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Creating Individual Behavior Change Through 360-Degree Feedback: A Development Pipeline Perspective

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CREATING INDIVIDUAL BEHAVIOR CHANGE THROUGH 360-DEGREE
FEEDBACK: A DEVELOPMENT PIPELINE PERSPECTIVE

by

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ABSTRACT

CREATING INDIVIDUAL BEHAVIOR CHANGE THROUGH 360-DEGREE FEEDBACK: A DEVELOPMENT PIPELINE PERSPECTIVE

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Old Dominion University, 2004
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Ensuring that individuals develop new and more productive behaviors on the job is a challenge for many organizations and a focus of time, effort, and energy spent on programs to facilitate this change. This research was an effort to validate and utilize a framework for understanding how efforts toward individual development are restricted. To do this, I used a new 360-degree feedback instrument called "Time 2 Change" that measures self, manager, direct report, and peer/colleague perceptions of change in the individual. This instrument also measures the individual's perceptions of development enablers, in a framework called a Development Pipeline. As a result of analyses, it is clear that while the scale being used to measure development enablers is intended to be multidimensional, it consists of one dimension. However, there are several opportunities to build on this research to improve the pipeline tool and to gain a better understanding of individual development.

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INTRODUCTION

In an effort to help their employees grow and develop on the job, organizations have relied primarily on providing information to individuals that either gives them a sense of where they stand in relation to others or provides them with additional information that is needed to fulfill their roles (Hicks & Peterson, 1997). Most commonly, organizations spend their efforts and resources to encourage individual development and to meet human resource priorities in the following areas: training, coaching, performance appraisal, and multi-rater feedback (Kerndt & Masica, 2003).

While the receipt of information or feedback is necessary for development, few would agree that it is sufficient to ensure that development occurs. But what additional help is needed, and what provides the best help for employees to grow and develop? Where, as individuals, do we perceive barriers to change and how does that relate to the extent to which we develop our skills? And how do we ensure, as an organization, that we are not wasting our money on these programs, at best giving the impression that we care about people and how they develop, while unsure that these methods have a clear effect?

Recently, a pipeline model was developed that seeks to provide a needed framework around individual development (Peterson, 2002). It hypothesizes that there are certain conditions that are both necessary and sufficient to ensure individual development. The current research uses the pipeline framework to determine if the elements of the pipeline do, in fact, facilitate individual development.

This dissertation adheres to the format of the *Journal of Applied Psychology*.

Individual Development

According to Benham (1993), individual development refers to organizational practices that facilitate improvements in current performance and prepare individuals for future opportunities within the organization. As such, individual development is the primary way that organizations are able to communicate expectations and inculcate them into individual capabilities. Benham (1993), therefore, recommends that individual development should be carried out in organizations as a process that includes well defined and logically integrated structures and practices that are operated with the following employee questions in mind:

- “What can I expect in the way of opportunity and support from this organization?”
- How do I succeed in this organization?
- What specific career options are available to me in my functional area?
- What specific forms of development support exist to improve performance and develop potential?
- How is career success rewarded in this organization?” (Benham, 1993, p. 34).

What follows is an exploration of feedback, what it means in organizations, and how feedback has contributed to the development of individuals.

Feedback

Feedback is a large part of our lives, and we receive it frequently from friends, colleagues, family members, and complete strangers. According to Cascio (1998), feedback provides information that allows individuals to correct mistakes and is essential if learning is to occur. Feedback, in this large context, is information that can come from a variety of sources to inform individuals’ behaviors on specific tasks. This

information can be intrinsic, stemming from the task itself, or extrinsic, arising from outside the task performance and the individual. Feedback can describe the task (qualitative), give specific instructions to improve the task (quantitative), provide new information (informative), or give a description of the individual's efforts and results (evaluative; Cascio, 1998).

The importance of feedback and its usefulness in organizations is partially based on the well founded psychological theory of goal setting. According to Locke and Latham (1990), goal setting is founded on the idea that a person's goals and intentions determine and regulate behavior and that motivation is strengthened considerably by setting goals. Cascio (1998) outlines six clear findings from the goal setting literature:

- The effects of goal setting are stronger for easy tasks and are weaker for complex tasks (Wood, Mento, & Locke, 1987).
- It is a necessary condition that individuals be committed to the goals for goal setting to work (Locke, Latham, & Erez, 1988).
- Goal setting enhances goal acceptance on complex tasks (Erez, Earley, & Hulin, 1985).
- Past experience with goal setting effects increases the chances that individuals will set challenging, yet attainable, goals (Locke, Frederick, Buckner, & Bobko, 1984).
- Specific, difficult goals result in higher levels of performance than do easy or general goals (Latham & Steele, 1983).
- Providing individuals information on how to perform a task and on why it is important enhances the effects of goal setting (Earley, 1985).

With respect to feedback, it has been hypothesized that individuals become aware of the expectations of others by receiving feedback and set goals according to these expectations. Control Theory goes on to postulate that this would be particularly true when an individual's self-perceptions vary markedly from those of others (Carver & Scheier, 1982). In these instances, feedback that suggests that standards are not being met would further motivate individuals to alter behaviors to end the discrepancy between the self and others' views (Atwater, Waldman, Atwater, & Cartier, 2000). London and Smither (1995) take this further, to say that the act of introducing a feedback process into an organization sends a clear message that skills need to be developed, and this alone will likely encourage individuals to set goals to attain their perceptions of the organization's expectations.

Why Feedback is Important to Individual Development

According to Wilson (1997), well-expressed and specific feedback is critical for development. Findings traditionally have shown that feedback improves performance (Ilgen, Fisher, & Taylor, 1979). As researchers delve more deeply into feedback, however, they find that these interventions do not always improve performance. On average, feedback is associated with enhanced performance, but feedback can also result in decreased levels of performance (Kluger & DeNisi, 1996).

Other research has identified some of the aspects of feedback that make it more or less effective for individuals. One of these is that behavior change in individuals is more likely to occur if others' perceptions vary markedly from the individual's own (Larson, 1989). Therefore, if self-image is threatened, a person is more likely to take action to change some of these behaviors. The opposite is also true: if others view the

individual much more positively than the individual views himself or herself, eventually the individual will view his or her behaviors in a more favorable light.

Another aspect that improves the chances that feedback will be well received is to take the problem-solving approach (Dugan, 1989). This approach involves not only giving feedback itself, but also addressing ways to correct and improve performance. It avoids merely telling what is wrong with performance and gives the individual responsibility and tools for addressing shortfalls. Similar research by Jacoby, Mazursky, Troutman, and Kuss (1984) addresses the need to describe performance issues in terms of causes within the individual's control, precisely why the behaviors were or were not effective, and what specific actions could be taken to address this. When corrective action involves more than doing something specific in the future, Chhokar and Wallin (1984) insist that goal setting be included as a package with feedback, which will provide individuals with needed tools to address performance issues and to address motivation around change.

Given these cautions around feedback, is there a method or approach to giving feedback that is most helpful to individuals? In the past, almost all feedback in the workplace centered on managers' communications to employees. And if done in accordance with the cautions noted above, this feedback can be very effective. Recently, however, there has been a trend to move toward obtaining feedback from a wider variety of sources and research has shown the advantages of using multiple raters. Feedback from these sources is not usually readily available, and there is clear value in gaining insight from those in the best positions to observe behavior (Ashford, 1993; Campbell, McCloy, Oppler, & Sagar, 1993). Other advantages include an ability to obtain a much wider view of performance in various circumstances (Borman, 1974); gaining more

information than is usually available from the supervisor alone (London & Smither, 1995); greater reliability from multiple sources (Latham & Wexley, 1982); the inclusion of self-evaluation, which improves perceptions of fairness (London & Beatty, 1993); and the anonymity involved, which also improves acceptance of ratings and perceived fairness (Waldman, Atwater, & Antonioni, 1998).

MULTI-RATER FEEDBACK

Organizations use the multi-rater feedback processes, also known as 360-degree feedback, to provide multiple perspectives on an individual's performance on the job. In this process, individuals assess themselves and receive ratings from managers, direct reports, coworkers and internal or external customers (Antonioni, 1996; Edwards & Ewen, 1996; Romano, 1994; Tornow & London, 1998). This feedback helps them to identify developmental needs, offering insight to employees on how well they conform to the organization's values. It also contributes to personal and organizational development in line with the company's strategic plans and culture (Atwater & Waldman, 1998; Gebelein, 1996; Waldman et al., 1998). The 360-degree feedback process came into practice in the 1950s (Bookman, 1999) and from this beginning, 360-degree feedback and other related forms of multirater assessment methods in organizations have continued to grow in popularity. According to a recent study, approximately 40% of organizations use 360-degree feedback (Bracken, Timmreck, & Church, 2000).

The 360-degree feedback process has evolved from a nice-to-have technique administered only at the highest levels to become a standard tool that is an integral part of overall performance measurement and human resource management strategy. Participants now gain insight from their direct reports, peers, team members, colleagues, supervisors (straight and/or dotted-line), and customers. And the results of the 360-degree feedback represent the next standard in personnel evaluation and the perception of managerial competence (e.g., Bracken, 1994, 1996; Church, 1995; London & Beatty, 1993; Tornow, 1993). This tool has become so popular as to receive attention in

business magazines such as *Fortune* and *Computerworld* and has been credited with having the power to change one's life (e.g., Melymuka, 1994; O'Reilly, 1994).

Organizations today are using 360-degree feedback systems “for a variety of purposes, including: (1) leadership and management development, (2) performance appraisal and/or performance management systems, (3) measuring client and customer-related behaviors and perceptions, (4) succession planning, (5) general cultural assessment, and (6) organizational-change initiatives” (Church & Bracken, 1997, p.149).

The use of the 360-degree feedback systems is based on the assumption, derived in part from measurement theory, that obtaining observations from multiple perspectives will result in a greater degree of validity and reliability, which results in greater meaning and a higher degree of useful feedback for individuals (Church & Bracken, 1997). It is also important to note that when feedback from multiple sources is consistent, it is more likely to be perceived as accurate by the individual and therefore more useful for guiding behavior change (London & Smither, 1995; Meyer, 1980).

Although this assumption has been confirmed to some extent, when comparing ratings among coworkers (e.g., Furnham & Stringfield, 1994; Harris & Schaubroeck, 1988; Nowack, 1992; Riggio & Cole, 1992; Wohlers & London, 1989), agreement between perspectives is still typically quite low overall (e.g., $r = .30$; Church & Bracken, 1997). It also appears that there may be a great many moderators inherent in the ratings process that still need to be investigated (e.g., Ashford & Tsui, 1991; Borman, White, Pulakos, & Oppler, 1991; Judge & Ferris, 1993; Landy & Farr, 1980; Mabe & West, 1982).

As Church and Bracken (1997) point out, another fundamental assumption driving the 360-degree processes is that individual behavior will change because of

increasing self-awareness. This assumption has been supported by some researchers, notably Hazucha, Hezlett, and Schneider (1993), who found that managers who received less favorable ratings and those whose self-perceptions were negatively related to others' perceptions of them put a greater degree of effort into post 360-degree feedback development than those whose ratings were higher. The current assumption behind this finding is that when individuals become aware of the discrepancy between their self-perception and others' ratings they are forced into a cognitive process of reflection that ultimately results in greater levels of awareness of their own actions and the consequences those actions have on others (e.g., Church, Javitch, & Burke, 1995; Church & Waclawski, 1996; Hazucha, Hezlett, & Schneider, 1993; London & Wohlers, 1991; Tornow, 1993; Van Velsor, Taylor, & Leslie, 1993; Wohlers & London, 1989; Yammarino & Atwater, 1993). In fact, recent research has begun to link the similarity of self-perceptions and others' ratings to managerial performance (e.g., Atwater & Yammarino, 1992; Bass & Yammarino, 1991; Church, 1997; Furnham & Stringfield, 1994; Van Velsor et al., 1993).

The assertion that an individual will change negative behaviors because of discrepant feedback has been refuted in recent studies, however. For although some research has shown this to be the case (e.g., Atwater, Roush, & Fischthal, 1995; Reilly, Smither, & Vasilopoulos, 1996) other studies have not been able to confirm these results. For instance, Kluger and DeNisi (1996) conducted a meta-analysis in which they found that in more than one third of the cases, 360-degree feedback resulted in decreased levels of performance. Individuals in these studies were more often discouraged and not motivated to improve. Negative reactions were stronger, moreover, when feedback concerned personal characteristics rather than task behaviors (Kluger & DeNisi, 1996).

The concern from these findings is that people who may need feedback the most because they are not performing well or have an inaccurate view of their effectiveness are least receptive to feedback and find it less useful.

Although much of the research around the effectiveness of 360-degree feedback appears equivocal, from the longitudinal studies that have been done it would appear that 360-degree feedback methods could have a significant, positive impact on managerial behavior over time (e.g., Hazucha et al., 1993; London & Wohlers, 1991). It is, therefore, worth investigating the conditions necessary to ensure effectiveness of 360-degree feedback in facilitating individual development.

360-Degree Feedback Effectiveness

One of the key findings from the literature on 360-degree feedback is that feedback itself is necessary but not sufficient to encourage behavior change in individuals. Several researchers (Hellervik, Hazucha, & Schneider, 1992; Kluger & DeNisi, 1996; London & Smither, 1995) have noted that while gaining knowledge about our own performance can be a valuable tool, we are not able to assume that insight itself is sufficient; there must also be a process in place to ensure that development happens. A feedback intervention is more likely to have a beneficial effect if recipients perceive that there is a need for improvement, are optimistic about learning how to make improvements, and have clear opportunities to follow the insight with a program of development (Goodge & Watts, 2000). Peterson, Hicks, and Stoner (2000) support this view with the assertion that 360-degree feedback can provide clear and credible feedback, but in order to be optimally effective this must be the first step, the one that gives clarity for the developmental efforts on the job and helps focus individual efforts on clear, attainable goals and outcomes.

Facilitated feedback is a key differentiator in helping individuals work through the insights from 360-degree feedback and the steps that follow to ensure individual development. Research by Seifert, Yukl, and McDonald (2003) has indicated that having a competent, supportive facilitator increases the perceived utility of the feedback and results in more behavior change for individuals. Similar results were found by Brett and Atwater (2001), who include a caution to organizations that are considering adopting 360-degree feedback delivery methods that eliminate the costs associated with a facilitator. They warn that if organizations are to benefit from 360-degree feedback process, then the costs associated with a facilitator are a critical expenditure to ensure that individuals receive the focus on development that is needed. Other researchers have also found that individuals are more likely to set development goals and create plans for improving their performance if they work through the process with the help of a supportive facilitator (Bracken, 1994; DeNisi & Kluger, 2000). In the absence of a full development program, busy individuals may spend little time thinking about the feedback or how to work with it effectively (Bracken, 1994).

So what do facilitators do that enhance the effectiveness of 360-degree feedback? Examples include providing relevant skill training or immediate coaching, offering incentives for behavior change, and creating a supportive climate (Antonioni, 1996; Kluger & DeNisi, 1996; London & Smither, 1995). In addition to facilitation, 360-degree feedback can be followed by formal training or coaching, which some researchers have found to be effective in helping individuals toward development (Hazucha, et al., 1993; Wilson, O'Hare, & Shipper, 1990).

Other conditions that support individual development are described by Maurer, Mitchell, and Barbeite (2002) who found that having a work environment that includes

people who support skill development and beliefs by feedback recipients that they were capable of improving and developing were positively related to behavioral change and development on the job. Other researchers have also indicated the need for an “inclination to develop” whether that is internally motivated or is engendered by the organization (Megginson & Casserley, 1996). From an internal standpoint, motivation can include self-efficacy; that is a belief in one’s ability to perform a specific task (Bandura, 1977). In this case, self-efficacy would indicate a belief that it is possible to improve and that the necessary components for development were present in the organization (Maurer, et al., 2002). The need for motivation has also been highlighted by Westerman and Rosse (1997) who described the need for full participation in the process, meaning an active and willful involvement or buy-in that supports the process itself and the development that will ensue from it. These researchers assert that low participation threatens reliability and validity of a process as well as user acceptance. Wimer and Nowack (1998) also highlight the need for participation and involvement, citing the need for senior management’s true commitment and the involvement of key members of the organization.

Other research indicates the need for skill training to follow 360-degree feedback. In a study by Megginson and Casserley (1996), an organizational team participated in a 360-degree feedback program, and then was given opportunities to pursue learning that addressed their development needs. The team was then monitored in their progress and further encouraged to attain their goals. Because of this comprehensive program, in which participants continually received feedback and follow-on skill training, the researchers found significant increases in individual development.

This program was similar to one described by Sethi and Pinzon (1998) who included a clear plan for development following facilitated 360-degree feedback, which provided the training or skill acquisition needed. In addition, Tornow and London (1998) indicate that self-directed development usually fails without an organizational environment that supports these efforts.

The appraisal process and reward system can also affect motivation to use behavioral feedback. In fact, the absence of stronger effects in most feedback studies may reflect a lack of participant concern for addressing the development needs revealed by the feedback. In the study by Seifert et al. (2003), as with most applications of 360-degree feedback, the intervention was focused on the developmental aspects of 360-degree feedback, without including some form of accountability for change. Some scholars (e.g., London, Smither, & Adsit, 1997) have proposed that 360-degree feedback would be more effective if individuals were required to answer for their development in some fashion. Even if it is developmental in nature, individuals could be held accountable for the feedback or for adhering to a development plan (Seifert et al., 2003). In fact, some researchers have found very high rates of behavior change when programs included an essential accountability for a change in behavior (Sethi & Pinzon, 1998). But while accountability may encourage development, there is still a great deal of research (e.g., Bettenhausen & Fedor, 1997) that indicates that individuals may perceive peer and upward feedback more positively when used for developmental purposes, rather than administrative ones.

Overall, the research presented here has demonstrated that 360-degree feedback is an effective tool for providing insight, and if it is used in conjunction with an effective facilitator, can motivate individuals to accept and to utilize feedback to build effective

development plans. The research has also indicated that some form of skills training, perhaps with the accompaniment of real-world practice, can also increase the effectiveness of the program and the likelihood that it will change behavior. Finally, there is some support for incorporating accountability into the system in some fashion, bearing in mind the receptivity of individuals to feedback.

One way to do that is to begin to think of 360-degree feedback as part of a strategic initiative for the organization, one that incorporates what has been described above but that is also aligned with organizational goals and drivers. According to Gebelein (1996), it is critical to use 360-degree feedback as part of a broader context of strategic goal fulfillment. This can be done by identifying critical goals for the organization, applying the 360-degree feedback process to a competency model, and implementing the 360-degree feedback process as part of the larger whole. What this can achieve is a framework that allows the 360-degree feedback process to incorporate best practices of providing insight, support, and practice as noted above, and setting this within the context of organizational expectations. This type of embedded process increases perceptions of fairness and support, which in turn impacts motivation (Landy, Barnes-Farrell, & Cleveland, 1980), and when the 360-degree process includes a strategic context, individuals are not left to decide how to apply results and where to focus developmental actions (Ghorpade, 2000).

THE DEVELOPMENT PIPELINE

A proposed model for addressing the critical barriers around intervention acceptance was devised by David Peterson and Mary D. Hicks (Peterson, 2002). This model addresses development in terms of a pipeline. In this analogy, the degree of flow through the pipe is dependent on the size of the pipe at its narrowest point. In addition, it is by looking at constraints in this pipeline, that we are able to identify where development has been constricted.

Insight: Do People Know What to Develop?

From the literature, we have seen that 360-degree feedback is clearly placed to give the insight that individuals need to inform their behavior on the job. Hellervik and others (1992) noted that insight around performance is a valuable tool. And particularly because there is a wide range of input from various others, individuals receive more input from differing perspectives, which both increases reliability and gives greater insight (Borman, 1974; Latham & Wexley, 1982). And as discussed above, in a facilitated 360-degree feedback process, insight is also gained through the assistance of a knowledgeable individual to work through the data (Seifert et al., 2003), increasing the perceived utility of the feedback and resulting in more behavior change for individuals.

Motivation: Are People Willing to Invest the Time and Energy it Takes to Develop?

We have also seen that individuals' motivations affect how they behave and whether or not they develop new behaviors. Motivation in individuals has been attributed to the degree of support from the organization and a clear sense of benefits of change (Antonioni, 1996; Kluger & DeNisi, 1996; London & Smither, 1995). Other researchers have found that when 360-degree feedback is followed by other programs, individuals see greater benefits to behavior change and more actively develop their skills

(Hazucha, et al., 1993; Wilson, et al., 1990). In addition, the goal setting solution recommended by Chhokar and Wallin (1984) helps to increase motivation and lead to greater behavior change.

Capabilities: Do People Have the Skills and Knowledge They Need?

Another aspect of behavior change studied by researchers is capabilities. For instance, Maurer and others (2002) found that including a working environment that provided and supported skill development resulted in the development of capabilities and as a result, greater individual behavior change. Also, Megginson and Casserley (1996) reported on a comprehensive 360-degree feedback program that included follow-on skill training, which also resulted in a larger degree of individual behavior change.

Real-World Practice: Do People Have Opportunities to Try Their New Skills at Work?

As demonstrated by Sethi and Pinzon (1998) practice on the job resulted in greater behavior change than training without such practice. This finding is also widely supported in the training literature, which specifies that real behavior change results only from opportunities to practice new skills on the job (Ford, Quinones, Segó, & Sorra, 1992; Quinones, Ford, Segó, & Smith, 1995).

Accountability: Do People Internalize Their New Capabilities to Improve Performance and Results?

Finally, are individuals held accountable for changing their behaviors and developing on the job? As we have seen, London and others (1997) proposed that 360-degree feedback would be more effective if individuals were required to answer for their development in some fashion. And more directly, Seifert and others (2003) found that individuals who were held accountable for the feedback or for adhering to a development plan engaged in greater learning or development.

While the pipeline model has clear connections to the literature, there is an opportunity to test its utility and effectiveness. This research will measure behavior change as indicated by self-perceptions and ratings of others in the organization. These indications of behavior change will also be compared to their perceived barriers in the organization, or parts of the pipeline. The hypotheses are as follows:

Hypothesis 1: Perceived insight will be positively related to self-perceptions of behavior change.

Hypothesis 2: Perceived insight will be positively related to others' perceptions of an individual's behavior change.

Hypothesis 3: Perceived motivation will be positively related to self-perceptions of behavior change.

Hypothesis 4: Perceived motivation will also be positively correlated to others' perceptions of an individual's behavior change.

Hypothesis 5: Perceived capabilities will be positively related to self-perceptions of behavior change.

Hypothesis 6: Perceived capabilities will also be positively correlated with others' perceptions of an individual's behavior change.

Hypothesis 7: Perceived opportunity for real-world practice will be positively related to self-perceptions of behavior change.

Hypothesis 8: Perceived opportunities for real-world practice will also be positively correlated with others' perceptions of an individual's behavior change.

Hypothesis 9: Perceived accountability will be positively related to self-perceptions of behavior change.

Hypothesis 10: Perceived accountability will also be positively correlated with others' perceptions of an individual's behavior change.

As discussed above, part of the theory around the pipeline is that development is determined by the most constricted part of the pipeline (Peterson, 2002). Therefore, it is hypothesized that the best predictor of individual behavior change will be the aspect of the pipeline that is most constricted: insight, motivation, capabilities, real-world practice, or accountability.

Hypothesis 11: Individual behavior change, as rated by participants, is best predicted by the part of the pipeline that is considered the most constricted by participants.

Hypothesis 12: Individual behavior change, as rated by others, is best predicted by the part of the pipeline that is considered the most constricted by participants.

METHODS

Participants

A key problem with 360-degree feedback research noted in the literature is the small samples that are generally used (Church & Bracken, 1997). To ensure that this problem is not replicated, the sample used in this research consisted of 1092 participants, which is between 2 and 40 times greater than the sample sizes used in a review of the literature referenced in this study. The total number of respondents (excluding participants) was 6449. Of these, 1018 responded as “boss,” 2881 as “direct report,” and 2550 as “peer/colleague.” All of the participants in this sample are from 11 international finance, oil, and manufacturing organizations. There were differing numbers of participants from the different organizations, ranging from 7 to 548 (7, 16, 20, 21, 26, 31, 42, 42, 86, 253, & 548).

The original sample consisted of 1167 participants. From this, cases were culled that met any of the following criteria: the participant did not respond to the questions about their development, the participant did not respond to the pipeline questions, less than two respondents (boss, direct report, peer/colleague) completed the questions about participant’s development. This meant that the final sample of 1092 had no missing data for the participant and had data from at least two respondents (of any category).

I cannot state with complete confidence the gender, nationality, education, or ethnic origin of participants. This is because, while demographic data was requested (though not required) on the original 360-degree feedback tool that was used, it was not gathered in conjunction with the follow-up 360-degree feedback tool upon which this research is based. The software systems used to process the original 360-degree feedback tool and the follow-up 360-degree feedback tool were hosted on different

platforms, designed by different people, and were not coded in a similar manner, all of which makes it impossible to link the demographic data from the original 360-degree feedback tool to the user of the follow-up 360-degree feedback tool. The only link between these two systems are the first and last names of the individuals and the names of their employing organizations.

What I can say is that in all of the companies involved, the level of participant was that of middle manager or above; that 80% of these organizations are international, used this measure across countries, and employed expatriates within the countries; and that from looking at the first names, the sample appears to be 68.86% male. As I am unable to do any analysis on the demographic portion of the data, I cannot speculate as to differences in gender, national origin, or ethnicity that may be present.

Procedures

Individuals included in this research all participated in initial 360-degree feedback programs. In these programs, participants asked their bosses, direct reports and/or peers/colleagues, to complete a questionnaire that assessed their leadership behaviors. Participants were requested to have a minimum of six total raters. Respondents completed their self-evaluations and chose respondents entirely online. The online system was hosted by an external company.

Six to eight weeks after completing the 360-degree feedback tool, participants attended an hour-long individual meeting with a facilitator either from a trained feedback giver. Participants received a feedback report that included (a) a summary of self-ratings versus boss ratings on the importance of 20 skills; (b) self, boss, direct report, and peer ratings; (c) a graph indicating self, boss, average peer/colleague, and average direct report ratings set against a range of normative ratings on the 20 skills; and

(d) rankings of the highest and lowest ratings on items across all three rating sources.

The facilitator explained how to interpret the information included and how to understand the discrepancies between self-ratings and others' ratings.

Six to nine months after completion of this tool, participants then were asked to complete a new type of 360-degree feedback instrument. This measure asked participants and selected respondents (manager, peers/colleagues, and direct reports) the extent to which they observed changes in the behaviors of the participant. These changes were measured according to criteria that were selected by participants themselves, which focused on their personal development priorities. Included as part of this instrument, participants were also asked to rate the presence of developmental enablers according to the pipeline dimensions. All of these questions were administered via an online site that was hosted by an external company and that did not provide personal data about the individuals to the employing organizations.

Measures

The second 360-degree feedback tool that was used is a new method developed to replace the practice of comparing two administrations of a 360-degree feedback tool to determine if behavior change has occurred. This tool consists of two parts. The first section asks participants to identify the 5 to 10 items they wished to evaluate and upon which they would like to be evaluated by others. These items were chosen in accordance with stated development objectives and were therefore a targeted measure of only those objectives. Participants then chose the respondents according to the same categories as the earlier 360-degree feedback tool: boss, direct report, peers/colleagues, and others. When respondents went online, they saw and rated only those items chosen by participants.

The scale that participants and respondents used to rate participants' behavior change is constant. It is a 5-point Likert-type scale, (1 = *Changed for the worse*, 2 = *No change*, 3 = *Slight positive change*, 4 = *Noticeable positive change*, and 5 = *Dramatic positive change*). The question for participants reads: "To what extent have you changed in each of the following areas?" The one for respondents reads: "To what extent has this person changed in each of the following areas?" See Appendix A for a copy of the scales.

In order to analyze the data, the change that was observed by the participants was averaged together. So the "self" data consisted of an average response for the 5 to 10 questions on the scale and was used for Hypotheses 1, 3, 5, 7, 9, and 11. For the even numbered hypotheses, responses were averaged for each respondent (each boss, direct report, and peer/colleague had one average score) then the scores were averaged within the perspective (so the perspectives of boss, direct reports, and peers/colleagues all had one averaged score category, even if the participant had more than one respondent in each category). The final step was to average the perspectives (i.e., boss, direct report, peer/colleague) together to obtain one final average score that represented "all other raters." This method of combining data is used for the both of the 360-degree feedback tools described above and is intended to ensure that the perspectives which contain a small number of respondents is not underrepresented when combined with perspectives that contain a larger number of respondents. As an example, using this method would ensure that the responses from one boss would not be lost amongst the responses of 20 peers/colleagues.

Also included in second 360-degree feedback instrument are the questions about development enablers as seen in the development pipeline. The five aspects of the

pipeline (insight, motivation, capability, real-world practice, and accountability) are each measured by two items on a 5-point Likert-type scale, (1 = *Strongly disagree*, 2 = *Disagree*, 3 = *Neutral or neither disagree nor agree*, 4 = *Agree*, and 5 = *Strongly agree*). In order to form a scale, the two items are averaged together. All items are worded in a positive manner (e.g., “I do understand” as opposed to “I do not understand.”) A sample item for insight is “I receive honest, useful feedback about my development needs.” These ten questions are the same for all administrations and are only answered by the participant. See Appendix B for a copy of the questionnaire.

The development pipeline aspect of the second 360-degree feedback tool had yet to be evaluated with regard to its reliability and validity, and these analyses were conducted as part of this study.

RESULTS

Three key analytical steps were performed in the current research. The first step was to establish whether there are, in fact, five separate dimensions contained in developmental pipeline enabler scales. The second was to evaluate the consistency and accuracy of the pipeline measures used, and the third was to evaluate the extent to which individual behavior change is determined by the pipeline elements. All analyses were done using the Statistical Package for the Social Sciences (SPSS), version 9. In addition, all of the analyses were done using the sample of 1092 individuals' development pipeline scores, as described in the Methods Section above, except where otherwise noted.

The pipeline scale was created to measure the extent to which individuals perceived barriers to their development. As such, it was devised to be short, so as not to overtax participants; to be face valid, to appear appropriate to participants; and to appear to expert evaluators to appropriately measure the theory behind the scales. In addition, the five individual measures were devised so that one item on each was written from an internal perspective and one from an organizational or external perspective. For example, the two items for accountability are: "I feel accountable for developing skills that improve my performance" and "The organization holds me accountable for developing my capabilities." See Table 1 for a copy of the scale.

Internal Structure Analysis

As stated, the first step in the analysis was to ensure that even though there are only two items per scale, the scales represent five distinct factors. To test if this is the case, I did a factor analysis on the data, as recommended by Cohen, Swerdlik, and Smith (1992). As a result of a principle components factor analysis with an oblique rotation, I

found that the ten items comprise one factor. Because only one factor was present, the rotation could not be performed. See Table 2 for the results, which are presented in the order listed in Table 1.

Table 1

The Development Pipeline Scale

Insight

I know what capabilities I need to develop in order to be successful on the job.
I receive honest, useful feedback about my development needs.

Motivation

I regularly devote time and energy toward my development.
The organization makes it worthwhile for me to develop.

Capability

I have access to resources that can help improve my skills.
My organization invests in helping me learn new things.

Real-World Practice

I have sufficient opportunities to apply new skills at work.
My organization expects me to stretch beyond what I have been doing to apply what I have learned.

Accountability

I feel accountable for developing skills that improve my performance.
The organization holds me accountable for developing my capabilities.

To ensure that there were not, indeed, five factors, I next performed another factor analysis using oblique rotation, this time setting five factors a priori. The results indicated, however, that there were not five clean factors.

When computing the factor analysis, I also did a correlation matrix for the individual items. This correlation matrix, which is reproduced as Table 3, reveals that while not all of the correlations are not particularly strong (range = .204 to .603, with a mean of .360), all of the items are significantly correlated with all of the other items. In addition, the correlations that appear to be strongest are between external motivation and

external capability, external capability and external real-world practice, and between

Table 2

Factor Analysis for Pipeline Dimensions

<u>Factor</u>	
<u>Development Enablers</u>	
<u>Measure</u>	<u>Loading</u>
Insight A	.535
Insight B	.613
Motivation A	.520
Motivation B	.765
Capabilities A	.635
Capabilities B	.725
Real World Practice A	.647
Real World Practice B	.726
Accountability A	.632
Accountability B	.707
<i>Eigenvalue</i>	4.292
<i>Percent Variance</i>	42.920

external real-world practice and external accountability. Based on the theory behind the development pipeline it was expected that the individual scales would compose discrete factors and, as factor analysis is based on the interrelationships between factors (C. E. Bethel-Fox, personal communication, August 12, 2004), that the correlations would be stronger within the scales. Instead, the strong correlations among three of the five external items may indicate that there are meaningful differences between the external items and the internal items.

Although the internal items are not as strongly correlated within themselves, this could be due to scale construction or the fact that there are only two items per scale. But as this study is, at least partially, exploratory, it may be worthwhile to follow up on the

stronger intercorrelations between the external items and see if there is value in dividing the scales according to “internal” and “external.” Based on these results, then, I performed a factor analysis stating a priori that there would be two factors. The results of this factor analysis indicate, however, that there are not two distinct factors. Therefore, all future analyses will be done at the level of the overall scale.

Reliability Analysis

Internal consistency for the pipeline measure was assessed using coefficient alpha as recommended by Keith and Reynolds (1990). The result for the development enablers scale was $\alpha = .8487$, which indicates reasonable reliability. To further test the reliability of the pipeline measure, I administered the scale via email twice over the span of one week, to the same group of people in a convenience sampling. I sent the original request to 46 people and received 45 responses to the first mailing and 39 from both. This method gave an indication of test-retest reliability as recommended by Cohen and others (1992). The estimates obtained are the correlations of the pairs of scores for each person, using the intraclass correlation coefficients as opposed to standard correlations. This choice was made to capitalize on the fact that intraclass correlation coefficients are sensitive to the size of discrepancies between the Time 1 and Time 2 observations, not just their monotonic relationship.

This analysis was originally intended to be performed at the item level. However, because of the results of the factor analysis, the analysis was instead done at the scale level. To do this, the average of the ten item scores at Time 1 was compared to the average of the ten item scores at Time 2. The resulting correlation was .672.

Table 3
Correlations of Individual Pipeline Items

	Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Insight A	3.990	.570									
2. Motivation A	3.487	.848	.253**								
3. Capability A	3.774	.731	.300**	.366**							
4. Real-World A	3.864	.792	.307**	.282**	.407**						
5. Accountability A	4.241	.670	.335**	.306**	.317**	.359**					
6. Insight B	3.488	.881	.241**	.269**	.339**	.289**	.281**				
7. Motivation B	3.780	.889	.307**	.300**	.361**	.418**	.383**	.476**			
8. Capability B	3.943	.870	.259**	.313**	.465**	.398**	.322**	.391**	.603**		
9. Real-World B	4.039	.796	.316**	.204**	.310**	.423**	.403**	.352**	.528**	.498**	
10. Accountability B	3.958	.748	.321**	.280**	.326**	.342**	.448**	.376**	.488**	.378**	.579**

Note. Significant at the 0.01 level (2-tailed); n = 1092.

I chose to use one week instead of a longer span of time because this measure is not intended to be necessarily consistent over long periods of time. It could change as a result of a job change or a role change, or because of any number of factors, internal to the individual (e.g., a decision to perform well to achieve a reward or avoid punishment) or within the organization (e.g., the introduction of a development plan). The email that was sent out to request participation in the test-retest analysis appears in Appendix C. The subject line on this email was "Quick Help."

Testing the Sample

Although demographic items were not collected and therefore cannot be tested, it was possible to examine the differences between organizations whose participants were included in the research to see if there were significant differences at the organizational level. To test this, I compared the mean scores for self, boss, direct report, and peer/colleague ratings and the scores for the development enablers.

As a result of the ANOVA testing, it is clear that there are no consistent differences in these scores across organizations. For while there were some significant findings, these were not consistent across categories and organizations. For instance, "self" scores for one company were significantly different from two other companies, but not from the rest. Similarly, the development enablers did not show consistent differences across the various samples. The fact that there were some differences, however, could mean that there are key differences in ratings across organizations, but that these have to be considered in light of other organizational factors, of which I have no information.

Hypotheses Testing

To evaluate Hypotheses 1 – 10, correlation analysis was used as a first step to see if there is a relationship between the individual pipeline items, the internal/external grouping of items, and the scale as a whole and individual behavior change. The pipeline scale as a whole was used because of the results of the factor analysis, which indicated that overall, the pipeline items were measuring one factor. To arrive at an overall pipeline measure, the average of all items was computed.

As seen in Table 4, direct reports tend to have lower, and usually non-significant, correlations with the items on the pipeline and with the overall pipeline measures. This is particularly surprising due to the significant correlations that exist between direct reports' ratings and other perspectives. It appears to be the case that direct reports' ratings do not correlate with the pipeline in spite of the fact that their ratings are not vastly different than those of other perspectives. Another finding of note is the internal accountability item, which is significantly correlated with direct reports' ratings but not with peers/colleagues. This is similar to the external insight item, which is not significantly correlated with the boss' ratings, although the ratings for the boss are significantly correlated with all of the other items.

As noted in the previous section, all of the individual ratings for each respondent were averaged together, then the respondents in each perspective (boss, direct report, peer/colleague) were again averaged together. As a result, for each "self" rating, there was a maximum of one corresponding "boss" rating, one "direct report" rating, and one "peer/colleague" rating. Therefore, the maximum number of data points in the correlation matrix is 1092.

Table 4
Correlations for the Pipeline and Perspectives

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1. Self	3.303	.523											
2. Boss	3.365	.612	.182**										
3. Direct Reports	3.378	.614	.172**	.181**									
4. Peers/Colleagues	3.354	.519	.151**	.247**	.190**								
5. All Other Raters	3.373	.404	.228**	.712**	.704**	.657**							
6. Insight (A)	3.990	.570	.241**	.130**	.039	.116**	.110**						
7. Motivation (A)	3.487	.848	.315**	.111**	.024	.102**	.098**	.253**					
8. Capability (A)	3.774	.731	.222**	.128**	.043	.129**	.146**	.300**	.366**				
9. Real-World (A)	3.864	.792	.213**	.176**	.025	.104**	.115**	.307**	.282**	.407**			
10. Accountability (A)	4.241	.670	.251**	.123**	.078*	.060	.108**	.335**	.306**	.317**	.359**		
11. Insight (B)	3.488	.881	.200**	.059	.055	.123**	.114**	.241**	.269**	.339**	.289**	.281**	
12. Motivation (B)	3.780	.889	.212**	.116**	.027	.131**	.112**	.307**	.300**	.361**	.418**	.383**	.476**
13. Capability (B)	3.943	.870	.170**	.106**	.006	.137**	.111**	.259**	.313**	.465**	.398**	.322**	.391**
14. Real-World (B)	4.039	.796	.184**	.112**	.027	.094**	.101**	.316**	.204**	.310**	.423**	.403**	.352**
15. Accountability (B)	3.958	.748	.216**	.120**	.051	.118**	.108**	.321**	.280**	.326**	.342**	.448**	.376**
16. Internal	3.871	.491	.368**	.195**	.059	.149**	.170**	.600**	.688**	.712**	.711**	.667**	.420**
17. External	3.842	.634	.259**	.134**	.043	.159**	.144**	.379**	.362**	.478**	.494**	.481**	.696**
18. Pipeline	3.856	.511	.337**	.176**	.055	.171**	.171**	.523**	.555**	.638**	.647**	.618**	.633**

Note. *Significant at the 0.05 level (2-tailed); **Significant at the 0.01 level (2-tailed); n = 1092 for all pipeline items and measures, and for the self and all other raters, n = 903 for boss, n = 906 for direct reports, n = 885

Table 4 Continued
Correlations for the Pipeline and Perspectives

	Mean	SD	12	13	14	15	16	17
13. Capability (B)	3.943	.870	.603**					
14. Real-World (B)	4.039	.796	.528**	.498**				
15. Accountability (B)	3.958	.748	.488**	.378**	.579**			
16. Internal	3.871	.491	.522**	.523**	.482**	.501**		
17. External	3.842	.634	.826**	.766**	.770**	.726**	.646**	
18. Pipeline	3.856	.511	.763**	.727**	.709**	.691**	.881**	.930**

Note. *Significant at the 0.05 level (2-tailed); **Significant at the 0.01 level (2-tailed); n = 1092 for all pipeline items and measures, and for the self and all other raters, n = 903 for boss, n = 906 for direct reports, n = 885

There are fewer than 1092 for some perspectives when no one from that perspective responded (i.e., a participant did not have direct reports). The next step was the regression analysis, used to determine if the development enablers accounted for a significant degree of behavior change. For this step, the development enablers scale was entered as the predictor. The criterion variable was the average change in behavior as rated by “self” for Hypotheses 1, 3, 5, 7, & 9.

Table 5 displays the results of the regression analysis for “self” for the development enablers scale. From this analysis, it is clear that the development enablers scale does contribute significantly to the prediction of individual development. While it is not possible to measure the hypotheses as individual scales, this result does indicate that overall, the development enablers that form the pipeline are important to development.

Table 5

<i>Self Ratings of Behavior Change Regressed on Development Enablers</i>		
	Self	
	β	Overall R^2
Development Enablers	.337	.114**

Note. Significant at the 0.01 level (1-tailed); n = 1092.

Based on the findings reported in Table 4, namely that direct reports’ perceptions of behavior change are largely not correlated with individuals’ perceptions of barriers to change, it appears to make more sense to separate the raters into their component parts of bosses, direct reports, and peers/colleagues then to leave the groups as “all other

raters.” Therefore, the criterion variables used are the individual perspectives instead of “all other raters” for Hypotheses 2, 4, 6, 8, & 10.

Because of the way that the data was combined, the sample size in each case was 1092, because all of the bosses, direct reports, and peers/colleagues were connected to one of the 1092 “selves” used in the analysis.

From Table 6, then, it appears that bosses’ perceptions of behavior change is significantly predicted by individuals’ perceptions of development enablers. It would also seem that the variance explained by the development enablers when compared to bosses’ perceptions of an individual’s development is not as strong as when the individuals themselves consider their own development.

Table 6

Boss Ratings of Behavior Change Regressed on Development Enablers

	Boss	
	β	Overall R^2
Development Enablers	.176**	
		.031**

Note. Significant at the 0.01 level (1-tailed); $n = 903$.

From the perspective of direct reports, there appears to be no predictive relationship between direct reports’ observations of an individual’s behavior change and the individual’s perceptions of development enablers. See Table 7 for this analysis.

When looking at “peers/colleagues,” in Table 8, however, it is clear that their ratings of individuals’ development are predicted by the development enablers as seen by individuals themselves. These results are similar to those seen in Table 6, when looking at bosses’ ratings of individuals’ development.

Table 7

	<u>Direct Reports</u>	
	β	Overall R ²
Development Enablers	.055	.003

Note. Significant at the 0.01 level (1-tailed); n = 906.

Table 8

	<u>Peers/Colleagues</u>	
	β	Overall R ²
Development Enablers	.171**	.029**

Note. Significant at the 0.01 level (1-tailed); n = 885.

Hypotheses 11 and 12 both state that individual behavior change is best predicted by the part of the pipeline that is considered the most constricted. From the analyses done so far, however, I have found that the five aspects of the pipeline cannot be considered to be five separate measures, but rather as one overall measure. Unfortunately, therefore, I was not able to test these hypotheses as stated.

DISCUSSION

Individual development can be predicted, in part, by measuring the development enablers in the pipeline scale. At this point, however, the development enablers, as measured, do not contribute to the prediction of development to a large extent. Because the effect size is small, there is indication that there are other variables that are involved in predicting individual development. However, there is scope to improve the rate of prediction by revisiting the way the pipeline is measured and by working to account for the ways that different raters perceive these enablers and the development of others.

The Pipeline Scale

Looking at the Development Pipeline from a practical standpoint, it is an appealing heuristic, making intuitive sense to individuals who are working to develop themselves (Peterson et al., 2000). In addition, the five aspects of the pipeline (insight, motivation, capability, real-world practice, and accountability) have been found to relate to or predict individual development in studies focusing on 360-degree feedback (e.g., Antonioni, 1996; Hellervik, et al., 1992; London, et al., 1997; Maurer, et al., 2002; Sethi & Pinzon, 1998). This research, then, provided an opportunity to look at the five aspects of the pipeline together, to examine its structure a little more closely, and to begin to define how the five pipeline scales are being used and how they might change to better focus research and application.

As seen in the structural analyses, there is some question around how the pipeline is currently defined. It appears to ultimately consist of one intercorrelated scale and because of this, there is the possibility that there is one general underlying factor behind at least some of the pipeline. It could be that there is one common determinant that causes people to develop, perhaps something centered on perceptions of self-

efficacy, a desire to develop that is not fully captured by 'motivation,' or perceptions of the importance of developing. It is also possible that the underlying factor is not a separate idea, but that the aspects of the pipeline are interconnected in the way that individuals think about development. That is, the extent to which I feel motivated to develop my skills might be directly or indirectly linked to whether or not I feel accountable to develop my skills (accountable either to myself or to the organization). Another example is that perceptions of my capabilities (what I need to develop and what I have already successfully developed) could be dependent upon the insight (or knowledge) that I have about my abilities. This linking of the variables might account for the finding that the items are intercorrelated.

Another factor to consider is the fact that there were stronger intercorrelations among some of the items in the pipeline. This could indicate that from an organizational perspective, some companies are more "developmentally focused" and include several aspects of the pipeline and some are decidedly not. Therefore, if one aspect of the pipeline is observed by an individual in an organization, others are also observed, with the converse also true.

Beyond the structure of the pipeline, there were opportunities to examine how consistently and accurately this tool measured what it purported to measure. Overall, I found that the development enablers scale appears to give generally consistent measure. However, reliability for this scale is moderate, leaving opportunities to examine how it might be rewritten to increase the degree to which it gives consistent measurement.

Testing the Hypotheses

The hypotheses were not tested as they were written because of the initial assumption that the two items of each scale combined to form five distinct pipeline

dimensions. Therefore, the hypotheses regarding the predictive nature of the pipeline were measured at the level of the overall scale (development enablers). In addition, because of the differences found in the various perspectives, it made more sense to consider the groups individually instead of combining them into a large group of all of the raters other than the “self.”

Self

Regarding the hypotheses made concerning the individuals’ self ratings (numbers 1, 3, 5, 7, & 9), it is clear that, though small, there is a relationship between individuals’ perceptions of the extent to which they have developed and the enablers they perceive in their development. Therefore, it would appear that individuals’ development is partially determined by the extent to which they understand where they need to develop, and motivated to develop, feel themselves capable, have opportunities to apply new skills, and feel personally accountable for change. From this, then, it would seem logical to assume that time spent addressing individuals’ insight, motivation, capabilities, real-world practice, and accountability would result in a greater degree of change in individuals. Further development of the pipeline scale could also establish if one or more factors are more important to development than others.

Other Raters

The results from the perspectives of other raters are not as clear, however. Looking first at the “boss” perspective, this group follows the same pattern as the individuals themselves. There does seem to be a predictive relationship between the development enablers and the degree to which bosses observed change in individuals. This relationship is quite small, however, which indicates that there are other factors which better, or more fully, predict this relationship. The same holds true for the

“peer/colleague” perspective. For these raters, there is again a relationship between the development enablers and the degree to which peers/colleagues observed development in individuals, but the relationship is quite small.

For direct reports there is no relationship between the perceptions individuals had of development enablers measured by the pipeline and the degree to which direct reports observed change in individuals. This is particularly noteworthy because the intercorrelations among the raters (self, boss, direct report, and peers/colleagues) do not appear to be different. One reason for this might be that from an organizational standpoint, and in comparison to individuals’ bosses and peers/colleagues, direct reports generally have less experience in the organization; less exposure to different roles, particularly at levels above their current station; and do not always have a full understanding of the roles, responsibilities, and restrictions that their bosses face. In addition, it is less common for individuals to share their development plans with direct reports than with their own bosses. In hindsight, therefore, it would be logical to assume that there would be less of a relationship between the development that direct reports see and the restrictions around development that individuals themselves perceive. In addition, bosses and peers/colleagues are likely to have a better sense of developmental restrictions or enablers than would direct reports.

The differences between the perspectives open up a question regarding whether or not these differences are real and if so, what they indicate. It is possible, given the number of participants (and so the power of the analyses) and the small effect sizes of the findings themselves that these results are, at least partially, due to chance. Whether or not this is true would need to be determined by further research in this area. It is more likely, however, that the differences in the results reflect real differences among the

raters. This finding would be consistent with other researchers (e.g., Church & Bracken, 1997), who have found that agreement among coworkers is typically quite low overall and that different perspectives are not necessarily highly related to one another.

Therefore, it is entirely possible that predictors found for one perspective would be different from others and still be a valid, reliable finding. If that is true, there may be an opportunity for research to look more closely at the differences between perspectives and why they happen and an opportunity for organizations to examine how they treat the input of different raters.

Pipeline Constriction

Hypotheses 11 & 12 addressed the question around whether the constriction hypotheses held in a sample. Because different dimensions of the pipeline could not be distinguished empirically from each other it was not possible to test these hypotheses. As a result, there are open questions around the applicability of this part of the model, which can only be resolved with a redesign.

Limitations

As with all studies, particularly those done outside the laboratory, there are limitations that might impact the results obtained. The one that has the potential for the most impact is the simultaneous measurement of pipeline dimensions and behavior change. Because both were done at the same time and using the same method (online, self-rating) there is the potential for method bias and for a contamination of the rating scales by answers given earlier. For instance, if an individual responds that he or she has not developed in a particular area, that individual might tend to respond to a question around restrictions in development to account for his or her lack of development.

Another limitation might be the fact that restrictions in the pipeline were only measured by participants, not by bosses, peers/colleagues, or direct reports. This may be a limitation, in the fact that it gives less data and does not show other raters' views, but it may also be unimportant, as other raters' perceptions in this area may be unreliable as they are too distant from that individuals' roles and responsibilities.

Another factor that might influence the results is the subjective wording of the scales. For instance, one item reads, "I have sufficient opportunities to apply new skills at work." Another is "The organization makes it worthwhile for me to develop." What is sufficient to one person might not be to another, and "worthwhile" can have several meanings to different individuals. In fact, the subjectivity of the wording might indicate that there is one common factor to the pipeline that is something in the vicinity of "I have what I need to develop."

Another limitation to the study is the fact that demographics were not included in the research. What might be particularly pertinent are cultural differences and gender, which could impact the results by influencing an individual's desire and willingness to change and perceptions of change.

Next Steps

While there are limitations to the research, there are clearly steps that can be built upon to further research in this area. One of the first things to note from the data is that a good deal of power was needed to obtain significant results. As the effect sizes were small, it would be worthwhile to examine the other factors that influence personal development to conduct a more holistic study. Some of these might be: time factors (e.g., to what extent people perceive that there is available time to devote to one's development); personality factors, such as conscientiousness, desire for achievement or

advancement, or desire for learning or personal growth; the extent to which one's job requires on-the-job learning; the belief that change is possible and sustainable; or a measure of cognitive ability.

To further look at development enablers, the first step could be to consider redesigning the pipeline scale. Factors to take into account in redesigning the scale would be the potential for creating five discrete factors for each of the aspects of the pipeline (insight, motivation, capability, real-world practice, and accountability), reliability of the scale in terms of the accountability items, and the split between internal and external items. It is entirely possible, however, that a redesign would not be effective, particularly if the pipeline measures one or a few common or underlying factor instead of multiple factors.

Apart from reliability and the number of items, there may be an opportunity to rewrite the scale to more accurately reflect the intended definitions. For instance, one of the items used to measure motivation ("I regularly devote time and energy toward my development") may not be an accurate measure of motivation as this aspect of the pipeline is defined. The question in the pipeline measure that is used to define motivation is, "Are people willing to invest the time and energy it takes to develop?" While the item on the scale could be argued to clearly link to motivation, it appears to be an end result, not a reflection of an intention to do a specific thing at a future time (London & Smither, 1995).

In order to improve upon the pipeline scale, the first step, as mentioned, would be to consult the literature. There is ample support for each aspect of the pipeline, so focusing on clear definitions and how these could be measured will better able researchers to obtain reliable results. The next step would be to use another sample of

individuals to measure results, this time accounting for the limitations noted above; particularly ensuring that differing methods or times of data collection were used and that demographic variables were collected. Other raters' perspectives on development enablers could also be included, to discover if these views did contribute in a meaningful way.

Other research could also use additional sources of data to measure individual differences, as noted above to broaden the testing and account for other factors that affect development. Another option would be to include an independent measure of the one or more of the aspects of the pipeline. For instance, a test could be devised that could include motivation, accountability and real-world practice. In this test, there could be two natural samples, one with clear sponsorship, recognition, and opportunities to perform specific skills and one group without these advantages. A naturally occurring experiment would be able to contrast the data on the two groups.

Finally, there is an opportunity to consider the differences that may or may not exist between organizations in terms of performance ratings and developmental enablers and how these might impact personal development. While this study did not find consistent differences between organizations, there is a great deal of further information that could be pursued, such as human resource practices, time and investment made toward development in the organization as a whole, and organizational culture.

CONCLUSIONS

This research focused on an opportunity to test a new measure; investigating its structure, reliability, and to what extent it could be used to predict individual development. Overall, the measure shows promise as an indicator for individuals' self perceptions around development and highlights the differences in the perspectives of others toward development. There is an opportunity, however, to consider how this scale could be revised to more effectively measure the variables in question.

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APPENDIX A

TIME 2 CHANGE

Items will differ according to the areas that individuals have named as those they desire to change. The scale involved is constant. The one for the participant reads: "To what extent have you changed in each of the following areas?" The one for other respondents reads: "To what extent has this person changed in each of the following areas?" The scale involved is:

- Changed for the worse
- No change
- Slight positive change
- Noticeable positive change
- Dramatic positive change

The free-text items are also constant and are only answered by respondents (not participants):

- Give a brief example of how this person has successfully improved in the area they have asked you to rate.
- Give a brief example of something this person did that indicates a need for continued improvement.

APPENDIX B

PIPELINE DIAGNOSIS

The pipeline questions follow and are answered using the following scale:

- Strongly disagree
- Disagree
- Neutral or neither disagree nor agree
- Agree
- Strongly agree

Insight

- I know what capabilities I need to develop in order to be successful on the job.
- I receive honest, useful feedback about my development needs.

Motivation

- The organization makes it worthwhile for me to develop.
- I regularly devote time and energy toward my development

Capabilities

- My organization invests in helping me learn new things.
- I have access to resources that can help improve my skills.

Real-World Practice

- I have sufficient opportunities to apply new skills at work.
- My organization expects me to stretch beyond what I have been doing to apply what I have learned.

Accountability

- The organization holds me accountable for developing my capabilities.
- I feel accountable for developing skills that improve my performance.

APPENDIX C

REQUEST TO PARTICIPATE IN RELIABILITY ANALYSIS

In order to finish my dissertation, I have to find out more information about a specific scale that I am using – so I need your help!!! I promise it will only take 2 (yes, literally 2) minutes! What I would ask you to do is to fill in the blanks on this email today, then, when you get the second email from me (in one week), fill it in again. This is to analyze the scale – not your answers.

So, to do this, please think of the job that you do and what **you** could do to improve your performance. And while you have this in mind, please answer the 10 questions at the end using the following scale:

- 1 - Strongly disagree
- 2 - Disagree
- 3 - Neutral or neither disagree nor agree
- 4 - Agree
- 5 - Strongly agree

_____ I know what capabilities I need to develop in order to be successful on the job.

_____ I receive honest, useful feedback about my development needs.

_____ The organization makes it worthwhile for me to develop.

_____ I regularly devote time and energy toward my development

_____ My organization invests in helping me learn new things.

_____ I have access to resources that can help improve my skills.

_____ I have sufficient opportunities to apply new skills at work.

_____ My organization expects me to stretch beyond what I have been doing to apply what I have learned.

_____ The organization holds me accountable for developing my capabilities.

_____ I feel accountable for developing skills that improve my performance.

Thank you so much! I will send this out again in one week and I promise that will be the end!!!

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