or development suggestions and is highest when feedback contains development suggestions but no graphs. This specific interaction was not hypothesized, thus it should be interpreted with caution.

Supplemental Results

Role of individual difference characteristics.

Individual differences including cognitive ability (measured by reported ACT scores) and personality (measured by IPIP big 5 scales) were collected for supplemental exploration of their role in the outcomes of receiving developmental feedback. ACT scores range from 16 to 36, with an average score of 27 (sd=3.82). This is reflective of the student population at the sample university (University of Minnesota, 2012). Additionally, participants were, on average, modestly outgoing, cooperative, diligent, and interested in new experiences, indicated by mean scores significantly above the middle possible score on scales measuring Extraversion, Agreeableness, Conscientiousness, and Openness to Experience, respectively. This is consistent with previous college student samples (Lounsbury, Sunstrom, Loveland, & Gibson, 2003). Descriptive statistics of personality and cognitive variables are presented in Table 9.

Examining the relationships between individual difference characteristics indicates meaningful influence of personal characteristics on feedback outcomes. Specifically, ACT scores were (unsurprisingly) positively related to average percentile recall accuracy and average relative recall accuracy (r= -.28 and -.31, respectively) indicating better delayed recall accuracy by individuals with higher ACT scores.

Additionally, Emotional Stability and Extraversion were both significantly, albeit modestly, related to Feedback Acceptance (r=.16 and .12, respectively). There appears to be a positive manifold of the personality traits across reported gain in insight and intentions to improve. This is not surprising as gained insight and intentions to improve are strongly correlated (r=.50). Each of the big five personality characteristics was modestly related to Gained Insight (r's=.14 to .20) and Intentions to Improve (r's=.16 to .24). There were modest negative relationships between the personality traits Extraversion, Openness to Experience, and Conscientiousness and average percentile recall accuracy (r=-.16, -.24, and -.11, respectively) and with relative recall accuracy (r=-.21, -.22, and -.10, respectively), indicating individuals higher in these traits display more accurate recall of the feedback they received. These relationships are presented in Table 10. Relationships among all study variables are presented in Table 11.

Controlling for individual differences.

Though feedback conditions were randomized, it is still possible that the presence of meaningful individual difference characteristics were differentially distributed across conditions. To control for chance differences in personality and cognitive characteristics among the feedback groups, outcome variables were individually regressed on feedback conditions with individual difference characteristics as covariates. These analyses did not change the pattern of results found for feedback conditions.

Aptitude treatment interactions.

The interactive roles between individual difference characteristics and feedback conditions were examined for each of the dependent variables. These analyses were conducted through three-term multiple regression models including one feedback

condition term, one individual difference characteristic term, and one characteristic-condition interaction term. A total of 60 regression models were constructed such that each characteristic-condition combination was examined for every outcome variable.

The regression models showed no significant condition-ACT interactions or graph-personality interactions; however the development suggestion feedback condition showed significant interactions with multiple personality characteristics when predicting intentions to improve or recall of feedback. Specifically, when predicting average percentile score recall accuracy, the presence of development suggestions showed significant interactions with Emotional Stability and Openness to Experience ($p<.05$), and marginally significant interactions with Conscientiousness ($p=.08$). When predicting average relative recall, development suggestions also showed an interaction effect with Emotional Stability ($p<.05$). Finally, when predicting intentions to improve, the presence of development suggestions showed a significant interaction with Conscientiousness ($p<.05$) and a marginally significant interaction with Agreeableness ($p=.07$). Regression results for significant and marginally significant interactions are displayed in Table 12.

Plotting the marginal means allows interaction effects to be examined. Since the personality variables are continuous in nature, high and low scores were determined based on a median-split of the data for the purposes of calculating marginal means and plotting the interaction effects. The interaction plots show a general benefit of development suggestions for percentile score recall accuracy when individuals are low in Emotional Stability, Openness to Experience, or Conscientiousness. These results are mirrored for intentions to improve, such that there is an increase in improvement intentions when presented with development suggestions for those who are low in

Conscientiousness or Agreeableness, but little to no such increase for those high in these traits. Together with marginal mean plots of non-significant suggestion-trait interactions, the pattern of results suggests a general benefit for those who are lower in a given personality traits and less to no such benefit of the suggestions for those who are higher on the same trait. Figure 2 illustrates this pattern of effects.

The suggestion-Emotional Stability interaction for relative recall accuracy also suggests a benefit of development suggestions for those who are lower in Emotional Stability, but those who are high in Emotional Stability appear to show relative recall accuracy even better without them, although the magnitude of the differences appears to be slight. The pattern of marginal means is similar for Conscientiousness, Extraversion, Openness to Experience, and Agreeableness. An example of this effect is displayed in Figure 3.

Content analysis.

A content analysis of the participants' written behavioral intentions to improve their leadership behavior was conducted. This was done to examine if development suggestions directed the behavior of intended development. During data collection, each participant was asked to draft four statements, one for each of the four CPI scales on which they received feedback. Three raters evaluated each behavioral intention for a total of twelve ratings per participant. The raters compared each behavioral intention to the content of the development suggestion that corresponded with their scale score regardless for both the develop suggestion condition and the no suggestion condition. Raters were blind to study condition. The statements were rated on a three-point scale. A rating of '1' indicated the behavior intention was *not at all* like the development

suggestion; a rating of '2' indicated the behavior intention was *somewhat* like the development suggestion; and a rating of '3' indicated the behavior intention was *a lot* like the development suggestion. There was an additional code of non-compliance where participants did not indicate any type of behavioral intention or left a non-response.

Because there were more than two raters, the intraclass correlation coefficient (ICC) using an absolute agreement definition was calculated for each leadership characteristic to examine the inter-rater reliability of the intention-suggestion consistency ratings. The ICCs were calculated using a two-way random effects model where both people (rater) effects and measures (participant) effects are random. The ratings for each of the characteristics showed reasonable ICCs, ranging from .76 to .84 indicating that the raters demonstrated adequate absolute agreement among their ratings across the scales.

The average of the three intention-suggestion consistency ratings was calculated within each leader characteristic to be used as the participant's consistency value for that leader characteristic. If only one rater marked a written intention as non-compliant, the average of the other two ratings was used as the intention's consistency value. If two or more raters marked a comment as non-compliant, it was not included in the analysis. The mean of the consistency values for those in the development suggestion condition were compared to that of those who did not received development suggestions. For each of the leader characteristics, those in the development suggestion condition drafted behavioral improvement intention statements that were significantly more like the development suggestions than those who were not ($p<.001$, $d=.49$ to $.82$).

The consistency values were then averaged across leader characteristics to create an overall consistency score. Note that since some responses were excluded due to non-

compliance, not all of the overall consistency scores were comprised of scores from all four leader characteristics. Thus the sample size for the overall consistency scores was larger than for any of the individual leader characteristic scales. The means of the development suggestion condition and non-development suggestion condition were also compared. Again, the data analysis showed that the intention statements created by those who received development suggestions were significantly more similar to those suggestions than those who were not (t=6.60, $p<.001$, $d=.77$). These results indicate that the development suggestions do appear to guide the intended developmental behaviors after receiving feedback. The content analysis results are displayed in Table 13.

Given the importance of the presence of development suggestions, correlations between the consistency values were calculated within both development suggestion conditions. Consistency scores for each leadership characteristic were meaningfully related to the overall consistency score, which is expected given that the overall score is the average of the four other scores. These relationships are presented in Table 14. Correlations with the consistency values were calculated for the feedback outcome variables and the individual difference characteristic variables. Most noteworthy are the modest relationships with the attitudinal feedback responses such as feedback acceptance and with the delayed recall variables within the development suggestion condition. These relationships are presented in Table 15. Coupled with the modest relationships found between the attitudinal responses to feedback and recall accuracy presented in Table 3, these data indicate that when development suggestions are present in written feedback, those who have more positive reactions to the feedback (i.e. accept the feedback) tend to develop behavioral intentions that are more consistent with the

development suggestions provided and also tend to have slightly more accurate recall of their feedback at a later time.

To further examine the drivers of the consistency scores between the written behavioral intentions and the provided development suggestions, three regression models were examined. In the first model, consistency scores were regressed on the development suggestion condition assignment. In the second model, consistency scores were regressed upon feedback acceptance, intentions to improve, and gained insight. Recall variables were excluded as they were measured at a later time from the included variables. Each of these two models is a reduced model of the third model in which consistency scores were regressed upon development suggestion condition assignment, feedback acceptance, intentions to improve, and gained insight. This combination of regression models allows one to examine the increment of the first two models over one another in terms of increase in variance of the consistency score explained (ΔR^2). The overall consistency score was used in the regression models as it serves as the more reliable composite of the other consistency scores. The regression results are presented in Table 16. Not surprisingly, these results indicate that the provision of a development suggestion (i.e. being in the development suggestion condition) was the most important driver of consistency between the written behavioral intentions and the content of the suggestions themselves. Feedback reactions, such as acceptance, also appear to have a unique impact on the extent to which the suggestions are used when forming behavioral intentions.

Between the two partial models (one and two), that with the development suggestion condition explained over three times the amount of variance in the overall

correspondence score than the set of feedback reaction variables (R^2=.128 vs. .042). The combined model explained the most amount of variance (R^2=.153), indicating each of the models explained some unique variance; however the majority of the variance explained appears to come from the development suggestion condition as it increments substantially over the feedback reaction model (ΔR^2=.111).

Discussion

Overall, several important results were obtained in this study. First, incorporating a graphical display of scores relative to important norm groups appears to improve retention of feedback. Second, inclusion of development suggestions promotes perceptions of gaining insight from the feedback, and third, the development suggestions also direct the behavioral intentions recipients create as part of a development plan. Finally, individual difference characteristics including cognitive ability and personality impact developmental feedback outcomes and should be taken into consideration by practitioners providing such feedback. The following sections discuss each in more detail and describe potential practice implications.

A main effect was found for incorporating a graph of the recipient's leadership personality score in relation to student leader norms and general student norms on delayed relative recall. In other words, those who viewed a graph of their results in comparison to leaders and the general population tended to have better recall of where there scores fall in relation to these two groups. These results are consistent with the notion of creating awareness of a discrepancy (or lack of discrepancy) as discussed in the negative feedback loop of control theory (Carver & Scheier, 1982). There was not a significant effect of graphs for improving accurate recall of the percentile of one's own

scores however, indicating that the graph better communicates (for the purposes of retention) relative standing as opposed to absolute standing on a personality trait. The key advantage here is that, for the context of development, feedback recipients are likely better served by understanding and maintaining an accurate picture of where their personality falls relative to critical referent groups than by where their personality falls in an absolute sense without such referent context.

These results are consistent with past research showing that people are sensitive to the global features of visual information (Pinker, 1990; Peebles & Ali, 2009; Ali & Peebles, 2013) and that they tend to recall the gestalt of an image (or information) or experience, rather than the absolute value or location of its components. Indeed, Wallace, West, Ware, & Dansereau (1998) found that improving the physical organization of information improved learning measured through delayed recall. Therefore, using bar graphs displaying a feedback recipient's score relative to other important norms or values may help affix the meaning of the information in a recipient's mind. This finding can easily be leveraged by those providing developmental feedback as part of their professional practice. By augmenting recipients' comparative feedback to a general referent group (e.g., sales managers) with a visual or graphical representation of their relative similarities or differences, the practitioner can increase the likelihood that the recipient will maintain and recall the meaning of the information they receive.

A main effect was also found for the inclusion of development suggestions on how much insight the participant reportedly gained from the feedback. Intentions to improve their leadership skills were also higher for the participants who received development suggestions than for those who did not, but the difference was not

statistically significant; however when the insight and intention items were combined into one scale, the main effect for development suggestions was significant. Together, these results lend tentative support to the results found by Nowack (2005). It is likely that suggestions which direct the feedback recipient's attention to tangible actions they can take to make improvements to their current leadership state give them a clearer picture of their current behaviors (greater than that acquired from the descriptive feedback alone) and may ultimately increase their intentions to engage in these types of actions.

Indeed the results of the content analysis whereby raters evaluated the consistency between written development plans and the development suggestions corresponding to their assessment score indicated that development suggestions do in fact direct the behavioral intentions written in the development plans. Together, these results suggest development suggestions to be a useful feature of written assessment practice. Though already commonly used in practice, this study offers empirical support of the use of development suggestions to increase insight gained from the feedback and ultimately drive the behavioral direction of development intentions. Given the critical role of intentions in developmental actions and behaviors (Ajzen, 1991), practitioners of leader development and other development programs may incorporate development suggestions into their written assessment feedback as a feature to support next steps in the development process such as drafting of a development plan and goal setting.

The data also showed a significant interaction effect between the graph and development suggestion conditions for reported gain in insight. Though it was not hypothesized, the interaction indicates the least gain in insight for non-graph and non-suggestion conditions and the highest gain in insight for the condition with suggestions

but no graphs. One plausible explanation may be that the presence of the graphs may pull feedback recipients away from the supplemental narrative information provided by the development suggestions. The differences between any of the four discrete feedback conditions are slight and the significance of the interaction appears to be reflective of the differences in slope direction, thus this interaction effect should be interpreted with caution and examined with future research. Any 'distraction' effect of the graph for reported gained insight is likely to be negligible in comparison to the benefit it provides to the accurate encoding and recall of the feedback relative to the key referent groups. Thus it appears that both development suggestions and graphs each add distinctive value to the cognitive, attitudinal, and behavioral (intentions) outcomes of written developmental feedback.

The individual difference characteristics measured in this study, namely the big five personality traits and ACT as a measure of cognitive ability, also showed clear and meaningful relationships with feedback outcomes. The pattern of correlations suggests that cognitive ability has little connection with attitudinal outcomes to feedback such as acceptance or intentions to improve but shows meaningful relationships with recall accuracy. Participants with higher cognitive ability tend to more accurately recall their absolute percentile scores as well as their relative standing in comparison to important referent groups (r=-.28 and -.31, respectively). These findings are consistent with the vast literature showing the importance of mental ability in deliberate information recall, such as that required in academic course examinations and licensing exams (Kuncel & Hezlett, 2010). Such results do highlight the need for practitioners providing developmental feedback to consider the cognitive skills of the recipient and ensure clear

and accurate understanding of the information at the time of the feedback session to promote recall and use of the feedback by the recipient in future settings.

Additionally, personality traits show some modest albeit meaningful relationships with recall accuracy as well as attitudinal feedback outcomes. Those who are generally more outgoing, curious, diligent, and rule abiding are somewhat more able to accurately recall the feedback they received evidenced by modest negative relationships of Extraversion, Openness to Experience, and Conscientiousness with the recall measures. Individuals with these characteristics may be more likely to pay close attention to the information they are receiving, be open to receiving it, and outwardly engage with the information, which ultimately is likely to help them retain an accurate view of the information. From an applied perspective, these results suggest those clients who score lower on these traits may require additional effort on the part of the practitioner to ensure that they are open and attending to the feedback information and actively engaging in the feedback conversation to create more improved circumstances for information processing and memory encoding.

Actively engaging in the information as well as maintaining a stable emotional demeanor also appears to facilitate feedback acceptance, demonstrated through modest relationships with Extraversion and Emotional Stability. These traits, along with Conscientiousness, Agreeableness, and Openness to Experience appear to be modestly related to gaining insight from the feedback and intending to make improvement-oriented follow-up actions.

Together, these results paint a picture that those who are more extraverted and emotionally stable tend to be more accepting of feedback and critiques regarding how

their behavioral tendencies align with those of typical successful leaders. These individuals, along with those who are more open to change and new experiences, are more cooperative in nature, and who are more diligent and rule abiding have a somewhat greater tendency to integrate feedback into their self-concept and intend to take actions to improve themselves.

Given the importance of individual difference characteristics in the feedback process, their impact on the feedback condition effects was examined. The pattern of results did not change when controlling for personality and cognitive variables; however when examining interactive effects, some patterns emerged. When the significant interactions for attitudinal feedback outcomes and absolute recall accuracy are examined alongside marginal mean plots for statistically insignificant interactions, the overall pattern of data suggest a consistent benefit of development suggestions for those who are lower in Conscientiousness, Extraversion, Openness to Experience, Emotional Stability and Agreeableness, and a less consistent benefit (sometimes present, sometimes not) for those higher in these traits. These data show a mixture of indicating pure main effects for both the trait and development suggestions and showing an aptitude treatment interaction such that those lower on the given trait gain more from the suggestions than do those higher on the trait. Figure 2 is illustrative of these general findings. These results suggest that in addition to the general benefit of development suggestions on important feedback outcomes, they may be particularly beneficial for those who are not benefitting from the main effects of the personality traits on feedback outcomes (i.e. those who are lower in on the traits). Such results offer tentative support for the inclusion of

development suggestions, particularly for those individuals who are prone to receive less benefit from the feedback.

When predicting recall accuracy relative to important leader and student norms, the pattern of data was slightly different. Though four of the five interactions between personality and development suggestions were not statistically significant, the data suggest a slight benefit for those who are low on a given personality trait and a slight impairment for those high on the same trait. This effect is illustrated in Figure 3. It is possible that those who are more disposed to receive feedback already (higher on a given personality trait) show less accurate recall of where their scores fall relative to important norm groups as a result of paying attention to more information in general, thus their relative standing becomes a less salient feature of the feedback; whereby those lower on such traits may become more open and attentive to the feedback in general such that it helps them attend to other important details more so than they already would have. Given the general lack of statistical significance of these particular findings, coupled with their lack of consistency with the personality-suggestion interaction patterns for absolute percentile recall, and the absence of a main effect for development suggestions on relative recall accuracy, it is possible these results are driven by chance differences in relative recall across the feedback conditions.

Strengths, Limitations, and Future Research

One key feature of this study is that it is both authentic to similar personnel development feedback conditions and highly controlled to allow accurate conclusions to be drawn from the data collected. More specifically, the study holds a realistic component such that it provides legitimate feedback to participants based on their

leadership-relevant personality scores. In addition, it boasts a true experimental design allowing for clear inferences to be made.

Despite these strengths, there are limitations to this study's ability to imitate reality and to establish the true beneficial impact of graphs and development suggestions. In particular, personnel feedback development is most often directed at individuals who are already employed within a sponsoring organization. Given that many college students are not yet in this position or are not yet employed in a role for which a company would sponsor this kind of personnel development, the student sample used in this study may have somewhat less fidelity than a sample of participants of individual assessment or assessment centers already in the business world. This issue is partially mitigated by current expectations that college graduates can enter introductory leadership positions; however this mindset may be more salient in a business school rather than a liberal arts college from which this sample was drawn. Thus, these results are likely to be modest estimates as participants had low investment in process as compared to those receiving such feedback in high-stakes situations such as the case of assessment for a professional promotion.

A feature impacting the likeness of the feedback process to that which is commonly done in practice is that this study only examined the impact of formatting aspects of a written report on important feedback outcomes. Though many assesses do receive written feedback, most also receive oral feedback with their assessor that discusses and may supplement the feedback report. This feedback session offers a second form of articulating the feedback details, and coupled with the written feedback, may enhance the outcome of providing developmental feedback. For instance, research

examining the impact of data presentation mode on ability to recall information found that bimodal presentation (e.g., auditory and visual) is more effective than presentation in a single presentation mode (e.g. picture and printed word; Goolkasian & Foos, 2005).

The oral feedback session also allows clarification of any information presented in the report. Indeed, Seifert, Yukl, and McDonald (2003) examined the behaviors of managers in three multisource feedback treatment groups, those involved in a feedback workshop with written feedback, a no-feedback control group, and a comparison manager group that received written feedback but did not participate in the feedback workshop. Those managers in the feedback workshop demonstrated behavior change by an increase in their use of influence tactics that were discussed in the feedback, whereas those in the control and comparison groups did not.

Taken together, these limitations support the need for more research examining the benefits of graphs and development suggestions on critical developmental feedback outcomes, especially in the context of formal business decisions. In particular, key aspects within the provided graphs and development suggestions should be examined to determine the optimal design and composition of these features. For instance, a future study may compare graphs that have a varied number of referent groups on their utility in promoting important feedback outcomes such as insight and retention. Determining graphical design features that draw attention to similarities or discrepancies between a current and goal state will also be useful in creating feedback that will lead to the desired change. Additionally, future research may explore ways to optimize developmental suggestions in the promotion of forming clear and actionable intentions.

Conclusion

In order for critical psychological feedback (i.e. personality results) to be maximally beneficial to feedback recipients, we must first determine how to best facilitate the written communication of these results. Discovering what aspects of the feedback format appeal to (and are best understood and retained by) key audience members, such as those receiving feedback in selection or development contexts, is a critical step to ensuring these aspects of feedback format are leveraged in professional practice.

This study provided an examination of the usefulness of two key features of written feedback, graphs and development suggestions. Overall the results suggest that each feature may provide some useful benefits. In particular, providing graphs showing a recipient's scores relative to meaningful referent groups may help illuminate important goal-state discrepancies (Carver & Scheier, 1982) and affix such information in the recipient's mind. Maintaining an accurate representation of one's developmental feedback is critical for continued progress and development. Also, providing development suggestions may help to orient the recipient to actions he or she can take to improve as well as enhance the recipient's intentions to take such actions. Forming such intentions is critical for the feedback to drive substantive behavior change. Thus both of these features can be useful for driving behavior change and development after developmental assessment and feedback.

These results can inform how practitioners should communicate written personality feedback to recipients to ensure maximum value. Such implementation would be particularly beneficial for participants of psychological assessment in business

contexts where subsequent development is often considered a critical outcome. This represents a growing value, as organizations are increasingly using personality assessment for selection and personnel development, both with external consulting firms as well as internally within their own Human Resource departments.

Table 1. Yukl (2010) Summary of early research on leader traits and skills

Traits	Skills
Adaptable to situations	Clever (intelligent)
Alert to social environment	Conceptually skilled
Ambitious, achievement oriented	Creative
Assertive	Diplomatic and tactful
Cooperative	Fluent in speaking
Decisive	Knowledgeable about the work
Dependable	Organized (administrative ability)
Dominant (power motivation)	Persuasive
Energetic (high activity level)	Socially skilled
Persistent	
Self-confident	
Tolerant of stress	
Willing to assume responsibility	

Table 2. Implications of Higher and Lower CPI scores

Scale Name	Implications for Higher and Lower Scores
Dominance	Higher: confident, assertive, dominant, task-oriented Lower: cautious, quiet, hesitant to take initiative
Self-Acceptance	Higher: has a good opinion of self, sees self as talented and personally attractive, talkative Lower: self-doubting, readily assumes blame when things go wrong, often thinks others are better, gives in easily
Independence	Higher: self-sufficient, resourceful, detached; persistent in seeking goals, whether others agree or not Lower: lacks self-confidence, seeks support from others, tries to avoid conflict, has difficulty making decisions
Empathy	Higher: comfortable about self and well-accepted by others; perceptive of social nuances; understands how others feel, optimistic Lower: unempathic, skeptical about the intentions of others, defensive about own feelings and desires, has limited range of interests

Note: reproduced from Gough & Bradley (1996, Table 1.2, p.12)

Table 3. Correlations between Dependent Variables

	Feedback Acceptance	Gained Insight	Intentions to Improve	Average Recall Accuracy[1]	Average Relative Recall Accuracy[1]
Feedback Acceptance	--				
Gained Insight	.42**	--			
Intentions to Improve	.26**	.50**	--		
Average Recall Accuracy [1]	-.14*	-.13*	-.13*	--	
Average Relative Recall Accuracy [1]	-.08	-.09	-.14*	.70**	--

Note: ** = significant at the 0.01 level (2-tailed); * = significant at the 0.05 level (2-tailed). N=272 for recall variables, N=311 for all others.[1]Lower scores indicate better accuracy.

Table 4. Dependent Variable Descriptive Statistics

Dependent Variable	N	Min.	Max.	$\bar{x}$	s.d.	Number of Items	Possible Score Range	Coefficient Alpha
Feedback Acceptance	311	5	12	9.15	1.56	3	3 - 12	0.87
Gained Insight	311	3	12	8.83	1.67	3	3 - 12	0.81
Intentions to Improve	311	3	12	9.33	1.62	3	3 - 12	0.81
Average Recall Accuracy[1]	272	0.00	0.36	0.11	0.07	4	0 - 1	---
Average Relative Recall Accuracy[1]	272	0.00	2.25	0.55	0.53	4	0 - 4	---

Note: Min.=Minimum; Max.=Maximum; s.d.=Standard Deviation. [1]Lower scores indicate better accuracy.

Table 5. Dependent Variable Descriptive Statistics by Feedback Condition

Dependent Variable	Condition	N	Min.	Max.	$\bar{x}$	s.d.
Feedback Acceptance	*Control Condition*	83	5.00	12.00	9.07	1.57
	Graph Only Condition	73	5.00	12.00	8.97	1.58
	Suggestion Only Condition	67	6.00	12.00	9.31	1.41
	Graph + Suggestion Condition	88	5.00	12.00	9.25	1.63
Gained Insight	*Control Condition*	83	3.00	12.00	8.41	1.83
	Graph Only Condition	73	6.00	12.00	8.74	1.56
	Suggestion Only Condition	67	6.00	12.00	9.33	1.42
	Graph + Suggestion Condition	88	3.00	12.00	8.92	1.69
Intentions to Improve	*Control Condition*	83	5.00	12.00	9.25	1.57
	Graph Only Condition	73	4.00	12.00	9.10	1.63
	Suggestion Only Condition	67	6.00	12.00	9.64	1.46
	Graph + Suggestion Condition	88	3.00	12.00	9.35	1.76
Average Recall Accuracy[1]	*Control Condition*	77	0.00	0.35	0.12	0.08
	Graph Only Condition	61	0.01	0.36	0.11	0.08
	Suggestion Only Condition	58	0.00	0.29	0.11	0.07
	Graph + Suggestion Condition	76	0.00	0.28	0.10	0.06
Average Relative Recall Accuracy[1]	*Control Condition*	77	0.00	2.25	0.60	0.56
	Graph Only Condition	61	0.00	2.00	0.48	0.52
	Suggestion Only Condition	58	0.00	2.25	0.64	0.54
	Graph + Suggestion Condition	76	0.00	1.50	0.49	0.48

Note: Min.=Minimum; Max.=Maximum; s.d.=Standard Deviation. [1]Lower scores indicate better accuracy.

Table 6. Source Table for Independent Samples t-test for Graph Condition

	Graph				No Graph					
Dependent Variables	N	$\bar{x}$	s.d.	Std. Error	N	$\bar{x}$	s.d.	Std. Error	t-value	*p-value*
Feedback Acceptance	161	9.12	1.61	0.13	150	9.18	1.50	0.12	-0.32	0.753
Gained Insight	161	8.84	1.63	0.13	150	8.82	1.72	0.14	0.10	0.922
Intentions to Improve	161	9.24	1.70	0.13	150	9.43	1.53	0.12	-1.04	0.301
Average Recall Accuracy[1]	137	0.11	0.07	0.01	135	0.12	0.08	0.01	-1.08	0.280
Average Relative Recall Accuracy[1]	137	0.49	0.49	0.04	135	0.62	0.55	0.05	-2.06	0.040

Note: s.d.=Standard Deviation. [1]Lower scores indicate better accuracy.

Table 7. Source Table for Independent Samples t-test for Suggestion Condition

	Suggestion				No Suggestion					
Dependent Variables	N	x̄	s.d.	Std. Error	N	x̄	s.d.	Std. Error	t-value	*p-value*
Feedback Acceptance	155	9.28	1.54	0.12	156	9.03	1.57	0.13	1.43	0.154
Gained Insight	155	9.10	1.59	0.13	156	8.56	1.72	0.14	2.84	0.005
Intentions to Improve	155	9.48	1.64	0.13	156	9.18	1.60	0.13	1.62	0.106
Average Recall Accuracy[1]	134	0.10	0.07	0.01	138	0.12	0.08	0.01	-1.53	0.128
Average Relative Recall Accuracy[1]	134	0.56	0.51	0.04	138	0.54	0.55	0.05	0.22	0.823

Note: s.d.=Standard Deviation. [1]Lower scores indicate better accuracy.

Table 8. Source Table for 2 (Suggestion) x 2 (Graph) Between-Subjects ANOVA

Dependent Variable	Source	SS	df	MS	F-value	*p-value*
Feedback Acceptance	Suggestion	5.17	1	5.17	2.13	0.15
	Graph	0.51	1	0.51	0.21	0.65
	Suggestion* Graph	0.03	1	0.03	0.01	0.92
	Error	744.43	307	2.42		
	Total	26794.00	311			
Gained Insight	Suggestion	23.23	1	23.23	8.56	0.00
	Graph	0.12	1	0.12	0.04	0.84
	Suggestion* Graph	10.47	1	10.47	3.86	0.05
	Error	833.35	307	2.71		
	Total	25112.00	311			
Intentions to Improve	Suggestion	8.00	1	8.00	3.05	0.08
	Graph	3.83	1	3.83	1.46	0.23
	Suggestion* Graph	0.34	1	0.34	0.13	0.72
	Error	805.50	307	2.62		
	Total	27877.00	311			
Average Recall Accuracy[1]	Suggestion	0.01	1	0.01	1.96	0.16
	Graph	0.04	1	0.01	0.81	0.37
	Suggestion* Graph	0.00	1	0.00	0.01	0.96
	Error	1.47	268	0.01		
	Total	4.86	272			
Average Relative Recall Accuracy[1]	Suggestion	0.06	1	0.06	0.24	0.63
	Graph	1.23	1	1.23	4.44	0.04
	Suggestion* Graph	0.12	1	0.12	0.04	0.84
	Error	74.11	268	0.28		
	Total	157.81	272			

Note: SS=Type III Sum of Squares; df= Degrees of Freedom; MS=Mean Square; N=278 for recall DVs, N=311 for all other DVs. [1]Lower scores indicate better accuracy.

Table 9. Individual Difference Variable Descriptive Statistics

Dependent Variable	N	Min.	Max.	$\bar{x}$	s.d.	Possible Score Range
Emotional Stability	311	10	45	25.03	6.67	10 - 50
Extraversion	311	14	49	34.52	6.87	10 - 50
Openness to Experience	311	17	50	37.50	6.21	10 - 50
Agreeableness	311	22	49	37.77	4.56	10 - 50
Conscientiousness	311	14	50	36.76	5.65	10 - 50
ACT	279	16	36	27.18	3.82	1 - 36

Note: Min.=Minimum; Max.=Maximum; s.d.=Standard Deviation.

Table 10. Correlations Between Dependent Variables and Individual Difference Characteristics.

Individual Differences	Dependent Variables				
	Feedback Acceptance	Gained Insight	Intentions to Improve	Average Recall Accuracy[1]	Average Relative Recall Accuracy[1]
Emotional Stability	.16**	.20**	.23**	-.07	-.05
Extraversion	.12*	.14*	.24**	-.16**	-.21**
Openness to Experience	.04	.16**	.17**	-.24**	-.22**
Agreeableness	.05	.17**	.24**	-.05	-.02
Conscientiousness	.05	.17**	.16**	-.11	-.10
ACT score	-.02	-.10	-.06	-.28**	-.31**

Note: ** = significant at the 0.01 level (2-tailed); * = significant at the 0.05 level (2-tailed). N=272 for recall variables; N=249 for ACT score; N=247 between recall and ACT variables; N=311 for all other variable combinations.[1]Lower scores indicate better accuracy.

Table 11. Correlations Among All Study Variables.

	Feedback Acceptance	Gained Insight	Intentions to Improve	Average Recall Accuracy[1]	Average Relative Recall Accuracy[1]	Emotional Stability	Extraversion	Openness to Experience	Agreeableness	Conscientiousness	ACT score	Dominance	Self Acceptance	Independence	Empathy
Feedback Acceptance	--														
Gained Insight	.42**	--													
Intentions to Improve	.26**	.50**	--												
Average Recall Accuracy[1]	-.14*	-.13*	-.13*	--											
Average Relative Recall Accuracy[1]	-.08	-.09	-.14*	.70**	--										
Emotional Stability	.16**	.20**	.23**	-.07	-.05	--									
Extraversion	.12*	.14*	.24**	-.16**	-.21**	.42**	--								
Openness to Experience	.04	.16**	.17**	-.24**	-.22**	.19**	.35**	--							
Agreeableness	.05	.17**	.24**	-.05	-.02	.41**	.18**	.33**	--						
Conscientiousness	.05	.17**	.16**	-.11	-.10	.29**	.14*	.09	.19**	--					
ACT score	-.02	-.10	-.06	-.28**	-.31**	-.03	.07	.19**	-.07	.04	--				
Dominance	.14*	.18*	.29**	-.25**	-.26**	.33**	.67**	.25**	.03	.36**	.20**	--			
Self Acceptance	.15*	.06	.20**	-.20**	-.23**	.31**	.68**	.30**	.06	.18**	.13*	.72**	--		
Independence	.13*	.06	.16**	-.24**	-.27**	.47**	.53**	.22**	.00	.29**	.24**	.73**	.59**	--	
Empathy	.10	.08	.16**	-.27**	-.31**	.37**	.57**	.49**	.31**	.12*	.17**	.49**	.52**	.43**	--

Note: ** = significant at the 0.01 level (2-tailed); * = significant at the 0.05 level (2-tailed). N=272 for recall variables; N=249 for ACT score; N=247 between recall and ACT variables; N=311 for all other variable combinations. [1]Lower scores indicate better accuracy.

Table 12. Statistically significant and marginally significant suggestion×personality interactions.

Dependent Variable	Model	B	Std. Error	β	t-value	*p*-value
Recall Accuracy[1]	Constant	0.22	0.04		5.24	0.00
	Conscientiousness	0.00	0.00	-0.22	-2.51	0.01
	Development Suggestion	-0.12	0.06	-0.79	-1.97	0.05
	Conscientiousness × Suggestion	0.00	0.00	0.73	1.77	0.08
Recall Accuracy[1]	Constant	0.06	0.02		2.73	0.01
	Emotional Stability	0.00	0.00	-0.20	-2.56	0.01
	Development Suggestion	0.07	0.03	0.50	2.17	0.03
	Emotional Stability × Suggestion	0.00	0.00	0.61	2.65	0.01
Recall Accuracy[1]	Constant	0.29	0.04		7.44	0.00
	Openness to Experience	0.00	0.00	-0.38	-4.45	0.00
	Development Suggestion	-0.13	0.05	-0.85	-2.39	0.02
	Openness to Experience × Suggestion	0.00	0.00	0.76	2.13	0.03
Intentions to Improve	Constant	5.87	0.87		6.72	0.00
	Conscientiousness	0.09	0.02	0.32	3.83	0.00
	Development Suggestion	3.44	1.19	1.06	2.88	0.00
	Conscientiousness × Suggestion	-0.09	0.03	-1.01	-2.69	0.01
Intentions to Improve	Constant	4.85	1.01		4.80	0.00
	Agreeableness	0.12	0.03	0.32	4.32	0.00
	Development Suggestion	2.95	1.50	0.91	1.97	0.05
	Agreeableness × Suggestion	-0.07	0.04	-0.84	-1.80	0.07
Relative Recall Accuracy[1]	Constant	0.22	0.16		1.33	0.19
	Emotional Stability	-0.01	0.01	-0.17	-2.08	0.04
	Development Suggestion	0.55	0.24	0.52	2.23	0.03
	Emotional Stability × Suggestion	0.02	0.01	0.52	2.24	0.03

Note: [1]Lower scores indicate better accuracy.

Table 13. Source Table for Independent Samples t-test for Content Analysis

	Suggestion				No Suggestion						
Dependent Variables	N	$\bar{x}$	s.d.	Std. Error	N	$\bar{x}$	s.d.	Std. Error	t-value	*p-value*	*d*
Dominance Consistency Score	128	2.28	0.76	0.07	122	1.66	0.73	0.07	6.52	.000	0.82
Self Acceptance Consistency Score	131	1.57	0.64	0.06	125	1.30	0.49	0.04	3.84	.000	0.49
Independence Consistency Score	130	1.96	0.75	0.07	128	1.56	0.66	0.06	4.53	.000	0.56
Empathy Consistency Score	136	2.26	0.61	0.05	134	1.87	0.61	0.05	5.20	.000	0.63
Overall Consistency Score[1]	149	2.04	0.45	0.37	150	1.67	0.53	0.04	6.60	.000	0.77

Note: s.d.=Standard Deviation. [1]=Average of other consistency scores. *d*=Cohen's *d.*

Table 14. Correlations Between Consistency Variables.

	Dominance Consistency Score	Self Acceptance Consistency Score	Independence Consistency Score	Empathy Consistency Score	Overall Consistency Score[1]
Dominance Consistency Score	--	.04	.02	.13	.53**
Self Acceptance Consistency Score	.15	--	-.01	.01	.31**
Independence Consistency Score	.18	.04	--	-.05	.44**
Empathy Consistency Score	.14	.05	.08	--	.43**
Overall Consistency Score[1]	.46**	.38**	.44**	.36**	--

Note: ** = significant at the 0.01 level (2-tailed); * = significant at the 0.05 level (2-tailed). Lower half =development suggestions condition; Upper half= no development suggestion condition. N=109-150. [1]=Average of other consistency scores.

Table 15. Correlations Between Overall Consistency Score and Study Variables by Development Suggestion Condition.

	Feedback Acceptance	Gained Insight	Intentions to Improve	Average Recall Accuracy[1]	Average Relative Recall Accuracy[1]	Emotional Stability	Extraversion	Openness to Experience	Agreeableness	Conscientiousness	ACT score	Dominance	Self Acceptance	Independence	Empathy
Development Suggestion Condition															
Dominance Consistency Score	.17	.06	.05	-.18	-.20*	-.01	.04	.04	.12	-.02	.17	-.08	.05	.01	-.04
Self Acceptance Consistency Score	.04	.01	.06	-.17	-.09	.16	.12	.18*	.12	.01	.03	.07	.08	.10	.12
Independence Consistency Score	.09	.03	.05	-.14	-.14	-.05	.09	-.01	-.09	-.02	.01	.10	.11	.00	.11
Empathy Consistency Score	.19*	.10	.07	-.15	-.15	.01	.16	.12	.06	.00	-.09	-.04	.08	.05	.04
Overall Consistency Score[2]	.22**	.13	.10	-.25**	-.19*	.11	.16	.11	.06	.04	.02	.06	.19*	.12	.19*
No Development Suggestion Condition															
Dominance Consistency Score	.05	.15	.08	-.03	.07	-.08	-.18*	.06	.04	.05	-.07	-.12	-.11	-.05	-.08
Self Acceptance Consistency Score	.10	-.01	.08	-.06	-.05	.08	.05	.09	-.03	.08	.15	.07	-.02	.07	.11
Independence Consistency Score	.05	.03	-.03	.19*	.28**	-.26**	-.25**	-.16	-.08	-.14	-.06	-.29**	-.14	-.49**	-.19*
Empathy Consistency Score	-.03	.01	.12	-.08	-.13	.03	.07	.03	.07	.15	.13	.07	.09	.06	.02
Overall Consistency Score[2]	.12	.07	.06	.08	.09	-.05	-.12	.07	.01	.06	.06	-.15	-.05	-.17*	-.08

Note: ** = significant at the 0.01 level (2-tailed); * = significant at the 0.05 level (2-tailed). N=106-150. [1]Lower scores indicate better accuracy. [2]=Average of other consistency scores.

Table 16. Regression of Overall Consistency Scores[1] onto Study Condition and Attitudinal Outcome Variables

Model	Development Suggestion Condition β	Feedback Acceptance β	Gained Insight β	Intentions to Improve β	R^2
Development Suggestion Condition	.39**				.128
Feedback Acceptance + Gained Insight + Intentions to Improve		.15*	.07	.05	.042
Development Suggestion Condition + Feedback Acceptance + Gained Insight + Intentions to Improve	.34**	.14*	.02	.03	.153

Note: ** = significant at the 0.01 level (2-tailed); * = significant at the 0.05 level (2-tailed). N= 298. [1]=Average of other consistency scores.

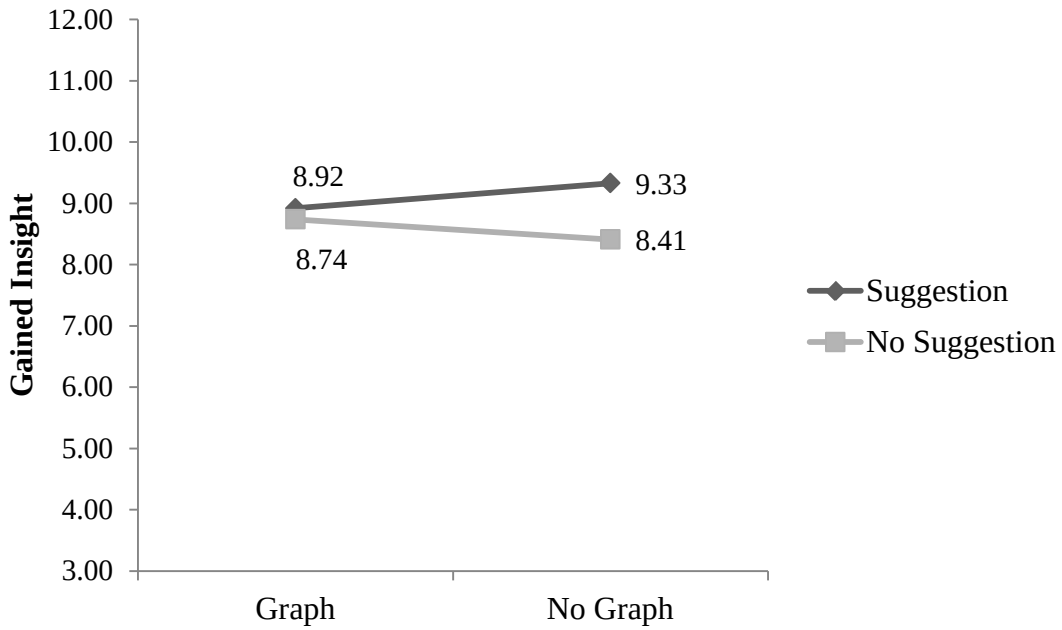


Figure 1. Plot of Development Suggestion*Graph Interaction for Gained Insight

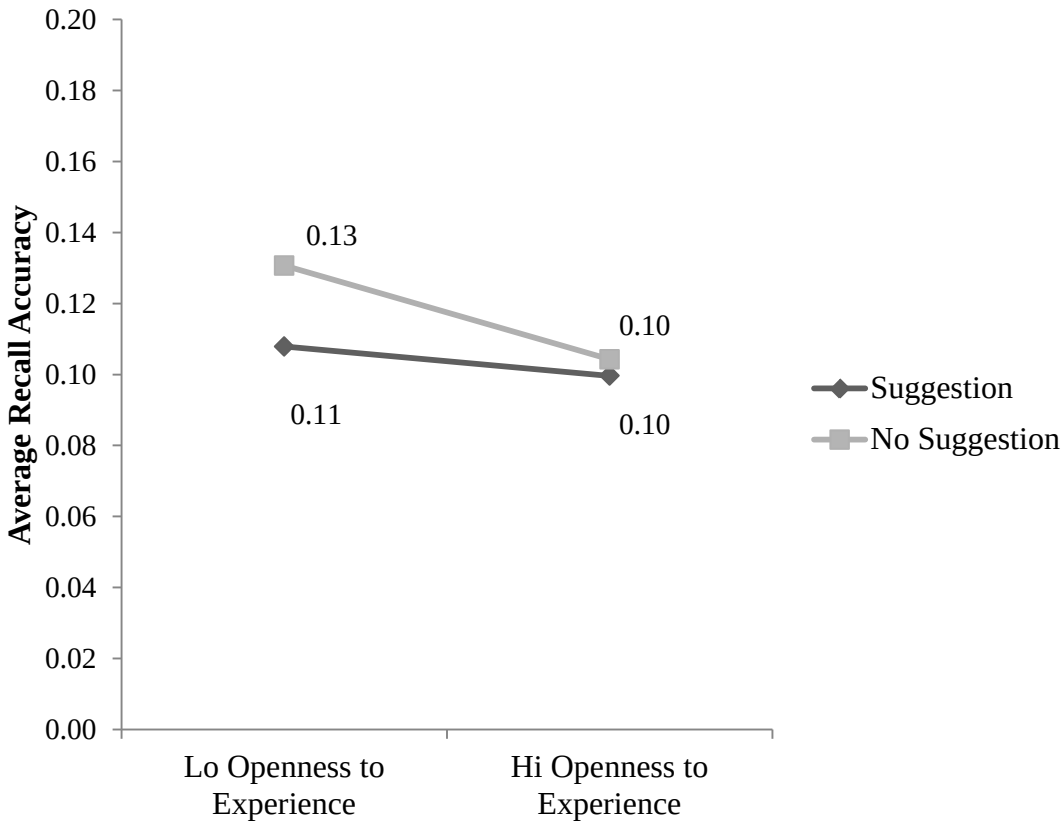


Figure 2. Plot of Development Suggestion*Openness to Experience Interaction for Average Recall Accuracy

Note: Lower scores indicate greater accuracy.

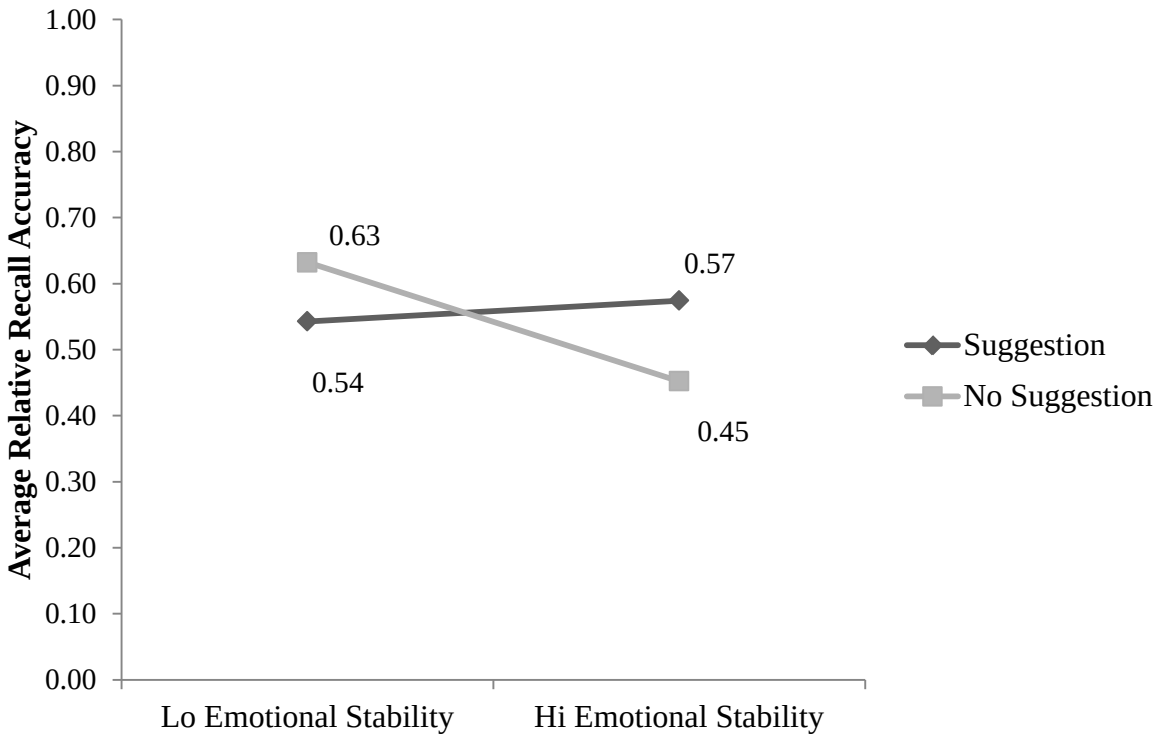


Figure 3. Plot of Development Suggestion*Emotional Stability Interaction for Average Relative Recall Accuracy

Note: Lower scores indicate greater accuracy.

References

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl and J. Beckmann (Eds.), *Action control: From cognition to behavior* (pp. 11-39). Berlin: Springer-Verlag.

Ajzen I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*, 179-211.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood-Cliffs, N.J.: Prentice-Hall.

Ajzen , I., & Fishbein, M. (2005). The influence of attitudes on behavior. In. D. Albarracin, B. Johnson, & M. Zanna (Eds.) *Handbook of attitudes and behavior*.

Ali, N., & Peebles, D. (2013). The effect of gestalt laws of perceptual organization on the comprehension of three-variable bar and line graphs. *Human Factors, 55*, 183-203.

Anseel, F., & Lievens, F. (2009).The mediating role of feedback acceptance in the relationship between feedback and attitudinal and performance outcomes. *International Journal of Selection and Assessment, 17*, 362-376.

Armitage, C. J., & Connor, M. (2001). Efficacy of the theory of planned behavior. A meta-analytic review. *British Journal of Social Psychology, 40*, 471-499.

Atwater, L., & Brett, J. (2006). Feedback format: Does it influence manager's reactions to feedback. *Journal of Occupational and Organizational Psychology*, *79*, 517-532.

Atwater, L. A., Roush, P., & Fischthal, A. (1995). The influence of upward feedback on self- and follower ratings of leadership. *Personnel Psychology, 48*, 35-60.

Atwater, L. & Yammarino, F. (1992). Does self-other agreement on leadership perceptions moderate the validity of leadership and performance predictions? *Personnel Psychology, 45*, 141-164.

Atwater, L., Ostroff, C., Yammarino, F., & Fleenor, J. (1998). Self-other agreement: Does it really matter? *Personnel Psychology, 51*, 577-598.

Ashford, S. J. (1986). The role of feedback seeking in individual adaptation: A resource perspective. *Academy of Management Journal, 29*, 465-487.

Arvey, R. D., Rotendo, M., Johnson, W., Zhang, Z., & McGue, M. (2006). The determinants of leadership role occupancy: Genetic and personality factors. *The Leadership Quarterly, 17*, 1-20.

Arvey, R.D., Zhang, Z., Avolio, B. J., & Krueger, R. F. (2007). Developmental and genetic determinants of leadership role occupancy among women. *Journal of Applied Psychology, 92*, 693-706.

Avolio, B. J., Reichard, R. J., Hannah, S. T., Walumbwa, F. O., & Chan, A. (2009). A meta-analytic review of leadership impact research: Experimental and quasi-experimental studies. *The Leadership Quarterly, 20*, 764-784.

Beck, J. W., Gregory, J. B., & Carr, A. E. (2009). Balancing development with day-to-day task demands: A multiple goal approach to executive coaching. *Industrial and Organizational Psychology, 2*, 293-296.

Bell, S. T., & Arthur, W. (2008). Feedback acceptance in developmental assessment centers: The role of feedback message, participant personality, and affective response to the feedback session. *Journal of Organizational Behavior, 29*, 681-703.

Blickstein, S. (1996). Does training pay off? *Across the Board, 33*, 16-20.

Boudrias, J., Bernaud, J., & Plunier, P. (2012, April). Candidates' integration of individual psychological assessment feedback. Paper presented at the 27th Annual Conference of the Society of Industrial and Organizational Psychology, San Diego, CA.

Brown, J. S., Grant, C. W., & Patton, M. J. (1981). A CPI comparison of engineers and managers. *Journal of Vocational Behavior, 18*, 255-264.

Brett, J. F., & Atwater, L. E. (2001). 360 degree feedback: Accuracy, reactions, and perceptions of usefulness. *Journal of Applied Psychology, 86*, 930-942.

Burke, M. J., & Day, R. R. (1986). A cumulative study of the effectiveness of managerial training. *Journal of Applied Psychology, 71*, 242-245.

Campbell, J. P., & Kuncel, N. R. (2001). Individual and team training. In N. Anderson, D. S. Ones, H. Sinangil, C. Viswesvaran (Eds.), *Handbook of Industrial, Work, and Organizational Psychology* (pp. 287- 312). London: Sage Publications.

Campbell, J. P, McCloy, R. A., Oppler, S. H., & Sager, C. E. (1993).A theory of performance. In N. Schmitt & W.C. Borman (Eds.), *Personnel Selection in Organizations* (pp. 35-70). San Francisco: Jossey-Bass.

Campion, M. A., & Lord, R. G. (1982). A control systems conceptualization of the goal-setting and changing process. *Organizational Behavior and Human Performance, 30*, 265-287.

Carson, G. L. & Parker, C. A. (1966). Leadership and profiles on the MMPI and CPI. *The Journal of College Student Personnel, 7*, 14-18.

Carver, C. S. (1974). Facilitation of physical aggression through objective self-awareness. *Journal of Experimental Social Psychology, 10,* 365-370.

Carver, C. S. (1975). Physical aggression as a function of objective self-awareness and attitudes toward punishment. *Journal of Experimental Social Psychology, 11*, 510-519.

Carver, C. S., & Scheier, M. F. (1981). *Attention and self-regulation: A control-theory approach to human behavior,* New York: Springer-Verlag.

Carver, C. S., & Scheier, M. F. (1982). Control theory: A useful conceptual framework for personality-social, clinical, and health psychology. *Psychological Bulletin, 92*, 111-135.

Costa, P. T., Jr., & McCrea, R. R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) professional manual.* Odessa, FL: Psychological Assessment Resources, Inc.

Culbertson, H., Flores, T., Powers, R., & Sarbaugh, L .E. (1959).*Using graphs more effectively.* (Bulletin 29). Madison: University of Wisconsin. Department of Agricultural Journalism.

Dickson, D. H., & Kelly, I. W. (1985). The 'Barnum effect' in personality assessment: A review of the literature. *Psychological Reports, 57,* 367-382.

Digman, J. M. (1990). Personality structure: Emergence of the five-factor model. *Annual Review of Psychology,* 41, 417–440.

Dmitruk, V. M., Collins, R. W., & Clinger, D. L. (1973). The "Barnum effect" and acceptance of negative personal evaluation. *Journal of Consulting and Clinical Psychology, 41*, 192-194.

Engelbrecht, A. S., & Fischer, A. H. (1995). The managerial performance implications of a developmental assessment center process. *Human Relations, 48*(4), 387-404.

Flaherty, M. R. (1967). Personality traits of college leaders. *The Journal of Educational Research, 60*, 377-378.

Feliciano, G. D., Powers, R. D., & Kearl, B. E. (1963). The presentation of statistical information. *Audio Visual Communication Review, 11*(3), 32-39.

Fletcher, C. (1990). Candidate's reactions to assessment centres and their outcomes: A longitudinal study. *Journal of Occupational Psychology, 63*, 117-127.

Foos, P. W., & Goolkasian, P. (2008).Presentation format effects in a levels-of-processing task. *Experimental Psychology, 55*(4), 215-227.

General Electric Company (2009). Fact sheet – leadership development & training at GE. Retrieved from: http://www.ge.com/pdf/innovation/leadership/leadership_development_fact_sheet.pdf

Godin, G., & Kok, G. (1996). The theory of planned behavior: A review of its applications to health-related behaviors. *American Journal of Health Promotion, 11*, 87-98.

Goldberg, L. R. (1999). A broad-bandwidth, public domain, personality inventory measuring the lower-level facets of several five-factor models. In I. Mervielde, I. Deary, F. De Fruyt, & F. Ostendorf (Eds.), *Personality Psychology in Europe*, Vol. 7 (pp. 7-28). Tilburg, The Netherlands: Tilburg University Press.

Goodstein, L. D., & Schrader, W. J. (1963). An empirically-derived managerial key for the California Psychological Inventory. *Journal of Applied Psychology, 47*, 42-45.

Goolkasian, P. (2000). Pictures, words, and sounds: From which format are we best able to reason? *The Journal of General Psychology, 127*(4), 439-459.

Goolkasian, P., & Foos, P. W. (2002). Presentation format and its effect on working memory. *Memory and Cognition, 30*(7), 1096-1105.

Goolkasian, P., & Foos, P. W. (2005). Bimodal format effects in working memory. *American Journal of Psychology, 118*, 61-77.

Gough, H. G. (1969). A leadership index on the California Psychological Inventory. *Journal of Counseling Psychology, 16*, 283-289.

Gough, H. G. (1984). A managerial potential scale for the California Psychological Inventory. *Journal of Applied Psychology, 69,* 233-240.

Gough, H. G. (1990). Testing for leadership with the California Psychological Inventory. In K. E. Clark & M. B. Clark (Eds.), *Measures of leadership* (pp. 355-379). West Orange, NJ: Leadership Library of America.

Gough, H. G. and Bradley, P. (1996). *CPI manual* (3rd ed.). Palo Alto, CA: Consulting Psychologists Press.

Guri-Rozenblit, S. (1989). Effects of a tree diagram on students' comprehension of main ideas in an expository text with multiple themes. *Reading Research Quarterly, 24*, 236-247.

Hall, D. T., & Mirvis, P. H. (1995). *Careers as lifelong learning,* In Howard, Al. (Ed.), *The Changing Nature of Work,* Jossey-Bass, San Francisco, CA.

Hausenblas, H. A., Carron, A. V., & Mack, D. E. (1997). Application of the theories of reasoned action and planned behavior to exercise behavior: A meta-analysis. *Journal of Sport and Exercise Psychology, 19,* 36-51.

Hazucha, J. F., Hezlett, S. A., Schneider, R. J. (1993). The impact of 360-dregree feedback on management skills development. *Human Resource Management, 32*, 325-351.

Hogan, J. C. (1978). Personological dynamics of leadership. *Journal of Research in Personality, 12*, 390-395.

Hollenbeck, G. P. (1990). The past, present, and future of assessment centers. *The Industrial-Organizational Psychologist, 28*, 13-17.

Ilgen, D. R., Fisher, C. D., & Taylor, M S. (1979). Consequences of individual feedback on behavior in organizations. *Journal of Applied Psychology, 64*, 349-371.

Jenkins, J. R., Neale, D. C., &Deno, S. L. (1967). Differential memory for picture and word stimuli. *Journal of Educational Psychology, 58*, 303-307.

Johnson, J. T., Cain, L. M., Falke, T. L., Hayman, J., & Perillo E. (1985). The "Barnum effect" revisited: Cognitive and motivational factors in the acceptance of personality descriptions. *Journal of Personality and Social Psychology, 49*, 1378-1391.

Johnson, R. T., & Frandsen, A. N. (1962). The California Psychological Inventory profile of student leaders. *Personnel and Guidance Journal, 41*, 343-345.

Jones, R. G., and Whitmore, M. D. (1995). Evaluating developmental assessment center as interventions. *Personnel Psychology, 48*, 377-388.

Judge, T. A., Bono, J. E., Ilies, R., & Gerhardt, M. W. (2002). Personality and leadership: A qualitative and quantitative review. *Journal of Applied Psychology, 87*, 765-780.

Kluger, A. N., & DeNisi, A. (1996). Effects of feedback interventions on performance: A historical review, a meta-analysis, and a preliminary feedback intervention theory. *Psychological Bulletin, 119,* 254-284.

Kudisch, J. D. (1996). Factors related to participants' acceptance of developmental assessment center feedback. *Unpublished Doctoral Dissertation,* The University of Tennessee, Knoxville.

Kuncel, N. R., Credé, M., & Thomas, L. L. (2005). The validity of self-reported grade point averages, class ranks, and test scores: A meta-analysis and review of the literature. *Review of Educational Research, 75,* 63-82.

Kuncel, N. R., & Hezlett, S. A. (2010). Fact and fiction in cognitive ability testing for admissions and hiring decisions. *Current Directions in Psychological Science, 19*(6), 339-345.

Kuncel, N. R., & Rigdon, J. (2012). Communicating research results. In I. Weiner, N. Schmitt, & S. Highhouse (Eds.), *Handbook of Psychology* (2nd ed., Vol. 12, pp. 43-58).

Larkin, J. H., & Simon, H. A. (1987). Why a diagram is (sometimes) worth ten thousand words. *Cognitive Science, 11,* 65-99.

Lounsbury, J. W., Sunstrom, E., Loveland, J.M., & Gibson, L.W. (2003). Intelligence, "big 5" personality traits, and work drive as predictors of course grade. *Personality and Individual Differences, 35,* 1321-1239.

Lord, R. G., De Vader, C. L., & Alliger, G. M. (1986). A meta-analysis of the relation between personality traits and leadership perceptions: An application of validity generalization procedures. *Journal of Applied Psychology, 71,* 402-410.

Mahoney, T. A., Jerdee, T. H., & Nash, A. N. (1960). Predicting managerial effectiveness. *Personnel Psychology, 13,* 147-163.

McAllister, L. W. (1996). *A practical guide to CPI interpretation* (3rd ed.). Mountain View, CA: CPP, Inc.

McCauley, C. D. (2008). Leader development: A review of research. Center for Creative Leadership. Online at shrm.org

McCrae, R. R., & John, O. P. (1992). An introduction to the five-factor model and its applications. *Journal of Personality, 2,* 175–215.

Meehl, P. E. (1956). Wanted- A good cookbook. *American Psychologist, 11,* 262-272.

Mumford, M. D., Zaccaro, S. J., Connelly, M. S., & Marks, M. A. (2000). Leadership Skills: Conclusions and future directions. *Leadership Quarterly, 11*(1), 155-170.

Mumford, M. D., Zaccaro, S. J., Harding, F. D, Jacobs, T. O., & Fleishman, E. A. (2000). Leadership skills for a changing world: Solving complex social problems. *Leadership Quarterly, 11*(1), 11-35.

Nowack, K. M. (2005). *Longitudinal evaluation of a 360 feedback program: Implications for best practices.* Paper presented at the 20th Annual Conference of the Society for Industrial-Organizational Psychology, Los Angeles, CA.

Orpen, C. (1972). The identification and prediction of managerial effectiveness: A pilot study with South African executives. *Journal of Behavioral Science, 1*, 251-253.

Peebles, D., & Ali, N. (2009). Differences in comprehensibility between three-variable bar and line graphs. In *Proceedings ofthe Thirty-First Annual Conference of the Cognitive Science Society* (pp. 2938–2943). Mahwah, NJ: Lawrence Erlbaum.

Pinker, S. (1990). A theory of graph comprehension. In R. Freedle (Ed.), *Artificial intelligence and the future of testing* (pp. 73–126). Hillsdale, NJ: Lawrence Erlbaum.

Powers, W. T. (1973). Feedback: Beyond behaviorism. *Science, 179,* 351-356.

Ballantyne, I., & Povah, N. (2004). *Assessment & development centres* (2nd edition). UK:Gower.

Rawls, D. J., & Rawls, J. R. (1968). Personality characteristics and personal history data of successful and less successful executives. *Psychological Reports, 23,* 1032-1034.

Reichard, R. J., & Avolio, B. J. (2005). Where are we? The status of leadership intervention research: A meta-analytic summery. In W. L. Gardner, B. J. Avolio, & F. O. Walumbwa (Eds.), *Authentic leadership theory and practice: Origins, effects and development* (pp. 203-226). Amsterdam: Elsevier.

Rigdon, J., & Kuncel, N. R. (2012). *Communicating selection research to hiring managers: Favorability of various statistics.* Paper presented at the 28th Annual Conference of the Society for Industrial-Organizational Psychology, Houston, TX.

Robinson, D. H., & Kiewra, K. A. (1995). Visual argument: Graphic organizers are superior to outlines in improving learning from text. *Journal of Educational Psychology, 87,* 455-467.

Roller, R. L., & Morris, S. B. (2008). Individual assessment: Meta-analysis. In I. L. Kwase (Chair) *Individual Assessment: Does the research support practice?* Symposium presented at the 23rd Annual Conference of the Society for Industrial-Organizational Psychology, San Francisco, CA.

Ryan, A. M., Brutus, S., Greguras, G. J., & Hakel, M. D. (2000). Receptivity to assessment-based feedback for management development. *Journal of Management Development, 19,* 252-276.

Ryan, A. M., & Ployhart, R. E. (2000). Applicants' perceptions of selection procedures and decisions: A critical review and agenda for the future. *Journal of Management, 26, 565-606.*

Ryan, A. M., & Sackett, P. R. (1987). A survey of individual assessment practices by I/O psychologists, *Personnel Psychology, 40,* 455-488.

Ryan, A. M., & Sackett, P. R. (1992). Relationships between graduate training, professional affiliation, and individual psychological assessment practices for personnel decisions. *Personnel Psychology, 45,* 363-387.

Scheier, M. F., & Carver, C. S. (1983). Self-directed attention and the comparison of the self with standards. *Journal of Experimental Social Psychology, 19,* 205-222.

Siefert, C. F., Yukl, Y., & McDonald, R. A. (2003). Effects of multisource feedback and a feedback facilitator on the influence behavior of managers toward subordinates. *Journal of Applied Psychology, 88,* 561-569.

Silzer, R., & Jeanneret, R. (2011). Individual psychological assessment: A practice and science in search of common ground. *Industrial and Organizational Psychology, 4,* 270-296.

Spychalski, A. C., Quinonwa, M. A., Gaugler, B. B., & Pohley, K. (1997). A survey of assessment center practices in organizations in the United States. *Personnel Psychology, 50,* 71-90.

Standing, L., & Keasy, G. (1986). Computer assessment of personality: A demonstration of gullibility. *Social Behavior & Personality: An International Journal, 14,* 197-202.

Stodgill, R. M. (1948). Personal factors associated with leadership: A survey of the literature. *Journal of Psychology, 25,* 35-71.

Stodgill, R. M. (1974). *Handbook of leadership: A survey of the literature.* New York: Free Thorton, G. C. III, & Byham, W. C. (1982).*Assessment centers and managerial performance.* New York: Academic Press.

University of Minnesota Office of Admissions. (2012). *Academic profile of fall 2011 admitted freshman applicants by college*. Retrieved from http://admissions.tc.umn.edu/academics/profile.html

Van Velsor, E., Taylor, S. & Leslie, J. (1993). An examination of the relationships among self-perception accuracy, self-awareness, gender, and leader-effectiveness. *Human Resource Management, 32* (2-3), 249-264.

Washburne, J. N. (1927). An experimental study of various graphic, tabular and textual methods of presenting quantitative material. *Journal of Educational Psychology, 18,* 361-376, 465-476.

Wilcox, W. (1964). Numbers and the news: Graph, table or text? *Journalism Quarterly, 41,* 38-44.

Young, D., & Dixon, N. (1996). *Helping leaders take effective action: A program evaluation.* Greensboro, NC: Center for Creative Leadership.

Yukl, G. (2010). *Leadership in Organizations, 7th edition*. New Jersey: Prentice Hall.

Yukl, G., & Van Fleet, D. D. (1992). Theory and research on leadership in organizations. In M.D. Dunnette & L. M. Hough (Eds.), Handbook of industrial and organizational psychology, vol. 3 (2nd ed.) pp. 147-197. Palo Alto, CA: Consulting Psychologists Press.

APPENDIX A

Norm values presented to study participants.

Leader Personality Scale (CPI)	College Leader	General Student
Dominance	75	41
Self Acceptance	70	42
Independence	60	40
Empathy	66	42

Note: Scores presented as percentile scores.

APPENDIX B

Summary of Written Feedback and Suggestions for Development and Sample Graph

Dominance

Percentile Score Range	Written Feedback
>97	Competitive and driven to 'win', you are assertive and willing to express and defend your own opinions. When the opportunity arises, you quickly hop into the leadership slot. At times you may come across as domineering.
69-97	Forceful when necessary, you are able to assume leadership roles when the situation calls for it. You tend to be comfortable taking the lead.
31-68	You likely do not have a strong need for power, but you will lead if the situation or role requires it. People tend to find you reasonably assertive without being overbearing.
2-30	Tending not to be too assertive, you often prefer participative roles and may avoid taking on leadership roles. At times, you may have trouble being direct about your frustrations.
<2	Often coming across as shy to others, you likely avoid jumping into leadership roles and may sometimes appear passive.

Percentile Score Range	Development Suggestion
Introduction	Effective leaders both take charge by offering their own ideas and ensure that others around them give input as well.
>97	As someone who often takes the lead, ensure that others around you are getting an opportunity to give their say. Making others feel heard is important to effectively getting others to follow your lead.
69-97	As someone who often takes the lead, ensure that others around you are getting an opportunity to give their say. Making others feel heard is important to effectively getting others to follow your lead. Continue to show leadership by being one of the first people to offer ideas. This is a good way of demonstrating some leadership in every situation.

31-68	To enhance your leadership strength in this area, seek out activities that give you the opportunity to lead a group or influence others. Getting a chance to gain more experience will increase your skills. Also, be one of the first people to offer ideas. This is a good way of demonstrating some leadership in every situation.
2-30	Practice being a bit more forceful in situations where you know people care about your input. This will help you get gain more comfort with putting your opinions out there and supporting them. In situations where you are less comfortable, try to be one of the first people to offer ideas. This is a good way of demonstrating some leadership in every situation.
<2	Think about the situations in which you feel most comfortable asserting your opinion and practice doing it. Ask someone you trust for feedback on how influential and persuasive you are and ask him or her for suggestions on what you could do to be more influential. Practices those things in situations that you are comfortable and confident and then challenge yourself to try them in new situations.

Self Acceptance

Percentile Score Range	Written Feedback
>97	Extremely self-confident, you often desire to 'prove yourself' to others. Though highly confident, you may sometimes be fearful of the possibility of rejection and may tend to avoid situations where this may happen.
69-97	Self-assured, you portray confidence in most settings. Being personally well-adjusted, you are able to effectively work with others and delegate responsibility when needed.
31-68	You are able to display confidence in situations where you have proven your competence. In areas that are less familiar, you may hesitate more and doubt your capability.
2-30	Deliberate and careful, you tend to never be overconfident and may sometimes lack proper confidence when addressing challenges or new situations. Not wanting to 'rock the boat', you will often opt for conventional solutions to problems.
<2	Though capable of doing many things, you quite often feel distressed by challenges and lack confidence in your abilities. You may find that you second-guess yourself often and blame yourself when things do not go as well as planned.

Percentile Score Range	Development Suggestion
Introduction	Effective leaders show confidence when sharing their ideas and working with others, even when the situation is new or challenging.
>97	Challenge yourself to seek out opportunities where you may receive the response "no". Think about how you plan to deal with your discomfort in advance. Remind yourself that if someone says "no", you haven't lost anything. Afterwards, reflect on the experience and consider how you can use it in important situations you may have previously avoided due to the possibility of rejection. This will open yourself up to even more opportunities that you otherwise would not have even tried for. Learn to look at negative feedback and criticism as useful for further developing.
69-97	Challenge yourself by taking on a new responsibility or activity that you have previously shied away from. Think about how you plan to deal with your discomfort in advance. After experiencing some new responsibilities or activities, think about those experiences can help you lead others who are less able to handle challenges.
31-68	Challenge yourself to take on a new responsibility or activity that you may not have previously found interesting. Think about how you plan to deal with your discomfort in advance. You may also opt to bring a friend along to support you. After experiencing some new responsibilities or activities, think about those experiences have helped you grow as a person and expand your areas of potential influence and expertise.
2-30	Challenge yourself to take on a new responsibility or activity that you have previously shied away from. Think about how you plan to deal with your discomfort in advance. You may also opt to bring a friend along to support you. After experiencing some new responsibilities or activities, think about those experiences have helped you grow as a person and become more confident in your ability to handle new and challenging situations.
<2	Challenge yourself to try out some new situations that make you a bit nervous (perhaps some things that you have been curious about). Think about how you plan to deal with your discomfort in advance. You may also opt to bring a friend along to support you. After experiencing some new situations, think about those experiences have helped you develop your confidence.

Independence

Percentile Score Range	Written Feedback
>97	Highly independent, resourceful and self-sufficient, you are are willing and able to take a stand and defend it. Many times, you will prefer to reach your conclusions separately from others. You tend to set high goals a pursue them diligently.
69-97	Determined and goal oriented, you show independence in your thoughts and actions and are very capable of taking initiative.
31-68	You are able to demonstrate independence when needed. In new or challenging situations, you may often look for reassurance or strong guidance from others.
2-30	You generally prefer cooperation and working together to achieve goals and resolve issues. When faced with decisions or tasks, you prefer to check in with others about what to do.
<2	Making decisions on your own can be quite challenging for you. You prefer to have others lead the way and make the tough calls. When things are left up to you, you tend to worry about your ability to get them done successfully.

Percentile Score Range	Development Suggestion
Introduction	Effective leaders are able to take a stand on an issue and defend it, even if it is not popular. They will consider input from others, but are comfortable making a decision on their own.
>97	You have a strong achievement-orientation overall. You enjoy achieving as part of the team where you contribute your part and others do the same. However, it is also clear that you also like to achieve based on your own independent efforts. You value knowing that you have achieved success or failure based on your own effort. You should find a pet project where you have sole ownership and responsibility for its success or failure. This would give you visibility and recognition for you individual contribution.
69-97	As someone who is quite independent, you may not always realize when the input of others can lead to better outcomes whether it's at work, in the classroom, or in your own projects. Practice asking others for their thoughts and opinions and consider how their input can help expand your own understanding and improve the end-results of projects you are working on.

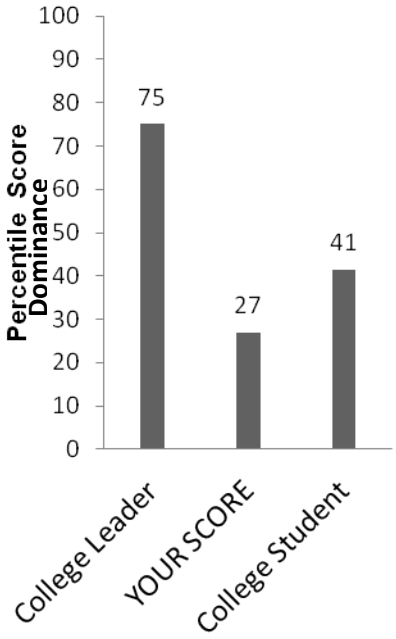
31-68	As someone who is fairly balanced in working independently and with others, try to further strengthen both sides. In new situations where you feel challenged, listen to your own voice first before asking others for guidance. In situations where you are part of a team, find ways to involve more quiet team members who may not have otherwise given input.
2-30	You are someone who makes a good team member. Try to also strengthen your ability to make challenging decisions independent of others. In new situations where you feel challenged, listen to your own voice first before asking others for guidance. By showing more independent action, others will view you are more capable and more leader-like.
<2	Challenge yourself to make more decisions on your own. In new situations where you feel challenged, listen to your own voice first before asking others for guidance. Tell them what you would decide before asking them for their input. By showing more independence in your decision making, others will view you are more capable and more leader-like.

Empathy

Percentile Score Range	Written Feedback
>97	You intuitively understand how others around you are feeling. You are able to interact with others according to their needs and come across as warm and friendly.
69-97	You are adaptable to various social situations and tend to understand people's behavior. You come across as perceptive and easy to be around.
31-68	You are somewhat sensitive to other people's behavior and likely prefer to learn things about others before you trust them fully and share personal information with them.
2-30	Somewhat shy and withdrawn, you may sometimes struggle to understand where others are coming from and feel the need to hold back from sharing too much with others.
<2	The feelings and needs of others may often be puzzling for you and as a result, you tend to have a hard time showing warmth toward them. Sometimes having a hard time connecting with others, some people may find you distant and hard to please.

Percentile Score Range	Development Suggestion
Introduction	Effective leaders are able to understand other people's point of view and work with them to achieve success.
>97	You are good at connecting with others and understanding their point of view. As an opportunity to develop further, seek out situations in which you are less familiar with perspectives that are different from your own and learn more about them. Think about how this new understanding can help you to better connect with others. Connecting with others and making them feel understood is important for effective leadership.
69-97	You are good at connecting with others and understanding their point of view. As an opportunity to develop further, seek out situations in which you are less familiar with perspectives that are different from your own and learn more about them. Think about how this new understanding can help you to better connect with others. Connecting with others and making them feel understood is important for effective leaders.
31-68	Show that you care about understanding the perspectives of others. People will open up to you if they know that you genuinely care about better understanding them. Likewise, think about how sharing things with others can also help them to better understand your own perspectives.
2-30	Develop and practice your skills in asking others what they need or want. Ask more questions to better understand where others are coming from. People will open up to you if they know that you genuinely care about better understanding them. Likewise, think about how sharing things with others can also help them to better understand your own perspectives.
<2	Develop and practice your skills in asking others what they need or want. Ask someone you trust to give you feedback in your ability to make him or her feel like you are concerned about their needs. Also, take opportunities to thank others and tell them when you are pleased so they can gain a better understanding of how you are feeling.

Sample Graph



APPENDIX C

Dependent Variable Items and Open-ended Prompts

Item Response Options:
Strong Disagree
Disagree
Agree
Strongly Agree

Dependent Variable Measures

Feedback Acceptance

1. The feedback describes my personality
2. The feedback was an accurate portrayal of my personality
3. The feedback speaks to who I am

Gained Insight

1. I have learned about my leadership characteristics
2. I have a better understanding of my leadership capability
3. I know my leadership characteristics better than I did before

Intentions to Improve

1. Based on the feedback, I intend to further develop my leadership characteristics
2. I plan to make progress on my leadership capability
3. Developing leadership capability is important to me

Commitment Item

I am committed to developing as a leader

Open Ended Prompts

To improve my leadership based on Social Dominance, I plan to... (Dominance)
To improve my leadership based on Self Acceptance, I plan to... (Self- Acceptance)
To improve my leadership based on Independent Action, I plan to... (Independence)
To improve my leadership based on Relating to Others, I plan to... (Empathy)

Actual Score Recall Prompt
For each personality scale, please indicate your score.

Social Dominance _____
Typical Student Leader:
75th percentile
Typical College Student:
41st percentile

Self Acceptance _____
Typical Student Leader:
70th percentile
Typical College Student:
42nd percentile

Independent Action _____
Typical Student Leader:
60th percentile
Typical College Student:
40th percentile

Relating to Others _____
Typical Student Leader:
66th percentile
Typical College Student:
42nd percentile

Relative Score Recall Prompt
Based on the feedback from last week, where did your scores fall compared to college leaders and general college students?

Social Dominance

Self Acceptance

Independent Action

Relating to Others

Relative Recall Response Options
Below both leader and general student
About the same as a general student
Between leader and general student
About the same as a student leader
Above both leader and general student