Multisource personality feedback:
Professional feedback interventions adapted for personal insight and development

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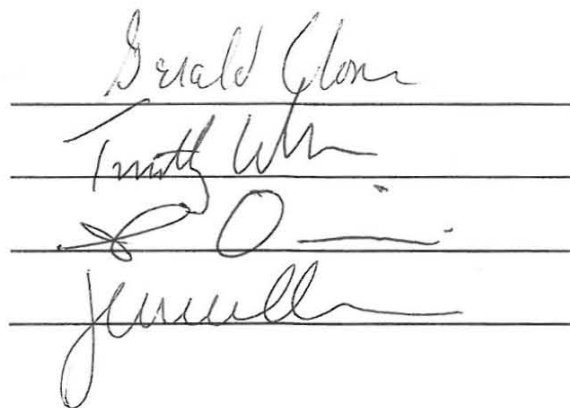for the Degree of Doctor of Philosophy

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Abstract

The unique human capacity for self-understanding, while extraordinary, is also limited and biased. But accurate self-knowledge is valuable, and people have the capacity to change themselves, so it may be worth working to overcome inherent challenges. This goal is endorsed by many organizations, and professional tools for acquiring and interpreting self-oriented feedback from multiple sources are now widespread. The primary objective of this project was to identify factors influencing the effectiveness of two experimental personal feedback interventions. Within an interventional framework, two longitudinal studies evaluated the general hypothesis that *multisource personality feedback* would provoke goal-directedness and motivate intentional self-development in a sample of college students. Compared to self-generated feedback or no feedback, multisource personality feedback was more likely to precipitate adaptive developmental outcomes, and the addition of informant feedback influenced certain developmental processes. An analysis of structural models revealed that post-intervention goal-directedness may play an essential intermediary role between receiving personality feedback and achieving subsequent self-development goals. Implications are discussed from social and organizational perspectives.

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Concern for one's self has to become an ardent practice which one must undertake all of one's life…The cultivation of the self should permit one not only to acquire new knowledge, but better than that, to get rid of old, bad habits, old false opinions.

- Michel Foucault, *Technologies of the Self*, Berkeley, 1983

Getting to know thyself is a difficult task. If self-insight is the destination, the individual faces many obstacles along the way. Accurate self-knowledge is threatened by self-serving (Dunning, 2005; Robins & John, 1997) and confirmation (Swann, 1983; Swann & Read, 1981) biases, by dissociation between implicit and explicit cognitive processes (Wilson, 2002), and by our tendency to misconstrue self-relevant information (Bem, 1972). Unfortunately for us, self-understanding may be more important than ever. The complexities of modern social life demand an accordingly complex sense of self (Rappaport, Baumgardner, & Boone, 1999), and there is evidence to suggest that such complexity is best complemented by emphasis on acquiring accurate self-knowledge (Wilson, 2009; Wilson & Dunn, 2004). Self-reflection and introspection may provide added insight (Fenigstein, Scheier, & Buss, 1975; Grant, Franklin, & Langford, 2002; Lyke, 2009), but essential aspects of one's own character are often inaccessible to introspection (Wilson, 2002; Wilson & Dunn, 2004) or vulnerable to a host of interpretation biases (Dunning, 2005; Swann, 1983; Swann & Read, 1981).

The problems inherent to gaining true self-insight are formidable, but they are not unchallenged. In professional environments, where an accurate understanding of one's own behavior may increase profit margins, the self-insight problem has been partially resolved using multisource (or *360-degree*) feedback

interventions. The goal of this project is to adapt best practices and existing

theoretical knowledge from the organizational literature to facilitate self-insight and

adaptive self-development in a collegiate population. These experimental strategies

are *technologies of the self* (Foucault, 1983; Foucault, Martin, Gutman, & Hutton,

1988), social psychological tools whose purpose is to help individuals chart new

territory within their selves and use this discovery to propel intentional behavioral

change.

The enduring problem of self-insight

Gaining an accurate understanding of one's own character has long been

considered among the most challenging, and most rewarding, human endeavors.

The pre-Socratic Greek philosopher Thales (circa 550 BCE) – recognized by Socrates

himself as the first philosopher in the Greek tradition – declared that knowing

oneself is the most difficult and most rewarding task a person faces during his (sic)

life. Aristotle (350 BCE, 1998) and many of his contemporaries perceived the

highest form of human achievement as the discovery and enactment of one's own

genuine character. Indeed, the value of accurate self-knowledge has remained a

central theme in philosophy for at least two-and-a-half millennia. How far have we

come toward understanding ourselves in this time? Psychological evidence

suggests we may be no better at knowing ourselves now than we were then. In fact,

due to the increasing complexity of our self-concepts, and the many distractions

from mindfulness and self-reflection we now face, we may be decidedly worse.

Dunning's (2005) recent book on self-insight is entirely devoted to failure,

broaching a host of discouraging topics such as *when feedback fails to inform*,

ignorance as bliss, *neglected sources of wisdom*, and *egocentric thought*. How might these many pitfalls be avoided or overcome?

Introspection has long served as standard practice for those pursuing self-discovery. Many famous thinkers (e.g. Socrates, Plato, Buddha) believed that to understand yourself, you must spend a lot of time thinking about yourself, and psychologists have traditionally agreed with this principle (Bem, 1967; Duval & Wicklund, 1972). Recent psychological evidence has exposed the limits of contemplation, suggesting that because of the pervasive influence of the adaptive unconscious, and because we are prone to so many errors, misattributions, and biases, introspection often leads to the generation of incorrect and incomplete self-narratives (Dunning, 2005). Wilson (2002) argues that the high functionality of the adaptive unconscious makes knowing who we are, and knowing why, information that may be inaccessible to our conscious awareness, eluding even our best introspective efforts. Another obstacle to accurate self-reflection is the disproportionate weight people place on their internal thoughts and feelings at the expense of observing their own behavior (Pronin & Kugler, 2007). Self-verification theory (Swann, 1983; Swann & Read, 1981) identifies an additional obstacle to accurate self-insight and intentional change - the pervasive human desire to maintain consistent, rather than accurate, self-perceptions.

It seems we have made little headway in resolving the problems inherent to self-insight, but psychologists have recently been offering new ideas in this domain. Wilson and Dunn (2004) recommend: "Another approach is to try to see ourselves through the eyes of other people, and if their view differs from ours, consider the

possibility that they are correct" (p. 513). Vazire and Mehl (2008) similarly propose: "It may be useful to draw on close others' impressions of us when trying to understand ourselves, when predicting our own future behavior, or even when making major life decisions" (p. 1214). Feedback strategies like these are mostly new to the contemporary domain of *personal* self-insight, but they have been utilized extensively to augment *professional* self-insight and -development practices. I will engage these organizational strategies following a brief review of relevant personality, social, and developmental perspectives.

Potential benefits of multisource personality assessment

Personality tests typically provide basic information about how individuals perceive their own general temperament. Self-reported survey measures draw on existing beliefs about one's own character. But do individuals provide accurate information about themselves? The self-insight literature discussed above suggests that they may not be motivated or able to do so. Perhaps collecting information from additional sources could increase the accuracy of personality assessment. Connelly and Ones (2010) recently published a meta-analysis on self- versus other-perceptions of personality. Integrating findings from 263 samples and 44,000+ participants, they found that not only are known others able to provide personality reports that rival the accuracy of self-reports, they typically account for unique variance, suggesting that multiple sources of feedback can describe a personality more completely than any single source. The authors conclude that there is "extraordinary value" (Connelly & Ones, 2010, p. 1119) in collecting other-reports to measure personality.

Using behavior as a criterion for accuracy, an earlier study compared personality judgments made by the self to those made by known others and found that other-ratings were more accurate than self-ratings in some domains (Kolar, Funder, & Colvin, 1996). Vazire and Carlson (2010) reviewed evidence on self-knowledge of personality, finding that individuals do have a general understanding of how they behave and how they are perceived by others, but this knowledge is limited and prone to misperception. Combining ratings from multiple perspectives can significantly increase the validity of personality assessment. Vazire and Mehl (2008) asked participants to predict how accurate their ratings of their own behavior would be compared to informants' ratings of their behavior. Close others were generally as accurate as the self in predicting daily behavior, and in some cases they were more accurate. Vazire (2010) also assessed self/other discrepancies in knowledge of personality traits. The self was the best at judging neuroticism-related traits; known others were better judges of intellect-related traits; and the self and others were equally good at judging extraversion-related traits. Bollich, Johannet, and Vazire (2011) recently published a theoretical article proposing that the solicitation of explicit personality feedback from close others is a productive means to achieving self-insight. The authors also predict that the impact of such feedback depends on the particular characteristics, goals, and motives of the recipient. The ways in which this information is put to use become a matter of intentionality and self-development.

Intentional self and personality development

In contrast to prevalent trait-based theories of personality that assume

personality is essentially fixed during adulthood (e.g. McCrae & Costa, 1990; McCrae et al., 2000), there is now evidence to suggest that personality continues to develop across the lifespan (Roberts & Mroczek, 2008; Specht, Egloff, & Schmuckle, 2011). Surprisingly, the degree of intentionality that accompanies personality development in adulthood has not yet been empirically studied. Can and do individuals direct their own personality development? This question is relevant to the current project, and work in the domain of intentional self-development suggests that individuals may indeed maintain some degree of control. Carl Rogers (1951) perceived intentional self-development as actions taken "...to actualize, maintain, and enhance the experiencing organism" (p. 487). Brandtstädter's (1999) Development Systems Theory maintains that individuals are both the products and producers of their own development, and that our motivations determine the trajectory of our lives. Through intentional action, individuals operationalize their motivations and intentions in the pursuit of personal goals and changes (Baltes & Baltes, 1990; Freund, Li, & Baltes, 1999). Gestsdottir and Lerner (2008) referred to these developmental processes as *intentional self-regulation* – actions aimed towards harmonizing personal goals in order to enhance the self. Taking such action, according to Baltes (1997), increases the likelihood of developing and enacting personal strategies that lead to desired outcomes. Others, e.g., Rotter (1966), Schultz and Heckhausen (1996), and Morf and Horvath (2010) have also identified self-directed development as an important means to achieving personal success and well-being.

Brandtstädter (1999) envisions four principle components of self-

development, including the ability to control one's everyday behavior, the development of a structured self-concept, the ability to evaluate and correct behavior, and the integration of these processes into a stable identity. Prochaska and Velicer's (1997) Transtheoretical Model of Health Behavior Change identifies five stages of the self-development process: pre-contemplation, contemplation, preparation, action, and maintenance, each of which is dependent upon contemplation and self-regulation. Earlier, Tough (1982) noted that individuals who chose, planned, and executed a process for change had a greater chance for success. But all efforts are not equal, as some personalities may be more suited for success than others.

Conscientiousness predicts professional and academic success

While psychologists have summarily rejected the idea of an ideal personality type, certain "Big Five" dimensions have been linked to indicators of professional and academic achievement. Conscientiousness and, to a lesser extent, emotional stability have been shown to positively predict numerous adaptive outcomes at work, including salary, number of promotions, occupational status, and job satisfaction (Judge, Higgins, Thoresen, & Barrick, 1999; Judge & Kammeyer-Mueller, 2007; Sutin, Costa, Miech, & Eaton, 2009). Conscientiousness also predicts collegiate success, as indicated by grade point average (for a review of 30+ studies, see O'Connor & Paunonen, 2007) and quality of thesis research (Chamorro-Premuzic & Furnham, 2003). Inspired by these findings, the second study in the current project evaluates a conscientiousness feedback intervention aimed at enhancing academic performance.

Social psychological interventions for academic success

Under the right circumstances, relatively minimal interventions can precipitate remarkable academic outcomes. Wilson (2006; 2011) reviewed a growing set of self-oriented social psychological interventions that have significantly improved academic performance in experimental studies. African-American seventh graders who completed a short writing assignment about their most important values achieved significantly better semester grades compared to students in a control condition (Cohen, Garcia, Apfel, & Master, 2006). This effect was recently replicated in a college physics class (Miyake, Kost-Smoth, Finkelstein, Pollock, Cohen, & Ito, 2010). Other small interventions that have enhanced academic success at the college level include telling students that grades tend to improve after the first year (Wilson & Linville, 1985), that intelligence is malleable (Aaronsen, Fried, & Good, 2002), and that worries about social belonging decrease over time (Walton & Cohen, 2011). The personality feedback interventions employed in the current project are similar in scope. While relatively minimal, their potential effectiveness depends on their ability to alter self-perceptions and motivate behavior in adaptive directions.

Yeager & Walton (2011) recently reviewed mechanisms underlying successful social-psychological interventions in educational contexts, concluding that small interventions can have large effects because they target subjective experience and subtly convey important ideas. In terms of developing effective interventions, the authors provide the following advice:

> To increase the reliability of social-psychological interventions across contexts, researchers and practitioners will have to decide whether to

> customize an intervention and, if so, how to do so to best evoke the intended psychological experience. Making these decisions draws on wisdom in two important areas: (a) *theoretical expertise*, or an understanding of the psychological experience that is targeted by the intervention, and (b) *contextual expertise*, or an understanding of the psychological experiences and backgrounds of students in the local context.   (Yeager & Walton, 2011, p. 25)

Wilson (2006) also advocated new research addressing issues of generalizability across contexts (i.e. among different age groups). Based on theoretical expertise from existing organizational literature, reviewed next, the current research project examines contextual factors (such as individual differences and personal experiences) that are likely to influence the impact of multisource personality feedback.

Multisource (360-degree) feedback interventions for professional success

Self-insight and self-development are valued in organizational settings because they are seen as essential to productivity. Organizations have always encouraged professional development by giving employees feedback about their job performance. When advancing technology made it feasible, organizations began testing the idea that multiple sources of performance feedback might be more effective than a single source. The first known systematic use of multisource feedback was by the German military during World War II (Fleenor & Prince, 1997). Supervisors, peers, and subordinates provided soldiers with feedback about their performance, and this information was also used to determine promotions. Several large companies (most notably General Electric) implemented multisource feedback in the 1960s and experienced subsequent success, inspiring others to follow suit. By

the mid-1990s, it was estimated that ninety percent of Fortune 500 companies employed multisource feedback strategies (Edwards & Ewen, 1996).

The effectiveness of multisource feedback – also called *360-degree feedback* – as a professional development tool has been debated since the early 1990s. Some researchers found that 360-degree feedback significantly improved performance (e.g. Hazucha, Hezlett, & Scheider, 1993; London & Smither, 1995), while others have concluded there is little evidence demonstrating that such feedback consistently results in behavior change or performance improvement (e.g. Waldman, Atwater, & Antonioni, 1998; Seifert, Yukl, & McDonald, 2003). Conway, Lombardo, and Sanders (2001) conducted a meta-analysis of correlational effect sizes and found that reports from subordinates and peers accounted for significant variation in desired objective measures (e.g., production, profit) over and above other sources. In a large sample of store managers, Erickson and Allen (2003) found that multisource feedback ratings were positively related to retail store outcomes, such as sales, revenue, and profit margins. Smither and Walker (2001) found that banks providing branch managers with multisource feedback scored higher on measures of customer loyalty compared to banks that did not employ such strategies. Church (2000) found that managers who received more multisource feedback had lower turnover and higher service quality in their workgroups. A review of 13 longitudinal studies by Smither, London, Flautt, Vargas, and Kucine (2004) found that, despite considerable variability in the magnitude of effect sizes across studies, 11 of the 13 studies found evidence of improvement over time for employees receiving multisource feedback.

Two earlier studies (Smither et al., 1995; Walker & Smither, 1999) found that feedback recipients who initially received low ratings subsequently improved more than those who received higher ratings. Locke and Latham (1990) suggested that feedback is not the direct cause of behavior change; instead, it is the goals that people set in response to feedback. Brutus, London, and Martineau (1999) reported that ratees who received negative feedback were more likely to set goals. Smither, London, and Richmond (2005) found that leaders who received unfavorable feedback had set more improvement goals than others six months later. A longitudinal study of supervisors by Atwater, Waldman, Atwater, and Cartier (2000) found that generally positive evaluative reactions to multisource feedback predicted more performance improvement six-months later. A subsequent study by Atwater and Brett (2005) found that ratees who expressed more positive emotions immediately after reviewing multisource feedback received higher ratings from their subordinates one year later, while negative emotional displays predicted lower ratings. Research has also shown that employees who believe that appraisals will be used for developmental purposes only are more likely to produce positive outcomes compared to those who believe their appraisals will be used for administrative purposes (Bettenhausen & Fedor, 1997).

Many experts now claim that multisource feedback processes are too complex to generalize their effectiveness, which is dependent on the quality of design and administration, as well as the particular motives of ratees (e.g. Bracken, Timmreck, Fleenor, & Summers, 2001; Smither, London, & Reilly, 2005). Compared to single-source feedback (typically from a direct supervisor), potential advantages of

multisource feedback include greater engagement with the feedback process, more

accurate self-knowledge, enhanced professional goal setting, greater motivation to

pursue development goals, and, ultimately, more professional development

(Goldsmith & Underhill, 2001; Lepsinger & Lucia, 2009; Van Velsor, Leslie, &

Fleenor, 1997). The Center for Creative Leadership, a leading authority on 360-

degree feedback, published a "best practices" model advocating the following

feedback administration strategies: 1) compare performance to norms, 2) highlight

the largest self/rater discrepancies, 3) provide item-level feedback, 4) highlight high

and low scores, 5) compare performance to ideals, and 6) emphasize the importance

of performance to job or success (Van Velsor, Leslie, & Fleenor, 1997). I have

integrated elements of these key strategies into the experimental personality

feedback interventions studied in the current project. Figure 1 compares common

sources of professional feedback to the sources of personality feedback utilized in

the current project.

A theoretical model of self-development following multisource feedback

An influential meta-analysis of longitudinal studies published by Smither,

London, and Reilly (2005) examined the amount of performance improvement that

occurs following multisource feedback and the factors that predict such

improvement. The authors, who are among the most prolific and highly-regarded

scholars in the field of organizational psychology, reviewed evidence from 24

longitudinal studies and formulated a theoretical model for understanding factors

predicting self-development following the receipt of multisource feedback (see

Figure 2). The design of the current project is derived in part from this model, so I

have included the rather lengthy passage below, which summarizes key findings and

implications.

> The accumulated evidence points to eight broad factors that play a role in determining the extent of behavior change and performance improvement following multisource feedback: characteristics of the feedback, initial reactions to feedback, personality, feedback orientation, perceived need for change, beliefs about change, goal setting, and taking action. The model begins with the characteristics of the feedback itself. These characteristics influence recipients' initial reactions, which in turn affect goal setting. Goal setting influences taking action, which in turn determines performance improvement. Personality and feedback orientation influence reactions to feedback, goal setting, and taking action. Beliefs about change influence initial reactions and goal setting, and perceived need for change influences goal setting and taking action.
>
> One implication of this model is that multisource feedback should not be expected to lead to substantial performance improvement for all feedback recipients. Another implication of our model is that the effects of some factors on performance improvement are likely to be indirect rather than direct. Unfortunately, research has not yet explored many of the causal links proposed in this model. As a result, we sometimes describe research showing the relationship between a factor in our model and performance improvement even though we propose that the factor has an indirect rather than a direct effect on performance improvement. Future research is needed to test many of the indirect effects proposed in the model. (Smither, London, & Reilly, 2005, pp. 46-47)

The authors go on to say that most of the studies reviewed for the meta-

analysis indicated that feedback recipients were encouraged to set goals, but there

were no measures of the extent to which feedback recipients actually set goals or of

the quality or commitment to any goals that might have been set. They conclude

that future research should collect data concerning the extent to which feedback

recipients set goals after receiving multisource feedback. The research designs and

empirical models I employ in the current project are based largely on the preceding

theoretical model and research recommendations. For instance, I assess

participants' reactions to receiving feedback about their personality as well as the

extent to which they are subsequently motivated to set and pursue self-development goals. Using structural equation modeling (SEM) techniques, I examine direct and indirect effects among these and other key variables in the multisource personality feedback process.

A warning from self-discrepancy theory

Before administering experimental feedback interventions, it is important to consider not only desirable outcomes, but also potential negative results. Higgins' (1987; 1989) influential Self-discrepancy Theory proposes that discrepancies among how we perceive our actual self, how we envision our ideal self, and how others see us are at the root of many negative emotions. Specifically, "The greater the magnitude...[and] accessibility of a particular type of self-discrepancy, the greater the likelihood that its possessor will suffer the kind of discomfort associated with that type of discrepancy" (Higgins, 1987, p. 324). From this perspective, providing honest character feedback that clearly illustrates the magnitude and location of various actual/ideal/other discrepancies might be expected to elicit negative reactions. I predict, however, that when discrepancy feedback is authorized by the individual and presented as an opportunity for self-insight and adaptive development, its negative impact will be attenuated. Participants in my pilot studies had predominantly positive reactions to the process of reviewing multisource personality feedback and setting self-development goals.

Summary

The unique human capacity for self-understanding, while extraordinary, is also limited and biased. Gaining accurate self-insight is difficult and potentially

distressing, so it can be tempting to adopt a laissez-faire attitude toward self-discovery. But accurate self-knowledge is valuable and people have the capacity to change themselves, so it may be worth working to overcome inherent challenges. This goal is endorsed by many organizations, and professional tools for acquiring and interpreting self-oriented feedback from multiple sources are now widespread. The organizational literature provides a theoretical basis for generating personal feedback interventions aimed at facilitating self-insight and motivating intentional self-development. The effectiveness of these experimental strategies will depend on their ability to penetrate defense mechanisms, influence self-perceptions, and precipitate observable downstream effects.

Overview of current research

With the broad goal of motivating adaptive self-development in a collegiate population, I applied "best practices" from organizational literature to inform the modification of *professional* multisource feedback strategies for *personal* applications. A logical place to begin experimentally administering personal feedback was at the theoretical core of the self, the Big Five personality traits. Prone to error and bias, individuals might benefit in predictable ways from discovering how their self-perceptions compared to close others' perceptions of them, as well as how their personality compared to their peers' personalities and to their own personality ideals. These possibilities were examined in Study 1. Using an adapted professional feedback model, my target population is college students. These students have a job of sorts, which is to successfully attend and graduate college. In this organization, professors evaluate the quality of student work and provide

grades as performance feedback. Students, like professionals, may benefit from gaining a clearer understanding of their own characteristic behavior and how it compares to established standards or ideals. A simple but impactful feedback intervention targeting behavior that predicts academic success could lead to better evaluations. This proposition was evaluated in Study 2. I also use a theoretical structural model proposed by Smither, London, and Reilly (2005) to guide empirical structural analyses of causal relationships among key contextual variables and feedback outcomes.

General design and methodology

To facilitate the goals of internal replication and extension, Studies 1 and 2 employed a common interventional design (see Figure 5). In Study 1, I systematically varied whether participants got introspective, normative, or 360-degree personality feedback. In the introspective condition, feedback was self-generated in the traditional manner promoted by philosophers, by thinking about oneself. This condition was intended to provide a standard for comparison to the experimental multisource strategies. Participants in the normative condition received feedback from multiple sources that conveyed mean level personality standards and ideals to which they could compare their own personality. The particular impact of this type of personality feedback has not previously been studied empirically, although it is now a common feature of online personality assessments (e.g. "This is how your extraversion score compares to the average extraversion score"). Participants in the 360-degree feedback condition received feedback from the same normative sources, and they also received personalized

informant feedback about their personality from their friends and family. A combination of normative and informant feedback is standard practice in professional 360-degree feedback programs. I assessed academic performance in Study 2, and while the normative and 360-degree conditions were analogous to those in Study 1, the comparison condition was an untreated control group of students in the same class.

In both studies, existing individual differences were assessed using a pre-feedback survey, followed by the administration of personality feedback, then a post-feedback survey assessing initial reactions to feedback and goal-directedness, and a follow-up survey assessing perceived self-development and personality change six weeks later. The theoretical model proposed by Smither, London, and Reilly (2005) includes the following eight factors that determine the extent of behavior change following multisource feedback: personality, need for change, beliefs about change, feedback orientation, characteristics of feedback, initial reactions to feedback, goal setting, and taking action. Accordingly, Studies 1 and 2 assess a similar set of measures that includes *pre-feedback personality*, *self-satisfaction, need for self-development*, *personality change-efficacy*, *feedback content*, *reaction to feedback*, and *goal-directedness*. Indicators of behavior change included *reported self-development* and *reported personality change*. During Study 1, these two outcomes were assessed solely through self-report. Study 2, however, included additional objective measures of academic performance. The other major difference between the two studies is that participants in Study 1 received feedback and set

goals relevant to all of their "Big Five" personality dimensions, while the feedback and goal setting in Study 2 focused specifically on the domain of conscientiousness.

To enhance interactivity and efficiency, professional multisource feedback is now often electronically administered. With colleagues, I developed an automated, interactive web platform that allows users to facilitate their own multisource personality feedback. This process incorporates prevalent 360-degree feedback strategies and "best practices" for effective feedback administration (Van Velsor, Leslie, & Fleenor, 1997), as listed above. At PersonalityPad.org, users register their own "Personality Pad," a dedicated WordPress dashboard that displays dimension- and item-level feedback generated by the user and by user-selected informants, as well as normative information for comparison, interpretation tools, and detailed instructions. Users are also provided space to take process notes and set personal development goals if they so choose. Feedback results and notes are automatically saved and available upon login. The platform integrates multisource feedback tools into a WordPress website using the advanced functionality of Qualtrics, an online survey generation, delivery, and analysis tool. Qualtrics offers an advanced programming interface that enables a relatively sophisticated level of automaticity, including automatic survey scoring and message distribution. Figure 3 shows a screenshot of the Personality Pad dashboard for a participant in the Big Five Project (Study 1). Figure 4 shows a screenshot of a participant's Personality Pad results for one of fifteen items used in The Conscientiousness Project (Study 2). Data were collected through the Personality Pad website over the course of two successive academic semesters.

Data analyses for each study were conducted in two stages. The first stage entailed between-groups analyses of the three experimental groups that received different types of personality feedback. The second stage entailed predictive modeling of the impact of individual difference factors such as individual experiences and the content of feedback. More specific design information is presented prior to the results of each study below.

Summary of study group attitudes

- 95% of all participants (390/411) reported that the pursuit of self-understanding is important to them, but 37% of this group also said there are parts of themselves they would rather not know about.

- 52% of all participants reported knowing what their friends and family think of them, and 82% said they wanted to know.

- 77% of all participants said they could change their personality if they wanted to.

- 71% of all participants receiving informant feedback said the description of their personality provided by friends and family was more accurate than their own.

- 90% of all participants said they enjoyed reviewing their personality feedback.

General hypothesis

My primary objective is to identify factors influencing the effectiveness of two experimental personal feedback interventions. Specific predictions accompanying the study descriptions below support the general hypothesis that

effectively administered multisource personality feedback provokes goal-directedness and motivates adaptive self-development.

Study 1: The Big Five Project

Data were collected over the course of an academic semester from a group of undergraduate students who received a Big Five personality feedback intervention.

Method

Participants

Participants were 224 undergraduate students at mid-size public university in the mid-Atlantic United States. Eighty-seven were men and 137 were women. The mean age at the conclusion of the project was 19.91. Participants received ungraded course credit for their participation, which was optional. Nine participants began the project but did not complete the follow-up self-development survey, and four others completed the study but had large amounts of missing data. These thirteen participants' data were excluded from all analyses.

Design

To examine differential outcomes among three personality feedback interventions, I employed an interventional design more commonly used by clinical researchers. Participants were randomly assigned to one of three groups, and I systematically varied the type of personality feedback they received. Those in the *introspective* feedback condition (n = 45) generated their own Big Five personality feedback and conducted a focused self-reflection. Participants in the *normative* feedback condition (n = 89) used PersonalityPad.org to generate real-self and ideal-self personality feedback using the Big Five Inventory (BFI) (John, Donahue, &

Kentle, 1991), and they compared these self-reports to mean-level real-self and ideal-self responses from previous Personality Pad users. Those in the *360-degree* feedback condition (n = 90) received the same type of feedback as those in the normative condition, and they also selected friends and family members to provide informant ratings of their personality. The five-bar feedback display employed in the 360-degree condition is shown at the lower left corner of Figure 3.

Personality ratings were obtained from multiple sources using a single measure. The Big Five Inventory (BFI) is a well-established, 44-item, self-report measure assessing the Five Factor Model of personality, which encompasses openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability (John, Donahue, & Kentle, 1991). These factors were discovered through extensive factor analyses, and have been found to be robust across many studies (Digman, 1990). Briefly described:

Openness: Intellectual curiosity, appreciation for novelty, unusual ideas;

>   inventive/curious vs. consistent/cautious

Conscientiousness: Self-discipline, achievement-orientation; efficient/organized vs.

>   easy-going/careless

Extraversion: Outgoingness, seeks energy from the company of others;

>   outgoing/energetic vs. solitary/reserved

Agreeableness: Compassion, cooperativeness; friendly/compassionate vs.

>   cold/unkind

Emotional Stability: NOT prone to negative emotions, depression, anger, or

>   vulnerability; secure/confident vs. sensitive/nervous

In all conditions, a pre-feedback survey assessed individual differences, a post-feedback survey assessed individual reactions to the feedback interventions, and a follow-up survey administered six weeks later assessed reported self-developmental outcomes. Full versions of these surveys are included in the Appendix. The items on each survey were subjected to confirmatory factor analyses to generate more reliable criterion measures that included the variables listed above in the general design section. Responses were obtained using Likert-type scales ranging from 1 (Strongly Disagree) to 7 (Strongly Agree), fixed-response scales ranging from 1 (e.g. No intent to pursue goals) to 10 (e.g. Very high intent to pursue goals), or an open format that allowed participants to list potential self-development goals and perceived behavioral changes. These self-report measures are vulnerable to bias and demand characteristics, so the outcomes of Study 1 are complemented with an objective assessment of academic performance in Study 2. Figure 5 displays the interventional design used in both phases of research.

I assessed participants' personalities at the beginning of the Big Five Project using the 44-item BFI, and I assessed the Big Five again six weeks later, at the end of the self-development survey. To encourage participation in the follow-up session, I chose to administer the much shorter, 10-item version of the BFI (Rammstedt & John, 2007). Using different measures makes it more difficult to make reasonable comparisons between pre-feedback and post-feedback outcomes. However, Rammstedt and John (2007) specifically designed the 10-item BFI to achieve convergent validity with the 44-item BFI, and they report an overall convergent validity correlation of 0.78 between the two measures.

I also examined feedback content. More specifically, I examined patterns in rating discrepancies for those participants who received informant feedback. This type of procedure is known as *gap analysis* in the organizational literature. My goal was to discover if positive or negative personality feedback from friends and family influenced subsequent developmental efforts. For instance, is it better to find out that close others see you as more conscientious or less conscientious than you see yourself? The organizational literature describes these two scenarios as the discovery of hidden strengths and hidden weaknesses, respectively. I performed a basic gap analysis on the feedback data to ascertain how such issues impact the interpretation of multisource personality feedback and subsequent self-development.

Procedure

Participants assigned to the 360-degree feedback condition were sent a link to the Personality Pad website and instructed to register. All subsequent feedback generation and interpretation procedures were conducted at PersonalityPad.org, although participants were encouraged to contact the experimenter with questions or problems. Upon logging in, they provided informed consent and completed a pre-feedback survey assessing demographic information and attitudes toward self-knowledge, self-development, and personality change. Participants then responded to a modified version of the BFI (John, Donahue, & Kentle, 1991) that contained 88 questions rather than the typical 44 because they responded to each item twice, first reporting how they actually are, and then reporting how they would ideally like to be. This process facilitated the generation of feedback contrasting the "real self"

with an "ideal self." Next, participants provided names and email addresses for three or more friends and/or family members to provide informant ratings. These individuals received an automatically generated email from the participant describing the project and requesting their help. After providing informed consent, they followed a link to the 44-item BFI and were instructed to complete the survey *about the person who had sent them the email*. Informants were also told that their responses would be averaged with numerous other responses and therefore remain anonymous. Upon submitting their assessment of the participant, informants were automatically sent an invitation to participate in the Personality Pad feedback process themselves. Data from informants and others who chose to participate were not used in the current project. Once at least three informants responded, participants were able to view their feedback on their Personality Pad dashboard.

The main dashboard screen displayed multisource feedback for each of the Big Five dimensions. Sources of feedback included self-generated "real self" and "ideal self" scores, mean-level informant (friends and family) scores, and mean-level "real self" and "ideal self" scores based on reports from previous participants (to provide a means for peer-group comparison). Feedback was displayed in a bar chart format commonly used in professional 360-degree feedback applications. Instructions on the same screen guided participants through the process of interpreting their dimension-level feedback. Next, participants were instructed to use arrow keys or a drop-down menu to scroll through their item-level feedback. The sources of feedback described above were provided in the same format for *each* of the 44 items on the BFI. Feedback for each item was displayed on a separate

screen within the larger dashboard. Figure 3 depicts a screenshot of the item-level

feedback display. Participants were instructed to pay particular attention to large

discrepancies among ratings from different sources. They were encouraged to use a

"Personality Notepad" area on the dashboard to take notes and record potential

development goals. There was no time limit, and participants could log off and log

back in later without losing their notes or data. After fully reviewing their

personality feedback, they responded to a survey assessing their reactions to the

feedback process, perceived gains in self-knowledge, and motivation to set and

pursue self-development goals.

Six weeks later, participants received a link to a survey that reassessed their

personality using a 10-item version of the BFI (Rammstedt & John, 2007). They also

reported perceived changes in their own behavior, self-knowledge, and personality

as well as final reactions to the project. Full versions of the three surveys assessing

individual differences (pre-feedback), individual experiences (post-feedback), and

reported self-development (six weeks later) are included in the Appendix.

Participants in the normative condition followed a procedure identical to

those in the 360-degree group, with the following major difference: They did not

request, receive, or interpret informant feedback. Their Personality Pad dashboard

presented personality feedback in the same format, except that all references to

informant feedback were absent from the instructions and bar graph displays. The

feedback administered to this group is considered normative because it is derived

from sources conveying typical and ideal personality standards. These participants'

feedback included their self-generated "real self" and "ideal self" BFI ratings as well as mean-level "real self" and "ideal self" ratings from previous participants.

Participants in the introspective condition did not use Personality Pad and did not generate multisource personality feedback. Instead, they were provided with a link to an online Qualtrics survey, where they provided informed consent and took the same pre-feedback survey as the other two groups. They then completed the BFI (John, Donahue, & Kentle, 1991) before reading background information about the Big Five model of personality, as well as definitions for each dimension. Next, participants received dimension-level Big Five feedback showing their self-reported location on each Big Five continuum (e.g. anchored by "highly introverted" at one end and "highly extraverted" at the other). On the same screen, they were then presented with the following instructions:

> For the next 15 minutes or so, think about how your *actual* personality (depicted above) differs from your *ideal* personality (how you would like it to be). How would you change each of your "Big Five" traits if you could? In other words, based on your own ideals or goals, *how could you motivationally develop your own personality*? Please take notes in the space below while you reflect, and please do not proceed to the next page until at least 15 minutes have passed.

I advocated 15 minutes or more of introspection to achieve a degree of time equity among the three conditions. In pilot testing, participants spent an average of about 15 minutes reviewing their multisource feedback using Personality Pad. After introspecting and taking notes, participants completed a survey measure analogous to those used in the other two conditions, reporting perceived gains in self-knowledge, motivation to set and pursue specific self-development goals, and

reactions to the feedback process. Six weeks later, they were sent a link and took the self-development survey.

Predictions

<u>Group differences.</u> Organizational research illustrates the benefits of effectively administered multisource performance feedback (e.g. Goldsmith & Underhill, 2001; Smither, London & Reilly, 2005; Van Velsor, Leslie, & Fleenor, 1997). On this basis, I predicted that, compared to participants in the introspection condition, those who received multisource personality feedback in the normative and 360-degree feedback conditions would report (1) more goal-directedness after reviewing their feedback and (2) more changes in their own behavior and personality six weeks later. Compared to participants in the normative condition, those in the 360-degree condition were expected to report significantly higher scores on these measures due to the added influence of informant feedback.

<u>Individual differences.</u> A study of engineering students found that trait-level conscientiousness and openness were positively related to performance improvement after receiving peer feedback from classmates (Dominick, Reilly, & Byrne, 2004). Extraversion and openness have been positively linked to the productive use of negative feedback (Smither, London, & Richmond, 2005). Based on these findings, I expected pre-feedback measures of conscientiousness, openness, and extraversion to predict more goal-directedness and stronger developmental outcomes. Based on their review of longitudinal feedback studies, Smither, London, and Reilly (2005) report that participants with low levels of desire or efficacy for self-development can be expected to exert little effort to change their behavior after

receiving multisource feedback. Therefore, I expected the pre-feedback measures of *need for self-developme*nt and *personality change efficacy* to positively predict *goal-directedness, reported self-development,* and *reported personality change* in both multisource feedback conditions. Funderburg and Levy (1997) found that ratees with higher self-esteem had more positive reactions to the 360-degree feedback processes. In a large military sample, higher core self-evaluations predicted higher satisfaction and goal commitment following performance appraisals (Kamer & Annen, 2010). Accordingly, I expected *self-satisfaction* (i.e. contentedness) to positively predict *reaction to feedback* and *goal-directedness*.

Individual experiences. As reviewed above, Atwater and colleagues reported that positive initial reactions to multisource feedback predicted more performance improvement, while negative reactions had the opposite effect (Atwater & Brett, 2005; Atwater et al., 2000). In Smither, London, and Reilly's (2005) theoretical model (Figure 2), reactions to feedback are expected to have a direct effect on goal setting. Based on these findings, I predicted that *reaction to feedback* would positively predict *goal-directedness* in both multisource conditions, and that this effect would be stronger in the 360-degree condition due to the added impact of informant feedback. Smither, London, and Reilly's (2005) model also predicts that higher degrees of goal setting behavior and other constructs related to goal-directedness will lead participants to take action and improve their performance following multisource feedback. Accordingly, I expected *goal-directedness* to be a positive predictor of *reported self-development* and *reported personality change* in both multisource feedback conditions, and, in this case, I did not expect differences

between conditions.

Feedback content. For all of the Big Five domains, the vast majority of participants reported higher "ideal self" scores than "real self" scores. In other words, most wanted to be more open to experience, conscientious, extraverted, agreeable, and emotionally stable than they currently were. Organizational researchers report that employees who receive negative feedback are more likely to set goals and improve their performance compared to those who receive positive feedback (Brutus, London, & Martineau, 1999; Smither et al., 2005; Walker & Smither, 1999). On this basis, I predicted that participants whose domain-level informant ratings were lower than their self-ratings would typically express more goal-directedness and ultimately report more self-development compared to those whose informant ratings were higher than their self ratings.

Results

The results of three stages of analysis are presented below. First, the survey items were factor analyzed to generate more reliable measures. Next, potential differences among the experimental feedback groups were assessed. Finally, a series of predictive models were tested to examine the causal relationships among key variables.

Factor Analysis

The survey items were intended to assess key variables identified in Smither, London, and Reilly's (2005) model of behavior change following multisource feedback (Figure 2). To determine if the desired latent variables contributed to common variance within the pre-feedback, post-feedback, and self-development

surveys, a confirmatory factor analysis was performed on participants' responses to each of the three sets of items. Because the underlying factors were likely to be intercorrelated and the data were relatively normally distributed, Maximum Likelihood extraction with oblique (oblimin) rotation was used to estimate factor loadings.   This method is preferable to the more commonly employed Principle Components Analysis (PCA) method, which is a simpler data reduction procedure computed without regard for the underlying structure of the latent variables (Costello & Osborne, 2005). I initially followed the Kaiser-Guttman rule of retaining factors with eigenvalues greater than one and then used the scree plots to inform subsequent decisions. I also employed the common practice of identifying items with common factor loadings at or above 0.30.

Individual difference survey (pre-feedback)

Three factors had eigenvalues greater than one and the scree plot indicated that additional (post-elbow) factors accounted for minor amounts of variance. The largest factor accounted for 23.86% of the total variance but included only the following two items: "A person's personality usually stays the same during his or her adult life," and "I can change parts of my personality if I want to." While the use of factors with fewer than three component items is generally not recommended, I chose to retain this factor because the items explained a relatively large amount of variance and clearly stood apart from the other items. This factor was labeled *personality change efficacy*. The second largest factor accounted for 19.77% of the total variance and included the following five items: "I am happy with the person I am now," "I understand myself," "Physically, I am in good health," "Mentally, I am in

good health," and "I don't think about self-improvement because I am satisfied with the person I am now." This factor was labeled *self-satisfaction.* The third factor accounted for 10.72% of the total variance and included the following three items: "The pursuit of self-improvement is important to me," "The pursuit of self-knowledge is important to me," and "I spend a lot of time thinking about the kind of person I am." This factor was labeled *need for self-development.* While the second and third items in this factor may not seem to clearly represent self-development, the pursuit of self-understanding is a core self-developmental process, as one actively and intentionally develops his or her sense of self.

Individual experience survey (post-feedback)

Three factors had eigenvalues greater than one. The largest factor accounted for 33.64% of the total variance and included the following three items: "Based on the feedback I received during this study, I have some personal goals in mind," "How likely are you to pursue a personal change based on what you learned about yourself during this study?" and "How much did you learn about yourself during this study?" The factor also included a fourth survey measure, the number of self-development goals listed by participants. This factor was labeled *goal-directedness*, defined generally as the degree to which one is aimed toward a goal or toward the completion of a task (Merriam-Webster, 2012). The second factor accounted for 19.78% of the total variance and included the following four items: "How did you feel about yourself after reviewing your personality feedback report?" "Reviewing my personality feedback report made me feel uncomfortable" (reverse scored), "Overall, I think the information I received on my personality feedback

report was accurate," and "I enjoyed reviewing and interpreting my personality feedback report." This factor was labeled *reaction to feedback*. The third factor accounted for 12.18% of the total variance, was beyond the elbow on the scree plot, and included only two items. This factor was not retained.

Self-development survey (follow-up)

Two factors had eigenvalues greater than one. The largest factor accounted for 40.53% of the total variance and included the following five items: "How likely are you to continue to pursue personal change(s) based on what you learned about yourself during this study?" "How much did you learn about yourself (overall) by participating in this study?" "I still think about the personality feedback I received during the Big Five Project," "Overall, how did participating in the Big Five Project make you feel about yourself?" and "Because of the personality feedback I received during the Big Five Project, my personality has changed." These items encompassed numerous possible latent constructs, so specific commonalities were difficult to ascertain. The factor appears to broadly represent the perceived impact or general effectiveness of the intervention. I was primarily interested in assessing motivated changes in behavior, however, and so I chose to exclude this fuzzy factor as a criterion measure in the subsequent analyses in favor of a second factor that more clearly represented self-development. This second factor accounted for 26.43% of the total variance and included the following two items: "Because of the feedback I received during the Big Five Project, I have intentionally altered my behavior," and "I think other people have noticed changes in my behavior since I participated in the Big Five Project." The factor also included a third survey measure, the number of

behavioral changes listed by participants. This factor was labeled *reported self-development*.

To create comparable scores, the item scores in each factor were summed and then divided by the number of items in the factor to retain a common scale (1-7). In the case of the two factors that included either the number of goals or the number of changes reported by participants, these scores were transformed from a six point scale (0-5) to a seven point scale (1-7) before summing to equalize the influence of individual items on composite factors.

Group differences

First, a series of one-way ANOVA (analysis of variance) tests were conducted to assess potentially significant differences among principle interventional outcomes reported by the three experimental groups. To determine the particular location of significant effects, omnibus tests were followed up with Tukey's HSD post hoc analyses. Second, ANCOVA (analysis of covariance) tests were conducted using the pre-feedback individual difference measures as covariates, which allowed me to compare outcomes reported by the two multisource feedback groups while accounting for the influence of existing individual differences. Assumptions of ANCOVA testing include equality of regression slopes and error variances across groups. These assumptions are vulnerable to unequal group sizes (Hamilton, 1973; Levy, 1980), so I was not able to include the introspective group in the ANCOVA analyses, as it was approximately half the size of the multisource groups and precipitated consistent assumption violations. The homogeneity of variance assumption for ANOVA is not as sensitive to unequal group sizes, and all of the

three-group results presented below represent analyses that produced

nonsignificant Levene's test statistics.

Individual differences

   One-way, between-groups ANOVAs were conducted to assess mean-level

individual differences among the introspective, normative, and 360-degree feedback

conditions. No significant differences were expected on these pre-feedback

measures, reflecting the random assignment to conditions. There were no

significant differences among conditions on the individual difference factors *need*

for self-development, F(2, 208) = 0.52, *p* = ns, and *personality change efficacy, F*(2,

205) = 0.45, *p* = ns. The omnibus test for *self-satisfaction* was significant, *F*(2, 208) =

3.42, *p* < 0.05, η^2 = 0.03. Tukey's HSD post hoc tests revealed that those in the

introspective group (*M* = 4.98, *SD* = 0.80) reported being significantly more satisfied

with themselves compared to the 360-degree group (*M* = 4.59, *SD* = 0.79). The

normative group did not differ from either of the other two groups. A series of

ANOVA tests was also conducted on the pre-feedback personality scores. The three

experimental groups did not differ significantly on any of the Big Five personality

dimensions.

Individual experiences

   A one-way, between groups ANOVA was conducted to compare *reaction to*

feedback scores in the introspective, normative, and 360-degree feedback

conditions. The omnibus test not was not significant, *F*(2, 205) = 0.75, *p* = ns,

indicating that the three groups did not differ in terms of their evaluative (positive

vs. negative) reaction to reviewing and interpreting their personality feedback.

Another one-way, between groups ANOVA was conducted to compare the three groups on *goal-directedness*. The omnibus test was significant, $F(2, 206) = 5.76$, $p < 0.01$, $\eta^2 = 0.05$. Tukey's HSD post hoc tests revealed that the 360-degree feedback group ($M = 4.57$, $SD = 0.87$) reported being significantly more goal directed than the introspective group ($M = 3.99$, $SD = 1.02$) and being marginally significantly more goal directed than the normative feedback group ($M = 4.27$, $SD = 0.95$). The goal-directedness of the normative group did not differ significantly from that of the introspective group. To clarify this finding, an additional ANOVA was conducted using the number of potential self-development goals listed by participants as the criterion measure. The omnibus test was significant, $F(2, 209) = 8.29$, $p < 0.001$, $\eta^2 = 0.07$. Tukey's HSD post hoc tests revealed that the 360-degree group ($M = 2.31$, $SD = 1.73$) listed significantly more goals than the normative group ($M = 1.40$, $SD = 1.60$) and the introspective group ($M = 1.30$, $SD = 1.36$). The normative and introspective groups did not differ.

Reported self-development and personality change

A one-way, between groups ANOVA was conducted to compare scores on *reported self-development* in the introspective, normative, and 360-degree feedback conditions. The omnibus test was significant, $F(2, 208) = 13.31$, $p < 0.001$, $\eta^2 = 0.12$. Tukey's HSD post hoc tests revealed that participants in the 360-degree group ($M = 4.28$, $SD = 1.06$) and normative group ($M = 4.12$, $SD = 1.21$) reported significantly more self-development compared to those in the introspective group ($M = 3.22$, $SD = 0.88$), but did not differ significantly from one another.

A composite measure of reported personality change was computed by subtracting participants' rescaled pre-feedback BFI-44 scores from their follow-up BFI-10 scores in each of the Big Five domains, and then summing the absolute values of these differences. The resulting scores ranged from 1 to 15 with a mean of 6.16. A one-way ANOVA was conducted to compare this indicator of *reported personality change* across the three feedback groups.   The omnibus test was significant, $F(2, 209) = 11.36$, $p < 0.001$, $\eta^2 = 0.10$. Tukey's HSD post hoc tests revealed that participants in the 360-degree group ($M = 6.68$, $SD = 2.56$) and normative group ($M = 6.42$, $SD = 2.66$) reported significantly more personality change compared to those in the introspective group ($M = 4.48$, $SD = 2.00$), but did not differ significantly from one another. A final one-way ANOVA was conducted using the score on the single item "Because of my participation in the Big Five Project, my personality has changed." The omnibus test was significant, $F(2, 208) = 10.80$, $p < 0.001$, $\eta^2 = 0.11$. Tukey's HSD post hoc tests revealed that participants in 360-degree group ($M = 4.11$, $SD = 1.38$) and normative group ($M = 3.93$, $SD = 1.51$) reported significantly more personality change compared to those in the introspective group ($M = 2.90$, $SD = 1.13$), but once again did not differ from one another.

ANCOVA analysis of multisource feedback effects

The ANOVA analyses above revealed only one interpretable difference between the two multisource feedback conditions, a marginally significant difference in *goal-directedness* that was driven by a significant difference in the number of self-development goals listed after reviewing feedback. An ANCOVA was

conducted to determine if this effect remained significant after controlling for individual differences. The test was significant $F(1, 162) = 11.81$, $p < 0.01$, partial η^2 = 0.07, indicating that the 360-degree group ($M = 2.31$, $SD = 1.73$) listed significantly more self-development goals than the normative group ($M = 1.40$, $SD = 1.60$), even after accounting for individual differences in *self-satisfaction*, *need for self-development*, and *personality change efficacy*.

A series of five ANCOVA tests were conducted compared the 360-degree and normative feedback conditions on follow-up Big Five personality scores while controlling for the influence of pre-feedback Big Five personality scores. Dimension-level tests of extraversion, openness, agreeableness, and emotional stability were nonsignificant. The test of conscientiousness was significant, $F(1, 169) = 10.80$, $p < 0.01$, partial $\eta^2 = 0.04$, indicating that after accounting for differences in pre-feedback conscientiousness scores, participants who received 360-degree feedback ($M = 5.84$, $SD = 0.93$) reported being significantly more conscientious six weeks after the intervention compared to those who received normative feedback ($M = 5.44$, $SD = 0.89$).

Predictive models

I used maximum likelihood estimation within the AMOS 5.0.1 structural equation modeling (SEM) program to examine the relationships among the principle variables observed during Study 1. A series of path models were tested according to the methods described by Kline (2010). In the absence of latent variables, as in the models identified here, SEM provides the same results as path analysis; however, unlike a series of linear regression equations without using the SEM technique, the

simultaneous nature of SEM-based path analysis provides the direct and indirect effects of exogenous variables on outcome variables while incorporating the intermediate variable(s) (Bollen, 1989).

Results of the preceding between groups analyses revealed that, as expected, the introspective feedback intervention generally produced significantly weaker effects compared to the two multisource feedback interventions. The introspective condition was included in Study 1 to provide a comparative baseline for the normative and 360-degree conditions, and I am primarily interested in assessing the effectiveness of multisource feedback strategies. Furthermore, the introspective group had under half as many participants (n = 40) as the multisource groups, which is not sufficient for SEM techniques. For these reasons, the introspective group was excluded from the following path analyses, and I focused instead on conditional differences in the effectiveness of normative and 360-degree personality feedback.

Model modification

Initially, I tested a fully saturated empirical model that represented my predictions about the causal associations among the set of observed variables (see Figure 6). Exogenous predictors included the independent variable *feedback type* (normative vs. 360-degree) and the three factored individual difference measures *self-satisfaction, need for self-development*, and *personality change efficacy*. Endogenous variables included *reaction to feedback* and *goal-directedness* in intermediate, potentially mediating roles and *reported personality change* and *reported self-development* as observed outcomes. Because all possible relationships

were allowed in the initial model, a probability level could not be calculated for the chi-square value. A second goodness-of-fit index, root mean squared error of approximation (RMSEA), suggested model revision with a value of 0.182, where a value of 0.08 or less is indicative of good model fit (Hu & Bentler, 1999). The initial model was modified through a step-by-step process in which non-significant paths were trimmed one at a time, and the model reanalyzed after each trimming, until all paths were significant and the model demonstrated good fit. Through this process, two of the exogenous variables, *feedback type* and *personality change efficacy,* were eliminated from the model. The final parsimonious model is demonstrated in Figure 7. Goodness of fit statistics for the parsimonious model indicated that it was reasonably consistent with the data. The chi-square test was still marginally significant (χ^2 = 12.00, *df* = 6, *p* = 0.062), but this is not uncommon for models with acceptable fit, and the GFI value of 0.98 and CFI value of 0.96 both exceeded the 0.95 standard for good fit (Hu & Bentler, 1999). The RMSEA value of 0.076 and TLI value of 0.90 both indicate marginally good fit because they were very close to the suggested thresholds of < 0.08 and > 0.90, respectively (Hu & Bentler, 1999). The PCLOSE statistic represents the results of a one-sided test of the null hypothesis that the RMSEA equals .05, indicating a close-fitting model. Because this test was not significant (*p* = 0.20), it can be concluded that the fit of the parsimonious model is "close," exhibiting a small amount of specification error (Kenny, 2011). Overall, the fit indices suggest that the model fits the data acceptably, although not exceptionally, well.

The combined effect of the two remaining exogenous variables, *self-satisfaction* and *need for self-development*, accounted for 28% of the total variance in *goal-directedness* ($R^2 = 0.28$). *Need for self-development* accounted for just 1% of the variance in *reaction to feedback* ($R^2 = 0.01$). As a group, these four predictors accounted for 20% of the total variance in *reported self-development* ($R^2 = 0.20$) and 18% of the total variance in *reported personality change* ($R^2 = 0.18$).

Direct and indirect effects

Acceptable fit justifies the interpretation of the direct and indirect effects represented in the model.   The two exogenous variables remaining in the parsimonious model, *self-satisfaction* and *need for self-development,* were inversely related ($\beta = -0.26$, $p < 0.01$), but this relationship was modeled as multi-directional, so no conclusions concerning causality could be drawn. *Self-satisfaction* had a direct negative effect on the outcome variable *reported personality change* ($\beta = -0.19$, $p < 0.01$). No indirect paths between these two variables were observed. S*elf-satisfaction* also negatively predicted the intermediate variable *goal-directedness* ($\beta = -0.21$, $p < 0.01$). The other exogenous variable in the parsimonious model, *need for self-development*, exhibited direct effects on both outcome variables, although its influence on *reported personality change* ($\beta = 0.34$, $p < 0.01$) was stronger than its influence on *reported self-development* ($\beta = 0.18$, $p < 0.05$). *Need for self development* was also a significant positive predictor of the intermediate variable *motivation to pursue self development* ($\beta = 0.37$, $p < 0.001$) and was marginally positively predictive of the other intermediate variable *reaction to feedback* ($\beta = 0.12$, $p < 0.10$). *Reaction to feedback* positively predicted *goal-directedness* ($\beta = 0.20$, $p < 0.01$)

but had no direct impact either of the outcome variables. *Goal-directedness*

positively predicted *reported self-development* (β = 0.34, p < 0.001) but was

unpredictive of *reported personality change*. In the parsimonious model, the

exogenous variables *self-satisfaction* and *need for self-development* are both

indirectly related to *reported self-development* through *goal-directedness. Need for*

self-development is indirectly related to *goal-directedness* through *reaction to*

feedback, and *reaction to feedback* is indirectly related to *reported self-development*

through *goal-directedness.* To more specifically evaluate the nature of the indirect

effects of the intermediate variables on the relationships between the exogenous

individual difference measures and the observed outcomes, a series of mediation

analyses using comparative path models could be conducted. Rather than

continuing to explore the influence of these individual differences, however, I chose

to refocus on my primary goal of investigating the differential effects of normative

and 360-degree personality feedback. As an exogenous predictor, this independent

variable (*feedback type*) was excluded from the parsimonious model, but this does

not necessarily imply null effects. I conducted multigroup moderation analyses to

evaluate the potential for localized effects of *feedback type* within the parsimonious

model.

<u>Moderation by feedback type</u>

Multigroup moderation analyses facilitated the identification of specific

relationships among the set of observed variables that varied according to *feedback*

type (360-degree vs. normative). I reanalyzed the fully saturated empirical path

model using *feedback type* as a grouping variable rather than as an exogenous

predictor. The initial model was modified by trimming paths that were non-significant for both feedback groups, and reanalyzed after each trimming until all paths were significant for at least one of the two feedback groups. The previously examined parsimonious model included only paths that were significant for *both* groups, so the present parsimonious model remained more complex. Specifically, the paths predicting *reaction to feedback* from *self-satisfaction* and *reported personality change* from *reported self-development* were retained because of their unique significance in the 360-degree condition. The paths predicting *reaction to feedback* from *self-satisfaction* and *reported self-development* from *reaction to feedback* were also retained because of their unique significance in the normative condition. The model demonstrated good fit ($\chi^2 = 6.76$, *df* $= 4$, *p* $= 0.15$), GFI $= 0.99$, CFI $= 0.98$, RMSEA $= 0.06$. The TLI value of 0.86 was below the recommended threshold of 0.90, but this index is based on the average size of the correlations in the data and shrinks as parameters are added to a model (Kenny, 2011), so one would expect it to be somewhat low for this type of between-groups analysis.

Analyzing two groups independently created a small sample size issue, which potentially threatens the reliability of the results. However, using the Bentler and Chou (1987) rule of thumb for the ratio of sample size to the number of free parameters, which is 5:1, the 18 free parameters in the model require a sample size of 90 per group. My group sizes (87 and 85) approximate this number. In addition, Kenny (2011) states that models with no latent variables generally require smaller sample sizes. Alternate rules of thumb (e.g. Tanaka, 1987) recommend higher

sample size to free parameter ratios, so I acknowledge that the reliability of the following results may be compromised to some degree.

To determine if *feedback type* significantly moderated the relationships among the observed variables in the model, I used a tool recently created by Gaskins (2011). The traditional method of testing the significance of group moderation within a path model requires a protracted path-by-path comparison. Evaluations of significance are typically based on chi-square difference test comparisons, an indirect method that may be unreliable when applied to smaller sample sizes. Gaskins' (2011) proposes a method using AMOS output pasted into an Excel macro that conducts pairwise comparisons between all possible parameters in the model contrasted by group and computes z-scores based on the magnitude of observed differences. This approach is a direct assessment of the differences in the size of the regression values (Gaskins, 2012). Table 1 summarizes these results and also includes standardized path estimates for both feedback groups. *Feedback type* significantly moderated four causal relationships in the model. The effect of *reaction to feedback* on *reported self-development* was stronger in the normative feedback condition ($\beta = 0.30$, $p < 0.01$) than in the 360-degree feedback condition ($\beta = -0.05$, $p =$ ns). The effect of *reaction to feedback* on *reported personality change*, however, was stronger in the 360-degree condition ($\beta = 0.20$, $p < 0.01$) than in the normative condition ($\beta = -0.07$, $p =$ ns). The effect of *need for self-development* on *goal-directedness* was stronger in the 360-degree condition ($\beta = 0.51$, $p < 0.001$) than in the normative condition ($\beta = 0.24$, $p > 0.05$), and the effect of *need for self-*

development on *reported personality change* was also stronger in the 360-degree condition (β = 0.23, p < 0.05) than in the normative condition (β = -0.03, *p* = ns).

Personality, grade point average, and sex

Pre-feedback BFI-10 scores and sex were not modeled as exogenous predictors in the preceding path analyses because simple correlations showed them to be generally unrelated to the outcome measures. Pre-feedback conscientiousness and emotional stability scores were wholly nonpredictive, and *feedback type* was not a significant moderator. There were, however, significant positive main effects of *extraversion* on *reported personality change* (β = 0.26, *p* < 0.05) and *openness* on *need for self-development* (β = 0.23, *p* < 0.01), and a significant negative main effect of *agreeableness* on *self-satisfaction* (β = -0.17, *p* < 0.05). Sex was not a significant predictor of any outcome measures.

Grade point average (GPA) was excluded from path analyses because of a large amount of missing data due to optional self-report. There were significant negative main effects of GPA on *goal-directedness* (β = -0.25, *p* < 0.05) and *reaction to feedback* (β = -0.33, *p* < 0.05). Again, *feedback type* was not a significant moderator.

Feedback content

Feedback content was excluded from the preceding path analyses because it was relevant only to the 360-degree group. Within the 360-degree group, domain-level *feedback balance* scores were computed to compare the magnitude of discrepancies between self and informant ratings. The goal was to test whether positive or negative deviations in each Big Five domain influenced developmental

processes and outcomes. Computed by subtracting informant reported scores from self reported scores in each domain, a positive *feedback balance* indicated that, compared to their informant raters, participants thought of themselves as more open to experience, conscientious, extraverted, agreeable, or emotionally stable. A negative score indicated lower informant ratings compared to self ratings in one of these domains.

Simple regression models were tested to determine if domain-level *feedback balanc*e scores predicted the endogenous variables in the path models above. In the domain of conscientiousness, *feedback balance* was a significant negative predictor *goal-directedness* (β = -0.29, $p < 0.05$) and a marginally significant negative predictor of *reported self-development* (β = 0.19, $p < 0.10$). In the domain of emotional stability, *feedback balance* was a significant positive predictor of *reaction to feedback* (β = 0.25, $p < 0.05$) and *goal-directedness* (β = 0.30, $p < 0.05$). No other significant relationships among domain level *feedback balance* scores and individual experiences or developmental outcomes were observed.

Summary of findings

The three feedback groups (360-degree, normative, and introspective) did not differ in terms of their evaluative reaction to reviewing personality feedback, but the 360-degree group reported more goal-directedness than the other two groups afterward. This effect was driven by a tendency for those in the 360-degree group to list more potential self-development goals. Both multisource feedback groups reported more self-development and personality change compared to the group that generated their own feedback through introspection, and the 360-degree

group reported relatively larger gains in the domain of conscientiousness compared to the normative group. Among those receiving multisource feedback, higher degrees of self-satisfaction predicted less engagement with the feedback process (as indicated by goal-directedness) and weaker developmental outcomes overall. Conversely, more need for self-development typically facilitated developmental processes, although self-development needs were a stronger predictor of goal-directedness and a stronger predictor of reported personality change in the 360-degree condition. Personality change efficacy was wholly unpredictive in both conditions. Evaluative reactions to personality feedback positively predicted goal-directedness in both multisource feedback conditions, but directly predicted reported self-development only in the normative condition and directly predicted reported personality change only in the 360-degree condition. Reported self-development also predicted reported personality change only in the 360-degree condition. Grade point average and feedback balance scores in the domain of conscientiousness negatively predicted multiple experiential and developmental outcomes, while feedback balance scores in the domain of emotional stability positively predicted reactions to feedback and goal-directedness. Among the Study 1 variables, goal-directedness was the most robust and consistent predictor of desirable feedback outcomes, leading to more reported self-development and reported personality change in both multisource feedback groups. To provide a qualitative complement to these quantitative analyses, Table 2 includes a sample of developmental outcomes listed by participants in response to the item: "Have you noticed specific changes in yourself or your behavior because of the personality

feedback your received? If so, please list these changes below."

Study 2: The Conscientiousness Project

As reviewed above, trait-level conscientiousness consistently predicts academic success (O'Connor & Paunonen, 2007; Chamorro-Premuzic & Furnham, 2003). In Study 2, the scope of multisource feedback was narrowed from all Big Five personality dimensions to conscientiousness only. The primary goal was to motivate students to take action and improve their conscientiousness to a degree that could be observed in objective evaluations of their academic performance. Data were collected over the course of an academic semester from a group of undergraduate university students who participated in a conscientiousness feedback intervention. Study 2 is intended to replicate and extend the results of Study 1, so the methodology is generally parallel. I have noted differences and included shorter versions of the design and procedure sections to avoid unnecessary repetition.

Method

Participants

Participants were 206 undergraduate students enrolled in a class entitled "Problem Solving Approaches in Science and Technology" at a mid-size public university in the mid-Atlantic United States. Eighty-four were men, 122 were women, and the mean age at the end of the project was 18.84. Participants received ungraded course credit in return for their participation, which was optional. Data from four participants were excluded from all analyses because they failed to

complete the follow-up self-development survey and from two others who had a large amount of missing data.

Design

The primary goal of Study 2 is to replicate and extend the self-report-based results of Study 1 by assessing both self-reported *and* objective gains in conscientiousness following a multisource personality feedback intervention. Once again, I employed the interventional design displayed in Figure 4, in which participants were randomly assigned to one of three groups. Those in the *control* condition (n = 45) were enrolled in the same course as active participants, but they did not know about the study or participate in any study-related activities. Participants in *normative* feedback condition (n = 82) used PersonalityPad.org to generate "real self" (but not "ideal self") conscientiousness feedback using a 15-item survey (Goldberg, 1999). They received normative feedback in the form of faculty conscientiousness standards and behavioral advice provided by professors at their university. Those in the *360-degree* feedback condition (n = 79) received the same sources of feedback as those in the *normative* condition, and they also received informant ratings of their conscientiousness from self-selected friends and family members. Like those in Study 1 project, all active participants in Study 2 completed a survey assessing individual differences before the intervention, the survey assessing individual experiences immediately afterwards, and a survey assessing perceived self-development six weeks later.

Rather than basing normative feedback on aggregated user responses, as in Study 1, I displayed mean-level faculty standards for each of 15 items on the

conscientiousness scale (Goldberg, 1999). Prior to the study, a group of 32 faculty advisors at the same university rated each item using the stem "A successful student is someone who…". They also listed specific behaviors that they believe promote or indicate conscientiousness. These suggestions were compiled, edited, and a unique set of faculty advice was displayed with feedback for each item on the Personality Pad dashboard. In addition to the bar chart display and faculty advice, each item-level screen also displayed a Johari widow plotting participants' self-rating against their informant rating in one of the following four quadrants, determined by the faculty standard for that item: 1) Known Strength – The self-rating and the informant rating are both above the faculty standard; 2) Known Development Area – The self-rating and the informant rating are both below the faculty standard; 3) Hidden Strength – The self-rating is below the faculty standard, but the informant rating is above the faculty standard; and 4) Hidden Development Area – The self-rating is above the faculty standard, but the informant rating is below the faculty standard. Figure 4 shows a screenshot of the item-level feedback display for The Conscientiousness Project.

A set of survey measures analogous to those assessed in Study 1 were assessed in Study 2. Building once again from Smither, London, and Reilly's (2005) theoretical structural model of performance improvement following multisource feedback (Figure 2), these measures included *pre-feedback conscientiousness*, *self-satisfaction, need for self-development*, *personality change-efficacy*, *feedback content*, *reaction to feedback*, and *goal-directedness*. Objective indicators of academic performance were also measured, including class *attendance* (out of 28), in-class

participation (total number of comments made), *homework grades* (both pre-feedback and post-feedback totals), *final paper grade*, *final course grade*, and overall *semester GPA*. I also assessed the Big Five personality dimensions before the conscientiousness intervention, and again six weeks afterward, using BFI-10 both times (Rammstedt & John, 2007). The control group was surreptitiously administered the BFI-10 at similar times as part of another class assignment. The professor, teaching assistants, and graders were aware of the research project, but they were blind to condition and to the specifics of the feedback process.

Procedure

Halfway through the academic semester, participants assigned to the *360-degree* feedback condition were sent a link to PersonalityPad.org and instructed to register an account. All subsequent elements of the feedback generation and interpretation process were fully automated through the Personality Pad website, although participants were again encouraged to contact the experimenter with questions or problems. Upon logging in, participants were presented with a link to take the pre-feedback survey and a 15-item measure of conscientiousness (Goldberg, 1999). Participants were asked to provide names and email addresses for three or more well-known friends and/or family members to provide informant ratings. These individuals received an email from the participant describing the project and requesting their help. They followed a link to the conscientiousness scale and responded *about the person who had sent them the survey*. Once at least three informants had responded, participants were able to view their feedback on their personal Personality Pad dashboard.

The main dashboard screen displayed multisource feedback for the overall domain of conscientiousness. Dashboard instructions guided participants through the process of scrolling through their item-level feedback and interpreting results. Apart from receiving a different type of personality feedback, participants adhered to the same procedural guidelines as those in the Big Five Project. Full versions of the pre-feedback, post-feedback, and self-development surveys are included in the Appendix. Participants in the *normative* condition followed the same procedure as those in the *360-degree* group, except they did not request, receive, or interpret informant feedback. Rather than an introspective condition, Study 2 used an untreated control group in the same class to provide a basis for academic comparison with the two treatment groups.

Predictions

Group differences. The Big Five intervention in Study 1 and the conscientiousness intervention in Study 2 employed the same basic treatments and survey measures. Consequently, I predicted a general replication of Study 1 results on the self-reported feedback outcomes, although the narrower scope and purpose of the conscientiousness intervention in Study 2 were expected to result in some degree of disparity among these outcomes. I expected the 360-degree group to again report being more *conscientious* than the normative group six week after the feedback intervention when controlling for the influence of pre-feedback *conscientiousness* scores.

As indicated earlier, organizational evidence has illustrated performance-related benefits of effectively administered multisource performance feedback (e.g.

Goldsmith & Underhill, 2001; Smither, London, & Reilly, 2005; Van Velsor, Leslie, &

Fleenor, 1997). In addition, conscientiousness is a robust positive predictor of

academic performance (for a review see O'Connor & Paunonen, 2007). I predicted

that, compared to participants in the control condition, those who received

multisource conscientiousness feedback in the normative and 360-degree feedback

conditions would perform significantly better across the set of objective academic

outcomes. Because of the added influence of informant feedback, participants in the

360-degree condition were expected to demonstrate relatively larger gains in

academic performance compared to those in the normative condition. I expected

the intervention to have the largest influence on the conscientiousness-oriented

outcomes of class attendance and in-class participation. I expected the intervention

to have a lesser impact on homework and final paper grades, which may reflect

variation in factors like intelligence and prior knowledge.

Individual differences. While the group effects were expected to differ to

some degree, the participants in Study 2 were demographically very similar to those

in Study 1, so I expected them to react to the feedback interventions similarly.

Therefore, I anticipated replicating the individual difference findings from Study 1

and extending them to the objective measures of academic performance. The pre-

feedback personality measures of *extraversion* and *openness* should have positively

predicted *reported self-development* and *reported conscientiousness change*. Because

Study 2 was specifically focused on academic outcomes, I expected pre-feedback

conscientiousness scores to predict higher scores across the set of academic

outcomes (O'Connor & Paunonen, 2007). *Self-satisfaction* was expected to

negatively predict *goal-directedness*, while *need for self-development* should have positively predicted *goal-directedness*, *reported personality change*, and *reported self-development*. I also expected *need for self-development* to positively predict the objective measures of academic performance.

Individual experiences. Based on the results of Study 1, which generally supported Smither, London, and Reilly's (2005) theoretical model (Figure 2), I predicted that *reaction to feedback* would positively predict *goal-directedness*, but would not directly predict the self-reported or objective academic outcomes. I predicted that *goal-directedness* would again emerge as the more robust predictor of self-reported feedback outcomes, and that this influence would extend to observed academic outcomes.

Feedback content. Study 1 data partially supported the prediction that participants whose domain-level informant ratings were lower than their self-ratings would report more goal-directedness and self-development. This prediction was supported in the domain of conscientiousness only, and contrary effects were observed in the domain of emotional stability. I expected *feedback balance* scores for conscientiousness would again negatively predict *goal-directedness* and *reported self-development*, and I expected this inverse relationship to extend to academic performance.

Results

The results of three stages of analysis are presented following the same general format as in Study 1. First, the survey items were factor analyzed to generate more reliable measures. Next, potential differences among the three

experimental feedback groups were assessed. Finally, a series of predictive models were tested to examine the causal relationships among key variables.

Factor analysis

As in Study 1, Maximum Likelihood factor analysis with oblique (oblimin) rotation was used to estimate factor loadings for the Study 2 survey measures. The resulting factors were analogous to those that emerged during the Study 1 factor analyses. This was not surprising, as the demographics of the two study groups and the treatments administered to each were quite similar. The strength of item-level factor loadings varied somewhat from Study 1, but because they were generally quite close, I chose to retain the same items in each factor. This facilitated a degree of continuity between Studies 1 and 2.

Group differences

A series of one-way, between-groups ANOVA tests were computed to assess potentially significant differences among the three experimental groups on the academic and self-reported outcome measures. To determine the particular location of significant effects, omnibus tests were followed up with Tukey's HSD post hoc analyses. As in Study 1, a subsequent series of ANCOVA tests compared outcomes reported by the two multisource feedback groups while controlling for the influence of individual differences.

<u>Academic performance</u>

A one-way, between subjects ANOVA was conducted to compare the effect of conscientiousness feedback on academic performance in the 360-degree feedback, normative feedback, and control conditions. The dependent measure was

attendance, as indicated by the total number of classes missed. The omnibus test was not significant, $F(2,197) = 1.94$, p = ns. Another one-way, between subjects ANOVA was conducted to compare the effect of conscientiousness feedback on the three groups. The dependent measure was in-class *participation* as indicated by the total number of comments made during the semester. The omnibus test was significant, $F(2, 199) = 4.51$, $p < 0.05$, $\eta^2 = 0.04$. Tukey's HSD post hoc analysis revealed those in 360-degree feedback group ($M = 17.18$, $SD = 2.71$) and the normative feedback group ($M = 16.89$, $SD = 3.16$) participated in class more than those in the control group ($M = 15.13$, $SD = 2.21$). Participation rates for the 360-degree feedback group and the normative feedback group were not significantly different.

A one-way ANOVA compared the three experimental groups on the dependent measure *post-feedback homework grade*. The omnibus test was significant, $F(2, 198) = 4.89$, $p < 0.01$, $\eta^2 = 0.05$. Tukey's HSD post hoc analysis indicated that participants in 360-degree group ($M = 16.37$, $SD = 2.29$) achieved significantly higher homework grades after the conscientiousness intervention compared to those in the control group ($M = 14.67$, $SD = 3.56$). The normative feedback group ($M = 15.49$, $SD = 3.10$) did not differ significantly from the 360-degree feedback group or the control group. Another ANOVA was conducted on *pre-feedback homework grades*. The omnibus test was not significant, $F(2, 199) = 1.49$, p = ns. Figure 8 displays mean level homework grades by feedback condition across the semester (before and after the conscientiousness intervention).

Potentially significant group differences on final paper grades were assessed with another one-way, between groups ANOVA test, which was not significant, $F(2, 197) = 0.55$, p = ns. Group differences on *final course grade* were computed using the same type of ANOVA test, and this time the omnibus test was significant, $F(2, 199) = 5.66$, $p = 0.004$. Tukey's HSD post hoc analysis indicated that participants in 360-degree feedback group ($M = 83.90$, $SD = 7.42$) had significantly higher final course grades compared to those in the control group ($M = 78.79$, $SD = 7.97$). The normative feedback group ($M = 81.67$, $SD = 8.63$) trended as predicted, but did not differ significantly from the 360-degree feedback group or the control group.

Survey measures

An ANCOVA test was conducted to compare the 360-degree, normative, and control groups on *follow-up conscientiousness* while controlling for the influence of *pre-feedback conscientiousness*. Like is Study 1, unequal sample sizes among the groups caused Levene's Test for Equality of Error Variance's to achieve significance, $F(2, 195) = 4.23$, $p < 0.05$. Three-group ANCOVA analyses were once again abandoned. Instead, paired-samples t-tests were computed for each group to assess mean-level differences in pre-feedback and follow-up BFI-10 conscientiousness scores. The 360-degree group reported significantly more conscientiousness six weeks after the intervention ($M = 5.54$, $SD = 0.97$) than they reported before it ($M = 4.98$, $SD = 1.04$), $t(76) = 4.73$, $p < 0.001$. The normative group also reported significantly more conscientiousness six weeks after the intervention ($M = 5.51$, $SD = 0.95$) than they reported before it ($M = 5.10$, $SD = 1.01$), $t(75) = 3.57$, $p < 0.001$. The BFI-10 was administered to the control group under the guise of another, unrelated

class project. Conscientiousness scores assessed half way through the semester (M = 5.05, SD = 1.07) were not significantly different from conscientiousness scores assessed again six-weeks later (M = 5.30, SD = 1.02), $t(39)$ = 1.52, p = ns.

A series of ANCOVA tests was conducted to compare the two multisource feedback groups on *reaction to feedback, goal-directedness,* and *reported self-development* while controlling for individual differences in *self-satisfaction, need for self-development,* and *personality change efficacy*. The control group was excluded from these analyses because it did not complete the survey measures. After controlling for individual differences, the two multisource feedback groups did not differ in terms of *reaction to feedback* or *reported self-development.*

Predictive models

To facilitate the potential replication and extension of Study 1 findings, the analysis of Study 2 data followed similar strategies. As in Study 1, the analysis of the structure of the relationships among the principle survey measures used maximum likelihood estimation within AMOS 5.0.1. I also tested a second model comprised of the same exogenous and intermediate endogenous variables, but using objective academic outcomes in place of self-reported outcomes.

<u>Survey model</u>

The analysis of Study 2 data used the same empirical model of survey measures tested in Study 1 (see Figure 6). Successive trimming of nonsignificant paths yielded the parsimonious model shown in Figure 9. The model demonstrated good fit (χ^2 = 6.96, df = 5, p = 0.224), GFI = 0.98, CFI = 0.97, TLI = 0.94, RMSEA = 0.05. The combined effect of the two remaining exogenous variables, *feedback type*

and *need for self-development*, accounted for 15% of the total variance in *goal-directedness* ($R^2 = 0.15$). *Need for self-development* and *goal-directedness* accounted for just 12% of the variance in *reported self development* ($R^2 = 0.12$), and *reported self-development* accounted for 15% of the variance in *reported conscientiousness change* ($R^2 = 0.15$).

Good model fit justified the interpretation of causal effects. The independent variable *Feedback type* (360-degree vs. normative) had a direct positive effect on the intermediate variable *goal-directedness* ($\beta = 0.25$, $p < 0.001$). *Need for self-development* exhibited direct positive effects on *goal-directedness* ($\beta = 0.29$, $p < 0.001$) and on the *reported self-development* ($\beta = 0.22$, $p < 0.01$). *Goal-directedness* had a direct positive effect on *reported self-development* ($\beta = 0.21$, $p < 0.01$), which, in turn, had a positive effect on *reported conscientiousness change* ($\beta = 0.39$, $p < 0.001$). *Feedback type* and *need for self development* predicted *reported self development* indirectly through *goal-directedness*, and *reported conscientiousness change* indirectly through *goal-directedness* and *reported self-development.*

Academic model

I tested another empirical model using objective indicators of academic performance (rather than self-reported survey measures) as predicted outcomes. Measures of academic performance included (1) total number of classes missed (*attendance)*, (2) total number of in-class comments (*participation*), (3) post-feedback *homework average,* (4) *final paper grade*, and (5) *final course grade.* The exogenous and intermediate variables were modeled identically to those in the empirical survey model. Model modification using the same path trimming

technique as above led to the parsimonious model displayed in Figure 10. This model fit the data very well (χ^2 = 4.67, *df* = 8, *p* = 0.793), GFI = 0.99, CFI = 1.00, TLI = 1.00, RMSEA = 0.00. The two remaining exogenous predictors and one remaining intermediate variable were identical to those in the parsimonious survey model. The relationships among these three variables were also essentially unchanged, as *goal-directedness* was positively predicted by *feedback type* (β = 0.26, *p* < 0.001) and *need for self-development* (β = 0.29, *p* < 0.001). *Goal-directedness* was a weak-but-significant predictor of *participation* (β = 0.15, *p* < 0.05), and a slightly stronger predictor of *homework average* (β = 0.25, *p* < 0.001). *Participation* was a positive predictor of *homework average* (β = 0.24, *p* < 0.01). *Final course grade* was strongly predicted by both *participation* (β = 0.15, *p* < 0.05) and *homework average* (β = 0.24, *p* < 0.01). No direct causal relationships were observed among the exogenous predictors and the academic outcomes. Both *feedback type* and *need for self-development* related to *participation*, *homework average*, and *final course grade* only through the mediating effect of *goal-directedness*, which explained 2% of the variance in *participation* (R^2 = 0.02) and 14% of the variance in *homework average* (R^2 = 0.14). The variable *final course grade* is a composite of the other four academic outcomes, so it is not surprising that *participation* and *homework average* explain 69% of its variance (R^2 = 0.69).

<u>Moderation by feedback type</u>

Multigroup moderation analyses using Gaskins' (2011) method was applied to both empirical models above using *feedback type* as a grouping variable rather than as a predictor. No significant interactions by feedback group were observed

with the survey model. There were, however, two unexpected moderating effects within the academic model. *Goal-directedness* was a signficantly stronger predictor of *participation* ($z = -2.18$, $p < 0.05$) in the 360-degree feedback condition ($\beta = 0.30$, $p < 0.01$) than in the normative feedback condition ($\beta = -0.03$, $p = $ ns). *Goal-directedness* was a significantly stronger predictor of *homework average* ($z = 2.03$, $p < 0.05$) in the normative condition ($\beta = 0.36$, $p < 0.001$) than in the 360-degree condition ($\beta = 0.07$, $p = $ ns).

<u>Personality, grade point average, and sex</u>

As in Study 1, the pre-feedback BFI-10 measures generally did not predict the observed outcomes in Study 2, and the independent variable *feedback type* was not a significant moderator. There were, however, two significant main effects. *Reaction to feedback* was positively predicted by the pre-feedback measures of conscientiousness ($\beta = 0.22$, $p < 0.05$) and agreeableness ($\beta = 0.23$, $p < 0.05$).

Self-reported grade point average (GPA) was excluded from Study 2 because I was concerned that in a study of academic performance, reporting one's GPA may prime confounding thoughts or behaviors. *Overall semester GPA* was obtained through the university registrar with participants' permission. These scores reflected the average grade of all courses taken during the semester that students participated in Study 2. *Overall semester GPA* was marginally significantly higher in the two multisource feedback groups than in the control group, but this effect was fully attenuated when I accounted for the influence of *final course grade*. In other words, the differences in overall GPA were driven by the differences in course

grades, as reported above. As in Study 1, sex was not a significant predictor of any

feedback outcomes.

Feedback content

Within the 360-degree group, *feedback balance* scores were computed by

subtracting informant-reported conscientiousness scores from self-reported

conscientiousness scores. As in Study 1, *feedback balance* in this domain was a

significant negative predictor of *goal-directedness* (β = -0.31, p < 0.01), indicating

that negative informant feedback was more likely to motivate goal-directed

behavior than positive informant feedback. A similar effect also applied to one of

the academic performance measures; *feedback balance* was a significant negative

predictor of *participation* in class (β = -0.22, p < 0.05).

Summary of findings

Two experimental groups that received multisource conscientiousness

feedback interventions participated more in class and had better homework grades

compared to an untreated control group in the same class. Although the two

multisource feedback groups were not significantly different in terms of academic

performance, students in the 360-degree group tended to perform best. This trend

led the 360-degree group, but not the normative group, to achieve significantly

higher final course grades than the control group. Based on the results of a very

brief personality test administered before the intervention and again six weeks

afterward, both multisource feedback groups reported significant gains in

conscientious while the scores of the control group did not change. Compared to the

students in the normative group, those in the 360-degree group demonstrated more

goal-directedness after reviewing their feedback. Path modeling results indicate that goal-directedness played a key role in motivating self-developmental action following the multisource personality feedback intervention. In both parsimonious models, the type of feedback administered and the need for self-development were both causally linked to academic performance and reported self-development *only* through the intermediary influence of goal-directedness. Interestingly, goal-directedness predicted in-class participation only in the 360-degree condition and predicted homework grades only in the normative condition. Students who received 360-degree feedback tended to be more goal-directed and participate more in class when informant ratings of their conscientiousness were lower than their self-ratings. Self-satisfaction, personality change efficacy, and evaluative reactions to feedback did not influence the academic or self-reported developmental outcomes assessed in Study 2.

Discussion

A major limitation of the Smither, London, and Reilly (2005) model, as identified by the authors, is a lack of existing knowledge about the hypothesized causal (i.e. direct and indirect) relationships among variables in the model. The predictive modeling techniques employed in the current studies were able to generate this type of evidence. I will discuss the implications of my findings before addressing potential limitations and considering future directions.

Group differences

Study 1 confirmed the prediction that, compared to participants who generated and contemplated their own personality feedback, students who received

Big Five personality feedback from multiple sources would report more self-development and personality change six weeks later. Study 2 extended these subjective developmental outcomes to objective indicators of academic performance. Students who got multisource conscientiousness feedback participated more in class and submitted higher quality homework assignments afterward, leading to significantly higher final course grades in the 360-degree group (M = 83.90) compared to a control group in the same class (M = 78.79). It may seem unremarkable that multisource feedback consistently generated stronger effects than self-generated feedback or no feedback, as participants in the multisource conditions received more self-relevant information and participated in a more elaborate, interactive experience. This situation could lead to a Hawthorne effect in which observed group differences stem from general study characteristics rather than specific features of the experimental manipulation. I will address this important issue, and why I consider it to be a source of strength rather than weakness, in my discussion of potential limitations.

The predicted differences in developmental outcomes between the two multisource feedback groups were largely unsupported by the data. Although the addition of informant feedback led to larger reported gains in conscientiousness in Study 1 and more goal-directedness in Study 2, the normative and 360-degree strategies precipitated similar outcomes in both studies. This general equivalence suggests that the potentially stressful and time comsuming process of soliciting and reviewing informant feedback is not always advisable. In some situations, normative feedback may be sufficient to motivate positive changes in behavior

(Shultz, 1998). The relatively weak effects reported by the introspective group in Study 1 suggest that motivation and self-development are *not* simply a consequence of focusing one's energy inward and on possibilities for self-improvement. Adaptive changes are more likely to be inspired by examining specific elements of one's own personality in comparison to self-relevant norms and ideals.

More subtle distinctions between the multisource conditions were identified through moderation analyses within an SEM framework (Table 1). In Study 1, more positive reactions to feedback led to more reported self-development in the normative condition only and to more reported personality change in the 360-degree condition only. A positive evaluative reaction to informant feedback may feel more significant than a similar reaction to normative feedback, leading one to equate such feedback with real changes in her personality. Positive reactions to normative sources might produce more motivation to pursue self-development while not being sufficiently influential to alter perceptions of personality. Reported self-development predicted the other outcome variable, personality change, in the 360-degree condition only, and the need for self- development was a stronger predictor of goal-directedness only in the 360-degree condition. The last two effects show how the increased potency of 360-degree feedback may have led to generally stronger associations among individual difference variables, intermediary variables, and observed outcomes.

Individual differences

Based on organizational literature linking high self-regard to positive reactions (Funderburg & Levy, 1997) and more goal commitment (Kamer & Annen, 2010)

following performance feedback, I expected self-satisfaction to positively predict positive reactions to feedback and goal-directedness. I did not observe either of these relationships. Conversely, *less* self-satisfaction predicted more goal-directedness in Study 1, an encouraging finding suggesting that participants who were more likely to need self-improvement were more motivated to set and pursue self-development goals after reviewing their personality feedback. The nonsignificance of personality change efficacy as a predictor in both studies eliminates it as a potential stumbling block for self- development. Preconceived notions about the viability of personality development in adulthood had little or no impact on engagement with the personality feedback processes. I expected this was due to most participants declining to associate behavioral change with personality change, but in fact, slightly more agreed than disagreed that their personalities had changed to some degree.

Predictive analyses revealed that, as expected, a pre-existing desire for self-knowledge and self-improvement tends to facilitate personal feedback and development processes. In Study 1, need for self-development positively predicted all four desirable feedback outcomes in the parsimonious model. That is not a particularly surprising finding, but this variable was important to my analyses because I modeled it as a covariate and accounted for its relatively strong effect. More importantly, I was able to confirm that individuals who are intrinsically motivated to pursue self-development can be expected to get more out of the feedback process and express more goal-directed behavior compared to the average participant in the current studies. The PersonalityPad.org website will be made

available to the public after the conclusion of the current project, and this finding

suggests that unsolicited users might report stronger outcomes in general.

Trait-level Big Five personality measures generally supported existing

organizational findings that higher degrees of extraversion, openness, and

conscientiousness predicted better multisource feedback outcomes (Dominick,

Reilly, & Byrne, 2004; Smither, London, & Richmond, 2005). Extraversion positively

predicted reported personality change in Study 1, while conscientiousness and

openness positively predicted reaction to feedback in Study 2. These were all

relatively small effects, and no Big Five measures predicted the more important

individual experience measure of goal-directedness.

Individual experiences

The intermediary factors reaction to feedback and goal-directness were

assessed immediately following the feedback intervention and reflected the

experience and the frame of mind of participants at that time. I focused on these

two variables in particular because they were both assigned key mediating roles in

Smither, London and Reilly's (2005) theoretical model of performance improvement

following multisource feedback (Figure 2). In this model, characteristics of

multisource feedback predict reactions to the feedback, which predict subsequent

goal-directed behaviors, which predict taking action, which, finally, predicts

performance improvement. While the authors readily admit to suffering from a lack

of evidence on the causal relationships among the variables, the model is derived

from a well-conducted review of longitudinal studies and a lot of combined

experience in the field. My data suggest that they were somewhat cavalier in

predicting a linear series of successive effects with no feedback or simultaneous elements. In the current studies, evaluative reactions to personality feedback predicted goal-directedness in one condition only – for those who received normative Big Five feedback. This finding does not necessarily threaten the validity of the proposed organizational model; however, reactions to personality feedback may systematically impact subsequent goal setting and motivation differently than similar reactions to job performance feedback. This could be due to the nature of rater-ratee relationships. While a negative reaction to feedback from professional acquaintances tends to demotivate subsequent improvement (Atwater et al., 2000), a similar reaction to feedback from close friends and family may be harder to dismiss, cause more dissonance, and lead to compensatory action. My finding that negative reactions led to less goal-directedness for those receiving normative Big Five feedback tends to support this explanation, as normative feedback is likely to be easier to dismiss than feedback from close others.

Goal-directedness, on the other hand, emerged playing a critical mediating role in the relationship between multisource personality feedback and adaptive behavior change. This indirect effect was observed in both studies and for both self-reported and objective behavioral outcomes. The parsimonious academic model from Study 2 indicates that the independent variable feedback type and the influential individual difference variable need for self-development are related to academic performance *only* through the influence of goal-directedness. Is demonstrating goal-directed behavior and attitudes immediately after reviewing personality feedback really that important? The modest regression weights and

relatively small amounts of variance explained by goal-directedness suggest that

other important variables are at play. However, these variables are likely to reflect

idiosyncratic variation among individuals, and they are unlikely to be as malleable

and broadly applicable as goal-directedness. Furthermore, goal-directed behavior

may be a linchpin in these and other interventional scenarios because of its

temporal importance. What recipients do immediately after reviewing their

feedback, while its effects are still at their most potent, may be the best predictor of

downstream developmental outcomes. Those who are inspired or strategically

prompted to set achievable goals and declare the intent to pursue these goals may

fare especially well. An interesting possibility which has not been evaluated in a

feedback context is that generating specific implementation intentions (i.e. when

and how a goal will be pursued) during this time would further enhance

developmental outcomes (Gollwitzer, 1999).

Feedback content

The characteristics of informant feedback, as broadly indicated by *feedback

balance* score, were not indirectly predictive of goal-directedness by way of initial

reactions to feedback as predicted by Smither, London and Reilly's (2005) model,

but instead directly predicted goal-directedness in both studies. More specifically,

students whose informant feedback in the domain of conscientiousness was more

negative (revealed more "hidden weakness") were more likely to set goals and be

motivated to pursue these goals compared to those who received more positive

feedback (revealing more "hidden strength"). This finding supports my predictions

and existing evidence in the organizational literature (Walker & Smither, 1999;

Brutus, London, & Martineau, 1999). It also represents an important step in demonstrating the utility of informant feedback for developmental purposes. Within the bias-centric models of self-perception that continue to dominate social psychology, however, this effect may be counterintuitive. Self-verification theory (Swann, 1983), self-discrepancy theory (Higgins, 1987; 1989), self-perception theory (Bem, 1972), and the many self-serving biases detailed by Dunning (2005) would likely predict that receiving feedback from close others that poses a direct threat to the integrity of cherished self-views while also exposing previously unknown self-discrepancies would trigger all manner of bias-inducing defense mechanisms as well as a predictably negative emotional reaction. The results of both current studies support my hypothesis that when potentially threatening discrepancy feedback is authorized by the recipient and framed as an opportunity for self-insight and -improvement, its negative impact may be attenuated or even reversed. Implied in this hypothesis is the importance of effective feedback administration. It is important that recipients are not overwhelmed with negative information (Smither & Walker, 2004).   Bollich, Johannet, and Vazire (2011) agree that individuals receiving negative feedback should be allowed time to process it effectively and on their own terms.

The positive influence of negative feedback was far from universal, however. I observed this effect only within the domain of conscientiousness, and in Study 1 a contrasting effect was observed within the domain of emotional stability. Why would discovering that close others see one as *less* conscientious and *more* emotionally stable than one sees oneself both motivate self-development? I suspect

this is due to intrinsic differences between these two personality domains. Conscientiousness is a part of one's personality that may be readily improved through goal setting and intentional behavioral change, as demonstrated by the current project and by organizational evidence. Improving one's own emotional stability (i.e. becoming less neurotic) without professional help may be far more difficult, however. I suspect that to some degree, participants were aware of these and other differences in self-developmental potential among the Big Five domains. Potentially threatening (i.e. negative) feedback may motivate goal setting and self-development only when an individual believes she can enact positive change. In the absence of such efficacy, self-developmental efforts may be trumped by self-defensive mechanisms. The contrasting effect I observed could have emerged because conscientiousness was perceived as the most changeable Big Five domain, while emotional stability was perceived as the least changeable. Less consistent perceptions of the malleability of the other three domains may have precipitated the non-significant relationships between feedback content and developmental outcomes.

Self-development

Among the more intriguing challenges inherent to the current project is choosing a responsible strategy for interpreting reported self-development. Undoubtedly, demand characteristics and self-serving biases may lead participants to intentionally or unintentionally exaggerate the magnitude of intentional behavioral changes. In the absence of complementary objective measures, relying on highly subjective self-report data is a risky strategy. Accordingly, the self-

reported outcomes in Study 1 are compelling only when paired with objective academic outcomes in Study 2. That being said, self-report data should not be discounted. Using these data to inform predictive models may be a more productive strategy than assessing absolute effect sizes or group differences. The magnitude of reported effects is probably unreliable, but the validity of emergent relationships among variables is less likely to suffer from some amount of exaggeration, particularly if the bias is relatively evenly distributed throughout the data.

Self-reported developmental gains may have intrinsic value for an entirely different reason as well. In recent work on the revision of self-narratives in the interest of adaptive self-development, Wilson (2011) recommends a *do good, be good* strategy, in which changes in behavior precede changes in self-perception. Upon observing our own good behavior, we may be compelled to revise our personal narratives accordingly. Walton and Banaji (2004) found a similar effect inherent to verbal behavior. How people described their attitudes affected the strength, quality, and stability of those attitudes. In an interview, Walton (2004) reported, "Our research suggests that people come to be who they say they are." If this is the case, then claims of self-development may precipitate actual self-development. When participants observe themselves making claims about changes in their own character, they may be compelled to revise their self-narratives and behavior accordingly. From this perspective, more initial exaggeration of self-development may be expected to precipitate more real self-development afterward. I might like to advocate a *say so, be so* strategy. Revisiting the sample of behavioral

changes reported by participants in Study 1 (Table 2), one can imagine how the *say so, be so* effect might apply in each case.

Personality change

The reported personality changes apparent in both studies are intriguing but demand skepticism. While it seems unlikely that enduring personality traits are being fundamentally altered by such minimal interventions, the variability I observed in self-reports and across pre- and post-intervention assessments may have implications for my interventional approach in particular and for the science of personality assessment in general. What should we make of the reported personality changes? Are these interventions really causing participants to become more conscientious people, or is this bias and imagination at work? One possibility is that participants are reporting imagined or intentionally fabricated behavioral changes because of demand characteristics, self-serving bias, or some other confounding process, but that they have not really improved their conscientiousness or changed their personality. A second possibility is that participants are reporting real behavioral changes, and have actually improved in their conscientiousness to some degree, but that this change is not indicative of real personality change. A third possibility is that participants are reporting real behavioral changes, have actually improved their conscientiousness, and this change represents real change in their personality. The observed group differences in objective indicators of academic performance indicate real differences in behavior, and to the degree that academic performance is a valid proxy for conscientiousness, I believe these participants have indeed become more conscientious to some degree. The critical

issue now becomes the relative durability and generalizability of behavioral change. If multisource personality feedback motivated students to extra effort over a short period of time in the context of one class only, it would be difficult to justify a claim of personality change. In contrast, demonstrating consistent changes in behavior over a relatively long period of time would provide convincing evidence for personality change. These data may be exceedingly hard to come by, however, not just because they require a longitudinal design, but also because characteristic behaviors that reflect personality vary with situational and motivational contexts (Mischel & Shoda, 1995). Further complicating the situation are stalwart proponents of trait-based models of personality who continue to insist that traits change *only* in response biologically-based processes of intrinsic maturation (Costa & McCrae, 2006). From this perspective, intentional personality development and the assessment of personality change in adulthood are lost causes.

If one adopts a holistic view of personality, however, a more readily observable set of conditions emerges which may be sufficient to indicate true change. McAdams and Pals (2006) recently proposed a new integrative science of personality based on understanding the whole person rather than relying solely on a limited number of dispositional traits. Personality is seen as the individual's unique variation on human nature, expressed as a continually developing network of dispositional traits, life narratives, and characteristic adaptations that include motives, goals, plans, strivings, and values. From this perspective, one needs only to show a change in these contributing factors to demonstrate real personality change. Furthermore, the model published by McAdams and Pals (2006) hypothesizes direct

effects of characteristic adaptations and life narratives on dispositional traits. Multisource personality feedback, then, should have a direct impact on personality development by influencing motivational and goal-setting processes, and an additional indirect influence on dispositional traits by way of these processes. The path models presented in the current project provide some empirical evidence to support this new model of personality. In both Study 2 models, for instance, the independent variable feedback type predicts goal-directedness, which in turn predicts perceived or observed conscientiousness.

Potential limitations

The Hawthorne Effect is the tendency for some people to work harder or perform better simply because they are participants in an experiment. This can present serious problems for researchers whose goal is to draw meaningful conclusions about the particular effects of specific manipulations. In the case of interventional strategies, however, the primary goal is usually to motivate changes in behavior, and the implications of a Hawthorne Effect in such situations may be strikingly different. Even if the outcomes of the current project are the result of such an effect, which to some extent I expect they are, this doesn't necessarily render the interventions less meaningful or useful. Because the primary purpose of these interventions is to focus attention on the self, motivate action, and change behavior (rather than simply to observe a systematic effect), the extent that people are motivated by the study process and/or the attention is likely to be an essential component of self-development. I think this is how interventions typically work. One could imagine that 360-degree feedback in organizational settings would have

very little effect if employees did not know they were being tested and were not

expected to change. A remaining concern is the durability of observed effects. One

would expect Hawthorne Effects to disappear when the study ends, while more

impactful effects should remain.

 Self-reports. Can we assume, or even hope, that the self-reported behavioral

changes (*reported self-development* and *reported personality change*) are a reliable

indicator of the true magnitude of changes in behavior? No, the biases exposed in

the self-insight literature almost certainly are at play. Self-reflection and self-report

remain as important parts of the multisource process, and introspection may work

better when people pay attention to subtle cues (Hofmann & Wilson, 2010), or are

educated about the common pitfalls and biases (Dunning, 2005; Pronin & Kugler,

2007). The self-report data, while subject to error and bias, provide a suitable

complement to the objective measures of academic performance in Study 2. In

addition, my proposal of a *say so, be so* effect (see above) could be empirically

evaluated. Do people feel compelled to match subsequent behaviors to previous

self-developmental claims, and does such behavior matching tend to justify the

original claim?

 Informant ratings. Funder's Realistic Accuracy Model (RAM) suggests that

accurate personality judgment is a complicated process in which many steps must

be achieved (Funder, 1995, 1999). Collectively, the research suggests that close

others, such as friends, family members, and coworkers, are often able to navigate

this process and, as a result, possess knowledge about a person's personality that

she herself lacks (Bollich, Johannet, & Vazire, 2011). Close others often have

positive biases about each other and may not be objective in their perceptions, especially for evaluative traits. Thus, well-acquainted informants who are not particularly attached to the target may be less biased in their ratings than those who are more connected (Leising, Erbs, & Fritz, 2010).

Path analyses. Path analysis techniques are sometimes vulnerable to unintended effects stemming from multicolliniearity among the measured variables. This is not an issue in structural equation modeling, which allows inferences to be drawn about the theoretical or latent variables, because each is multiply measured, and the error of each assessment can be calculated. A limit, then, is that I was able to assess only how the measured variables relate, whereas a stronger hypothesis using latent variables would allow me to make inferences about what they stand for. Finally, while my sample was generally just large enough to responsibly use path modeling techniques, analyzing the two feedback groups independently did create a small sample size issue, which potentially threatens the reliability of the results. As I mention earlier, using the Bentler and Chou (1987) rule of thumb for the ratio of sample size to the number of free parameters, which is 5:1, the 18 free parameters in the model require a sample size of 90 per group. My group sizes (87 and 85) approximate this number. In addition, Kenny (2011) states that models with no latent variables generally require smaller sample sizes. This being said, I realize that the reliability of my multi-group moderation results is probably compromised to some degree.

Future directions

      I have argued that the Hawthorne Effect should not always be feared in interventional studies, especially when the goal is performance improvement. However, one feature of Hawthorne Effects is that they tend to be short lived, disappearing when the study is over. Longitudinal studies are needed to determine if personality feedback effects are long-lived or short-lived for most, and under what conditions they are likely to endure.

      Being specific about when and how one's goals will be pursued can dramatically increase the chances of goal attainment by delegating control of goal-directed responses to anticipated situational cues (Gollwitzer, 1999). An expanded goal setting process that includes the generation of implementation intentions is likely to enhance the effectiveness of multisource feedback interventions. This enticing possibility has not been studied in the organizational literature, probably due to a lack of communication between social and organizational psychologists. Other tools could be added to the interventional processes as well. The functionality of PersonalityPad.org is currently being updated, and will include several new feedback and development features, such as more detailed informant feedback, more interactivity among site users (a support blog), and more development projects from which to choose.

      To achieve an experimental design and imply causality, I randomly assigned students to one of three conditions. However, these interventions were initially designed the facilitate self-insight and behavioral changes in intrinsically motivated populations. The broad facilitative effect of need for self-development suggests that

a study of individuals who are specifically interested in self-development, and eager to engage the personality feedback process, may experience larger and more consistent effects.

Another future goal is to enhance the quality and usefulness of the feedback widget. We would like to be able to display as much feedback as possible without overwhelming the participant. New features based on inter-rater reliability, personalized efficacy statements, and automatic weekly reminders, are currently being developed.

The current studies demand more investigation to identify potential inconsistencies between the two feedback administrations. The content and scope of personality feedback may have important motivational and behavioral consequences. Are there different implications of receiving relatively broad, versus relatively specific, personality feedback? One might suspect that Study 1 participants were generally more motivated because they got a lot more personalized feedback and were able to select the personality domain on which to target their efforts. Or, Study 2 participants may have benefitted the most from a targeted intervention that was able to precipitate observable improvements in academic performance.

Conclusions

The multisource personality feedback interventions appear to be generally effective, and the addition of informant feedback led to more desirable outcomes in some cases. Informant feedback seems to have increased the potency of self-reports, but it did not often precipitate better academic performance. An important

exception to this conclusion is that only those receiving informant feedback achieved significantly higher course grades compared to the control group during Study 2. Other contexts in which informant feedback may prove to be particularly valuable include interpersonal relationships and individual well-being. Even under the best circumstances, however, some people will be resistant to feedback. As with other routes to self-knowledge, the effectiveness of feedback will depend in part on a person's goals and motives. Does she want to improve the accuracy of his self-views? Is she defensive and interested in protecting or affirming her existing, biased self-views?

As reviewed earlier, Bollich, Johannet, and Vazire (2011) recently published a unique hypothesis, that explicit personality feedback from close others could serve as a valuable self-development tool. Smither, London, and Reilly (2005) published a theoretical model of improvement following multisource feedback. The current study provided some evidence for both these propositions; for instance, final course grades were significantly higher in the 360-degree feedback condition than in the control condition. One uniquely promising aspect of feedback as a route to self-knowledge is that, unlike the intrapersonal routes to self-knowledge, feedback actually gives the person new information to consider. Even if the person does not accept this new information right away, she may store it in memory and come back to it later, perhaps when more evidence presents itself that confirms the original feedback. If a person is confronted with repeated feedback from trusted sources, and if the recipient is appropriately prepared for the information, knowledge may be gained that would have otherwise never been possible through self-guided

efforts. In short, the search for self-knowledge likely requires the active involvement of close others to help fill in our blind spots.

A final essential element of self-development is the formation of an intentional developmental relationship with one's self. One must practice self-control through benevolent self-governance stemming from a meta-cognitive awareness one's multiple identities, inner voices, social dynamics, and competing priorities. Successful self-governance is not so much about self-discovery as it is about facilitating inner dialogue and relationships among identities. "People think that what we have to do is disclose, or liberate, the hidden reality of the self. The problem is not to free the self, but to consider how it could be possible to elaborate new types of relationships with ourselves" (Foucault, 1983).

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Table 1. Direct effects among Study 1 variables moderated by feedback type

|			360-degree Feedback	Normative Feedback	
			Estimate(β)	Estimate (β)	z-score of difference
Reaction to Feedback	<---	Need for Self-development	0.129	0.202	0.603
Reaction to Feedback	<---	Self-satisfaction	0.231*	0.047	-1.246
Goal-directedness	<---	Self-satisfaction	-0.111	-0.268**	-1.252
Goal-directedness	<---	Need for Self-development	0.505***	0.242*	-1.768*
Goal-directedness	<---	Reaction to Feedback	0.143	0.237*	0.901
Reported Self-development	<---	Need for Self-development	0.109	0.217*	1.053
Reported self-development	<---	Goal-directedness	0.393***	0.221*	-1.046
Reported self-development	<---	Reaction to Feedback	-0.053	0.299**	2.717***
Reported Personality Chg	<---	Self-satisfaction	-0.255**	-0.151	0.839
Reported Personality Chg	<---	Need for Self-development	0.225*	0.364***	1.166
Reported Personality Chg	<---	Reported Self-development	0.226*	-0.029	-1.839*
Reported Personality Chg	<---	Reaction to Feedback	0.201*	-0.066	-1.849*

Notes: *** p < 0.001; ** p < 0.01; * p < 0.05

Estimates are standardized regression weights (β)

Table 2. A sample of the developmental changes reported by participants in Study 1 six weeks after the receiving a multisource personality feedback intervention

I became a little more organized	I try to be more open and listen to
Try to talk more in general	other's problems
I changed my circle of friends	I have learned to listen more
I've become more productive	I talk to strangers more
My physical health is getting better	Less argumentative overall
Slightly more outgoing	I have been more open and upbeat
I think before I speak now	around my family
I have attempted to be less emotional	Increased ability to talk to strangers
Less critical	More talkative in some situations
I complain less	I am more comfortable being myself
I don't sweat the small things	A little more open to conversation
Been trying to get up earlier	I am more conscious of being judgmental
I am more optimistic	I am working on becoming less anxious
Getting my homework done earlier	I have been able to control my stress
Do not procrastinate as much	I'm not as hard on myself anymore
Try to be more organized	about my looks and weight
I view my actions as others would	I have been focusing on listening more
I've become a little more open with	and talking less when in groups
my emotions	I'm better about being on time

Figure 1. Typical sources of professional multisource feedback (top) compared to the multiple sources of personality feedback used in the current studies (bottom)
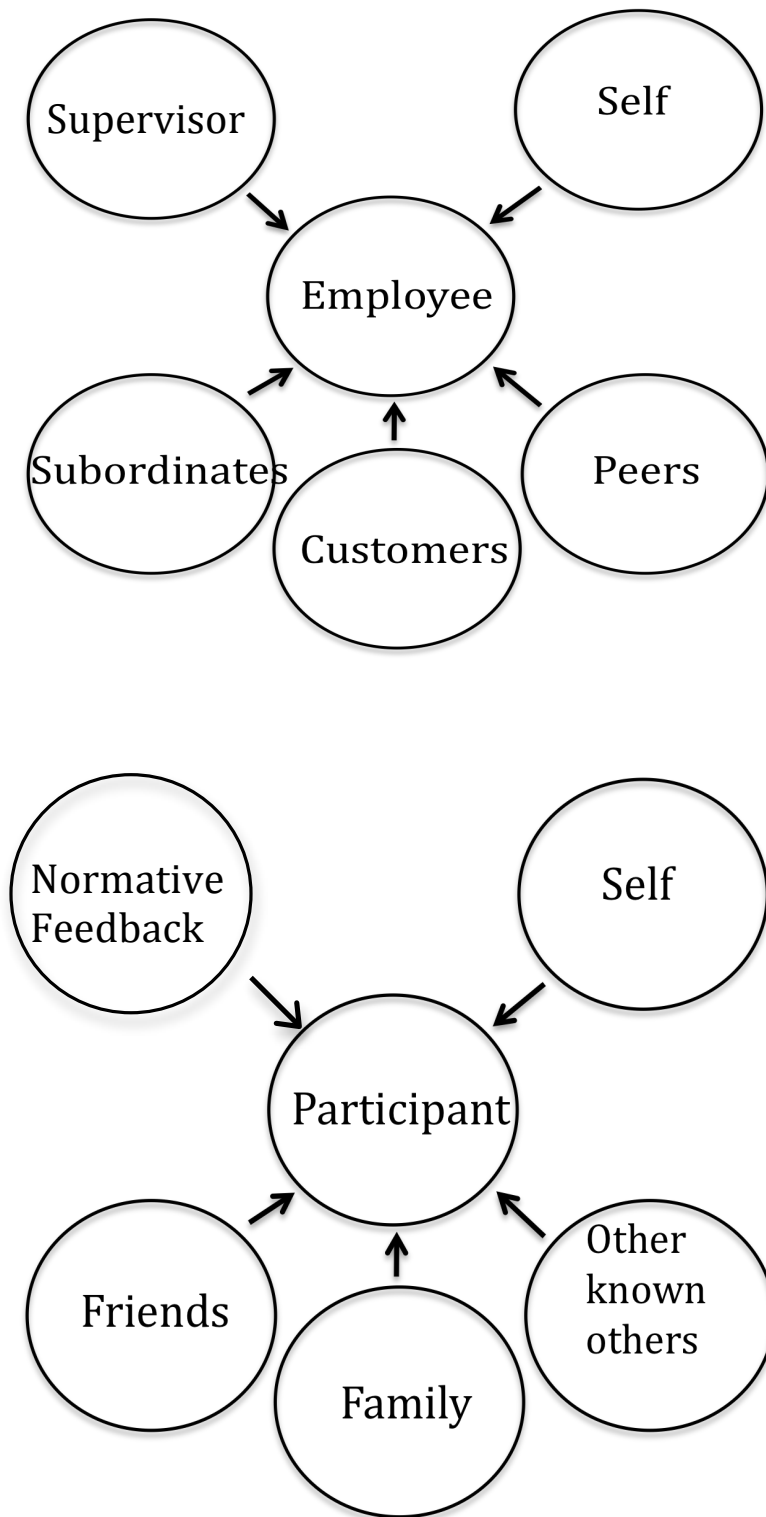
Figure 2. Theoretical model for understanding performance improvement following

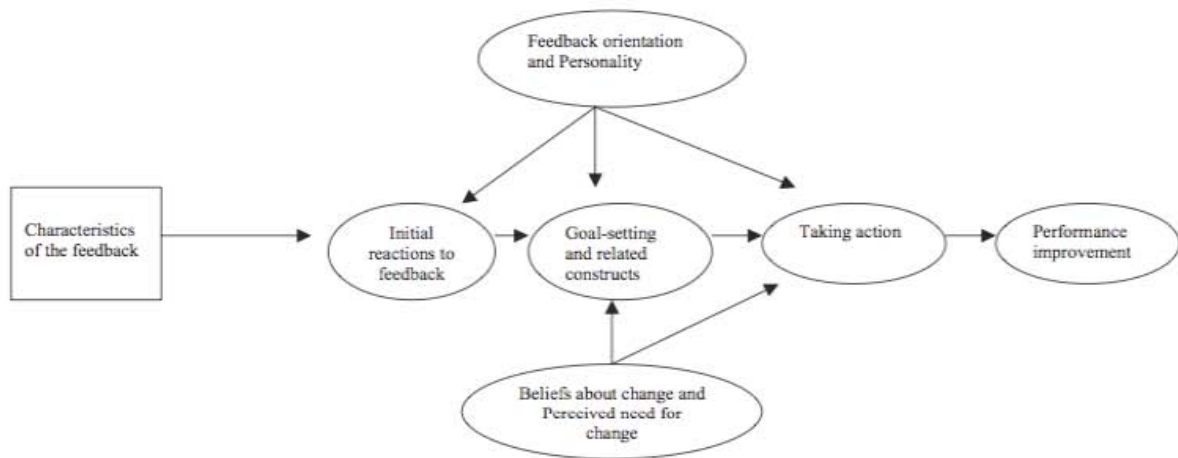multisource feedback (from Smither, London, & Reilly, 2005)

Figure 3. Sample screenshot of the Personality Pad dashboard for a participant in
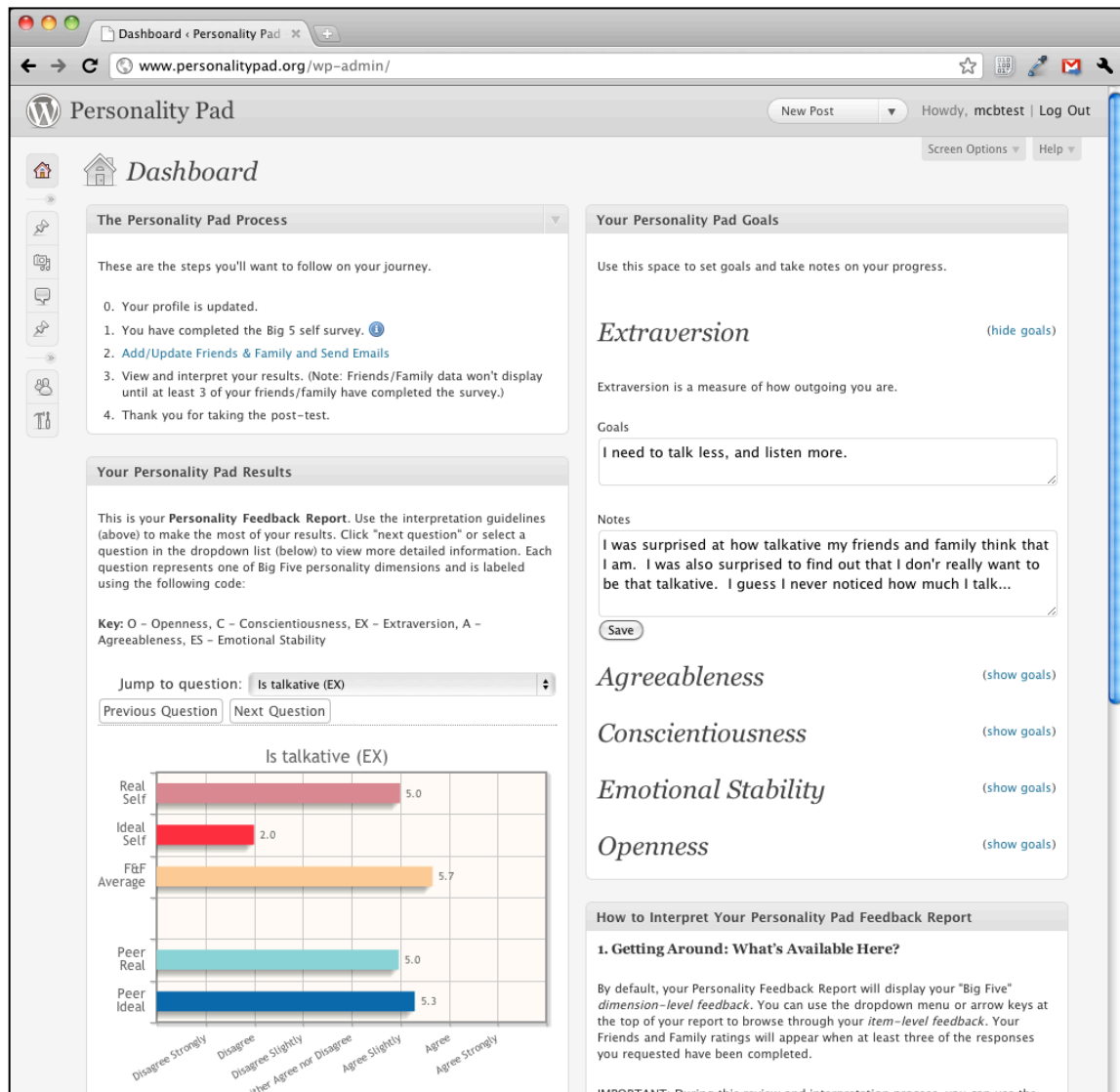
Study 1 (Big Five personality feedback intervention)

Figure 4. Sample screenshot of a participant's Personality Pad results for one of the

fifteen items used in Study 2 (conscientiousness feedback intervention)
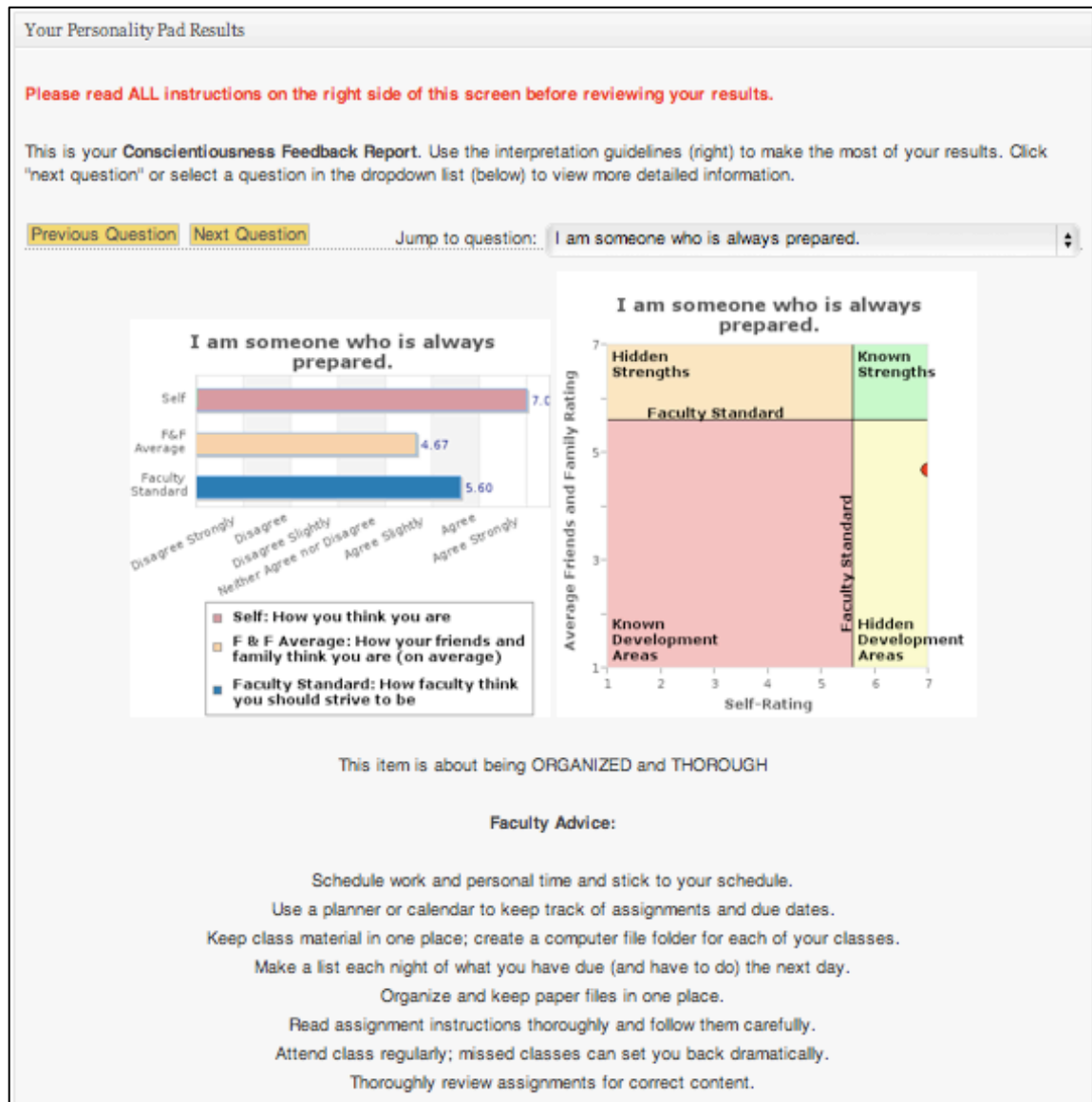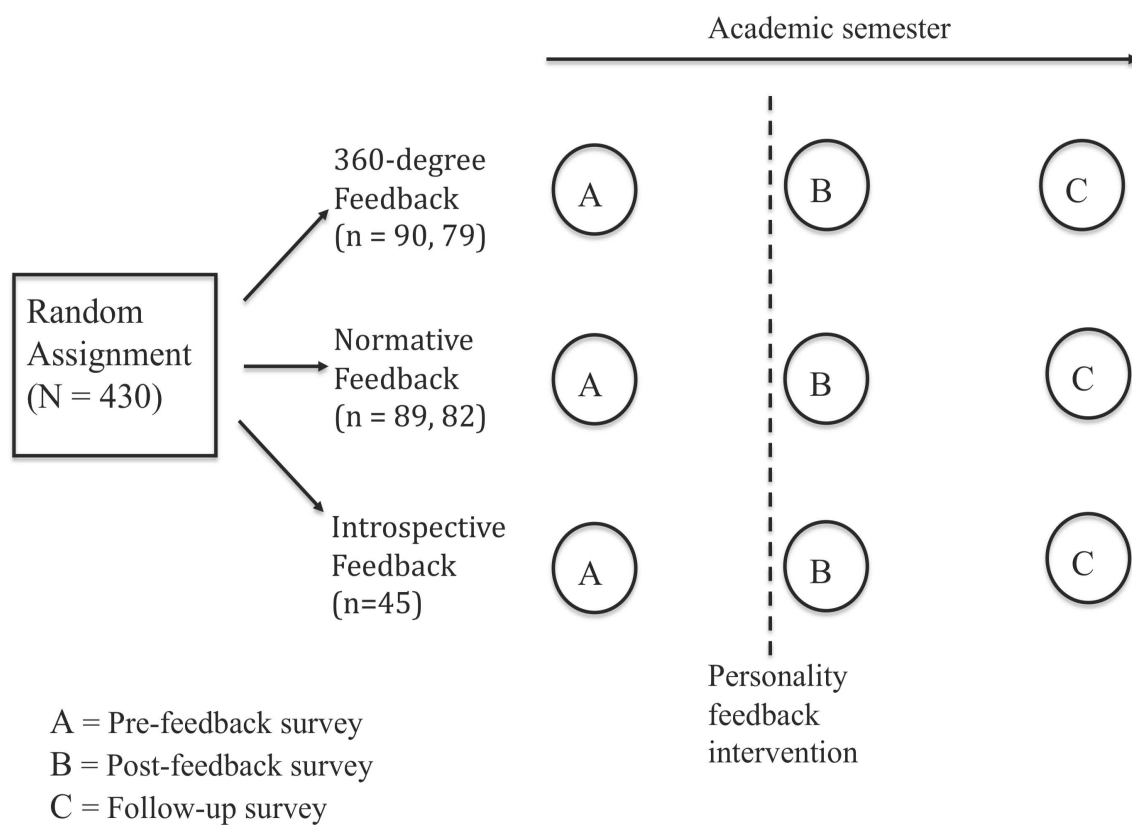
Figure 5. Interventional design applied in Studies 1 and 2

Academic semester

360-degree
Feedback
(n = 90, 79)

A   B   C

Random
Assignment
(N = 430)

Normative
Feedback
(n = 89, 82)

A   B   C

Introspective
Feedback
(n=45)

A   B   C

Personality
feedback
intervention

A = Pre-feedback survey
B = Post-feedback survey
C = Follow-up survey

Figure 6. Fully saturated empirical path model of survey measures in Study 1 and Study 2
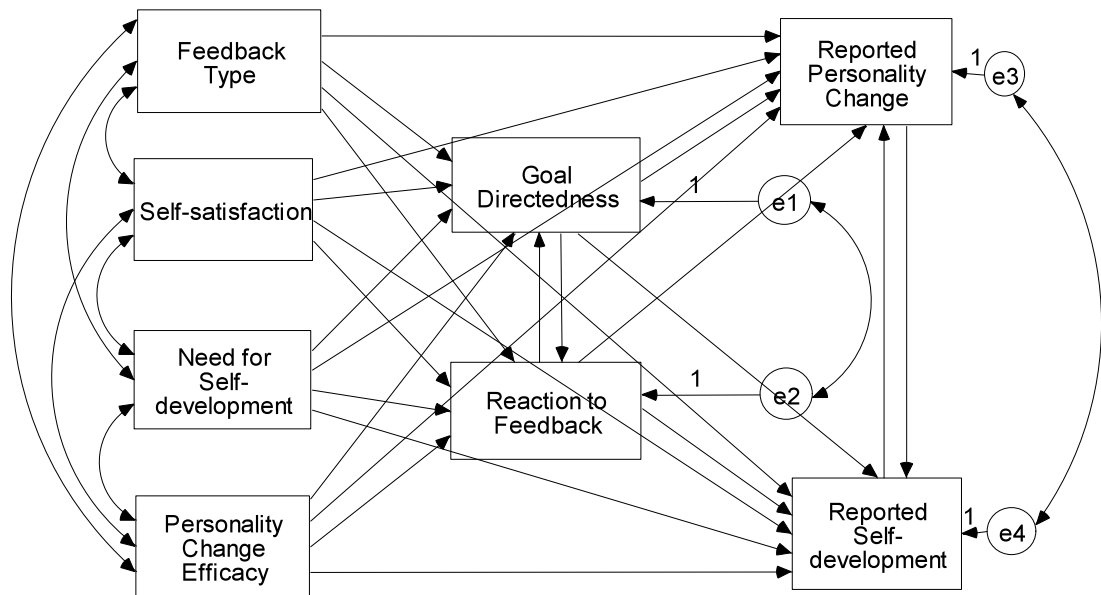
Figure 7. Parsimonious path model of survey data from multisource feedback recipients in Study 1
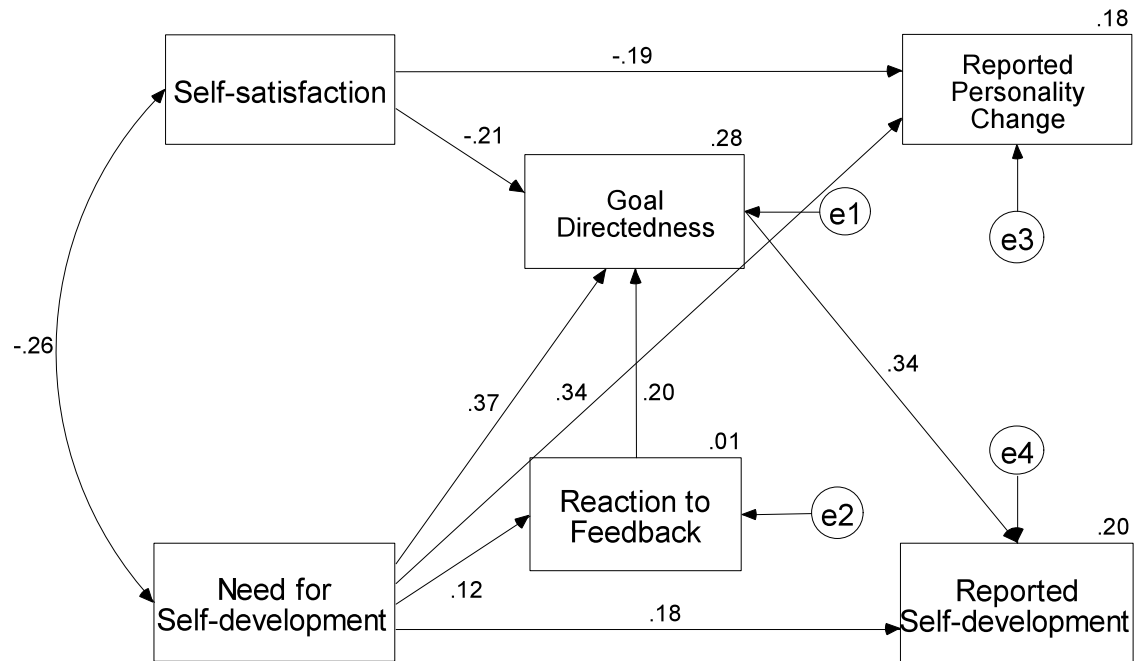
Figure 8. Mean-level assignment scores across the semester by conscientiousness
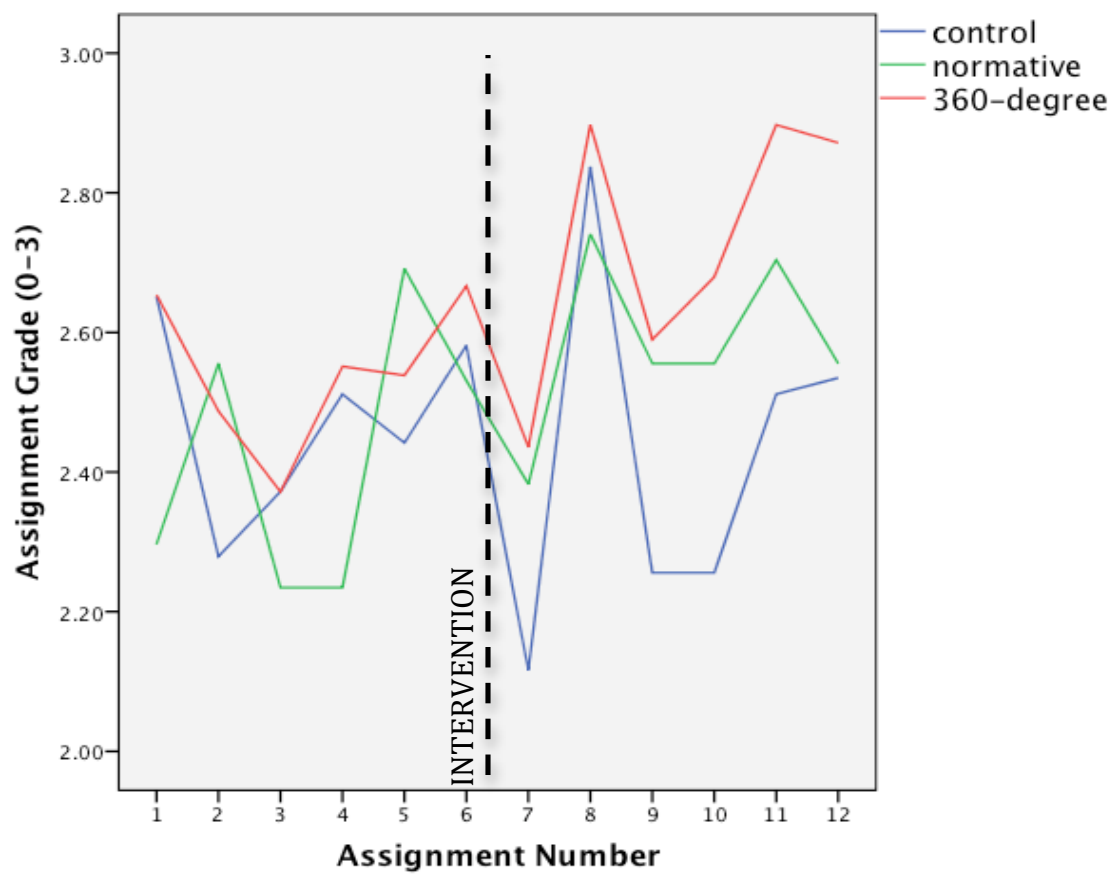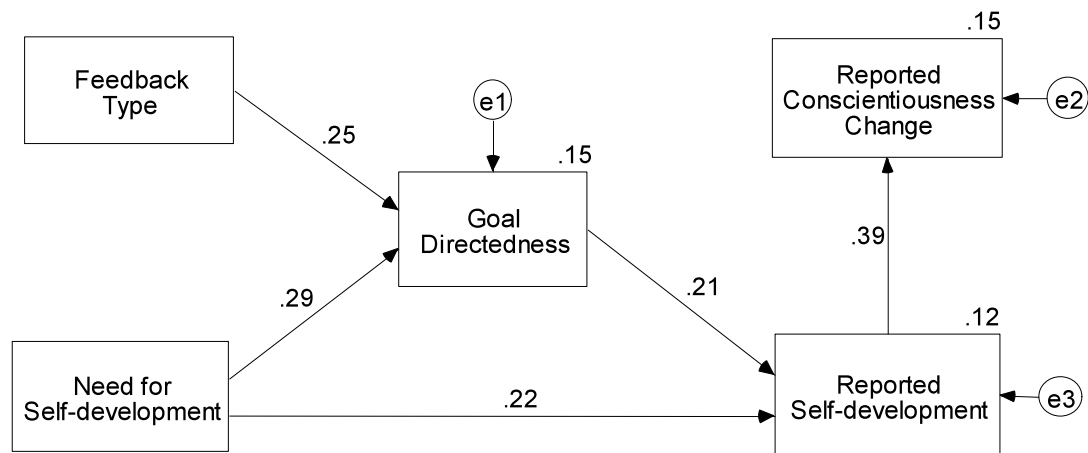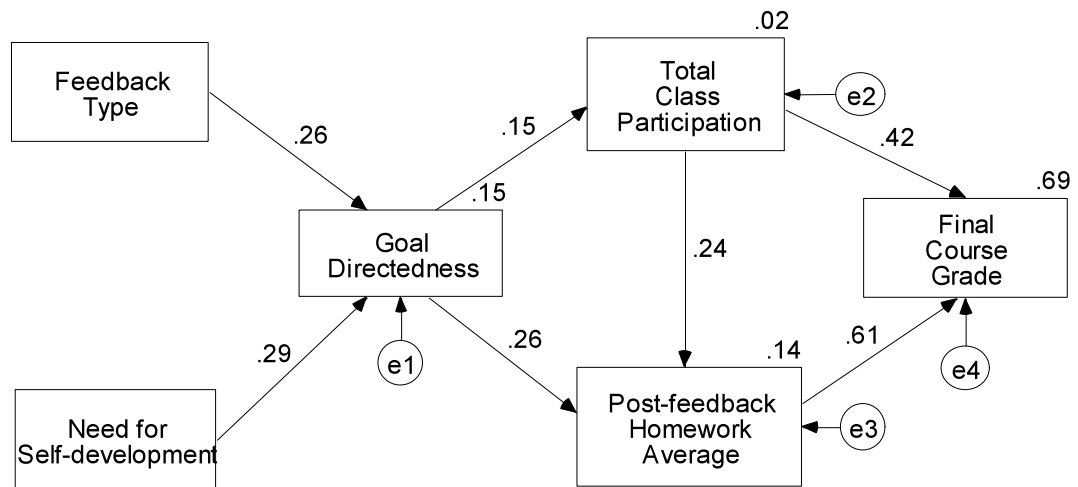
feedback condition

Figure 9. Parsimonious path model of survey measures in Study 2

Figure 10. Parsimonious path model of survey measures predicting academic

outcomes in Study 2

Appendix

Individual Differences Survey
[NOTE: administered pre-feedback]

What is your sex?

How old are you?

What is your current overall Grade Point Average?

[NOTE: Responses to the following items were recorded using a 7-point Likert-type scale with the following anchors: 1) Strongly Disagree, 2) Disagree, 3) Slightly Disagree,   4) Neither Agree nor Disagree, 5) Slightly Agree, 6) Agree, 7) Strongly Agree]

The pursuit of self-knowledge is important to me.

I'm satisfied with the person I am now.

I spend a lot of time thinking about the kind of person I am.

There are some parts of myself that I would rather not know about.

I don't think about self-improvement because I'm satisfied with person I am.

The pursuit of self-improvement is important to me.

A person's personality usually stays the same during his or her adult life.

I can change parts of my personality if I want to.

I *know* what my friends and family think about me.

I *want to know* what my friends and family think about me.

I understand myself.

Physically, I am in good health.

Mentally, I am in good health.

In general, I haven't had much success trying to improve myself.

[NOTE: During The Conscientiousness Project, the 10-item Big Five Inventory (Rammstedt & John, 2007) was also administered with the pre-feedback survey.]

Individual Experiences Survey
[NOTE: administered post-feedback]
[NOTE: Unless otherwise noted, responses were recorded using a 7-point Likert-type scale with the following anchors: 1) Strongly Disagree, 2) Disagree, 3) Slightly Disagree, 4) Neither Agree nor Disagree, 5) Slightly Agree, 6) Agree, 7) Strongly Agree]

My *personality [conscientiousness] feedback* revealed information about myself that I did not already know.

I enjoyed reviewing and interpreting my *personality [conscientiousness] feedback.*

Overall, I think my p*ersonality [conscientiousness] feedback* was accurate.

Reviewing and interpreting my *personality [conscientiousness] feedback* made me feel uncomfortable.

Based on the personality [conscientiousness] feedback I received during this study, I have some personal goals in mind that I would like to pursue.

Based on the personality [conscientiousness] feedback you received during this study, can you identify specific goals or actions you could pursue to enhance your well-being or personal effectiveness? If so, please list them here: [Free response with five entry boxes]

How did you feel about yourself after reviewing your *personality [conscientiousness] feedback?* [7-point Likert-type scale ranging from 1) Very Bad to 7) Very Good]

On a scale of 1-10, how likely are you to pursue a personal change based on what you learned about yourself during this study?

On a scale of 1-10, how much did you learn about yourself (overall) by participating in this study?

In one word, how did you feel after you reviewed your personality feedback report? [Free response with one entry box]

Overall, who do you think provided the most accurate depiction of your true personality?
[360-degree conditions only]
[Fixed response with 2 options: 1) I did, 2) My friends and family did]

Overall, I enjoyed participating in this study.

What would make the *personality [conscientiousness] feedback* a more effective tool for learning about yourself? If so, write your ideas here. (Optional)
[Free response with one large entry box]

Any other comments? (Optional) [Free response with one large entry box]

Self-development Survey
[NOTE: Administered six weeks after feedback]
[NOTE: Unless otherwise noted, responses were recorded using a 7-point Likert-type scale with the following anchors: 1) Strongly Disagree, 2) Disagree, 3) Slightly Disagree, 4) Neither Agree nor Disagree, 5) Slightly Agree, 6) Agree, 7) Strongly Agree]

Because of the personality feedback I received during the Big Five [Conscientiousness] Project, I have intentionally altered my behavior.

I think other people have noticed changes in my behavior since I participated in the Big Five [Conscientiousness] Project.

Because of my participation in the Big Five [Conscientiousness] Project, my personality has changed.

I still think about the personality feedback I received during the Big Five [Conscientiousness] Project.

Overall, how did participating in this study make you feel about yourself*?*
[7-point Likert-type scale ranging from 1) Very Bad to 7) Very Good]

On a scale of 1-10, how likely are you to *continue* to pursue personal change(s) based on what you learned about yourself during this study?

On a scale of 1-10, how much did you learn about yourself (overall) by participating in this study?

Have you noticed specific changes in yourself or your behavior because of the personality [conscientiousness] feedback your received? If so, please list these changes below.
[Free response with five entry boxes]

Any final comments or suggestions? (Optional)
[Free response with one large entry box]

[NOTE: The 10-item Big Five Inventory (Rammstedt & John, 2007) was also administered with the of the Self-development Survey