

DISSERTATION

MENTAL MODELS AND FEEDBACK REACTIONS: HOW KNOWLEDGE AND BELIEF
STRUCTURES RELATE TO THE ACCEPTANCE OF FEEDBACK

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ABSTRACT

MENTAL MODELS AND FEEDBACK REACTIONS: HOW KNOWLEDGE AND BELIEF STRUCTURES RELATE TO THE ACCEPTANCE OF FEEDBACK

Feedback acceptance has been found to be an integral step in the feedback-development process and increasing acceptance is a prime goal of performance appraisal and human capital management. This study investigated how feedback receivers' mental models for professional skills relate to their acceptance of professional skill feedback. University students participated in a leaderless group discussion and completed multiple measures of mental model knowledge and belief structure before receiving and responding to feedback. The hypothesis that knowledge structure accuracy would predict feedback acceptance was supported for multiple measures, while a significant relationship was not found for belief structure. The results of this study support the propositions of multiple theories and lend promise to the practical value of understanding and influencing mental models for employee learning and development.

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Introduction

Most organizations recognize the importance and value of developing employees. Keeping talent pipelines full, retaining top talent, and promoting from within saves time and money related to recruiting, assessing, hiring, and training new employees. U.S. firms spent about \$156 billion on employee learning and development in 2011 (American Society for Training & Development, 2012). Development interventions can be targeted at employees' job knowledge, technical skills, interpersonal skills, or leadership skills. Examples of developmental activities and programs include technical training, performance reviews, assessment centers, team-building exercises, 360-degree feedback, coaching, or Six Sigma (Aguinis & Kraiger, 2009; Day, 2001; Jacobs & Park, 2009; Yorks, O'Neil, & Marsick, 1999).

Successful developmental activities have shown positive increases in employee commitment (Rose, Kumar, & Pak, 2011), satisfaction (Rose et al.), job performance (Arthur, Day, McNelly, & Edens, 2003; Avolio, Reichard, Hannah, Walumbwa, & Chan, 2009; Collins & Holton, 2004) and overall organizational performance (Aguinis & Kraiger, 2009; Arther et al.). However, there is still much to uncover about what works, what does not, when, and why (Avolio, et al.; Day; Kluger & DeNisi, 1996; Smither, London, & Reilly, 2005). Understanding why people do or do not improve their performance after workplace learning activities remains a central question for performance management, employee training, and employee development (Brown & Sitzmann, 2010; DeNisi, 2010).

Performance improves when people consistently behave in more effective ways (Campbell, McCloy, Oppler, & Sager, 1992). In order to consistently behave in a more effective way, people must first change the way they think about the performance domain and their own

skills (Anderson, 1982; Azevedo, Cromley, Winters, Moos, & Greene, 2005; Kraiger, Ford, & Salas, 1993; Norman, 1983; Piaget, 1952; Vandebosch & Higgins, 1996). Consider an example from the service industry. A server might think that smiling, using eye contact, and being prompt and accurate define good customer service. A manager could tell her servers that occasionally touching restaurant patrons on the shoulder increases loyalty and tips. A server that was not touching patrons could become more effective by adding touching to the way they think about customer service and enacting the behavior. Some servers might easily accept this new idea, while others might skeptically question why and how touching makes a difference before they change their minds and perform the new behavior.

For a person to change the way they think, they have to expend mental energy and attention toward (1) understanding their current assumptions and modes of thinking and (2) learning new information and ways of thinking (Bandura, 1991; Zimmerman & Martinez-Pons, 1986). We know from cognitive psychology research that individuals are limited in their attention capacity for processing the large variety of information that constantly surrounds them (Kanfer & Ackerman, 1989; Miller, 1956; Wickens, 1984). Thus, people learn to create simplified representations of reality and strategies for information processing that decrease their cognitive load (Johnson-Laird, 1983; Simon, 1947). We call these representations *mental models* (Johnson-Laird; Wickens).

A *mental model* is a cognitive structure, a network of associations between concepts in an individual's mind (Ward & Reingen, 1990), which supports understanding, reasoning, and prediction (Markman & Genter, 2001). Although mental models can make people more efficient, they also can also lead to errors. Mental models act as filters for processing stimuli. In some situations, these filters can lead to efficiencies and creativity, whereas in other situations they can

lead to biased and naïve decisions (Hodgkinson, 2003). When a mental model cannot consistently inform and support effective behavior, it needs to be revised.

In this study, I will argue that people's mental models for performance play a critical role in employee development. I will focus on relationships between mental models and reactions to developmental feedback, specifically feedback acceptance. First, I will describe the context of employee development. Then, I will discuss the importance of feedback acceptance for skill acquisition and employee development. Next, I will provide an overview of variables that have been previously investigated as correlates of feedback acceptance and argue for more attention to be given to feedback recipients' mental models. I will describe two structures of mental models, knowledge and belief, and make hypotheses for each accordingly. Finally, I will describe the results of a study that tested multiple relationships between feedback recipients' mental models and their acceptance of performance feedback in the context of a performance simulation called a leaderless group discussion (LGD).

Employee Development

The term “employee development” represents a range of planned learning opportunities that focus on developing employees' competence to perform to their fullest potential for the sake of accomplishing personal, professional, and organizational goals (Jacobs & Washington, 2003; Noe & Tews, 2009). Thus, many activities for employee development involve the opportunity to acquire new skills. The details of several prominent development theories, presented below, indicate that mental models play a critical role in employee development.

Skill acquisition. The theory of Adaptive Control of Thought (ACT) explains the phenomenon of skill acquisition through a cognitive learning process (Anderson, 1982). This

cognitive learning process is a process of mental model construction and adaptation. In the first stage of the process, a learner encounters information about a skill and encodes it as a set of facts. This is called the *declarative stage* and the set of facts are labeled *declarative knowledge* (Anderson, 1982). Once declarative knowledge is obtained, the learner goes through a phase of practice in recalling and using the information.

Through interpreting and applying the facts in multiple instances, the learner fine tunes what s/he knows, develops discretion, and creates proceduralization. Through this *knowledge compilation*, skill acquisition evolves from the declarative to the *procedural stage*, which is tuned by experience (Anderson, 1982, p. 370). As such, the learner transforms a loose structure of facts into a more sophisticated mental model that includes “if-then” *production rules* that are domain specific (p. 370).

Evidence of the connection between knowledge compilation and learning is found in a study that looked at pre-instruction and post-instruction mental model sophistication. Learners with more accurate pre-instruction mental models were more likely to have more sophisticated mental models post-instruction (Greene & Azevedo, 2009). A similar study showed that students’ cognitive structures become more similar to an expert’s following instruction (Acton, 1991). Further, the similarity between an expert’s and student’s structure can be used to predict competence or achievement (Diekhoff, 1983; Goldsmith & Johnson, 1990). These results indicate that during skill acquisition, knowledge progresses in complexity as proposed by ACT theory.

Self-regulation. The Social Cognitive Theory of Self Regulation sheds more light on individual differences in knowledge and skill acquisition (Bandura, 1991). Self-regulation involves self-observation and self-evaluation in comparison to a goal or standard (Bandura).

While acquiring new knowledge, high self-regulators use multiple learning strategies to increase their mental model sophistication (e.g., information seeking, rehearsal, elaboration, critical thinking, and self-evaluation; Zimmerman & Martinez-Pons, 1986).

Not surprisingly, an experiment in self-regulation training showed that learners who were instructed to self-regulate made more significant mental model shifts and met more learning goals in comparison to those who were not instructed to self-regulate (Azevedo et al., 2005). The process of self-observation and evaluation requires information about the effects of the learner's performance strategies and behaviors. In other words, performance feedback, either sought or provided, is an integral component of self-regulation.

Constructive-developmental theory. The general notion of human development is explained similarly in broader psychological theories of development. According to Constructive-Developmental Theory (Kegan, 1980), there are two primary aspects of development: (1) the principles people use to organize and regulate how they make sense of themselves and the world, called *orders of development*, and (2) how these principles are built and re-constructed over time, called *developmental movement*. In this developmental theory context, a person's orders of development are mental models, the process of developmental movement is analogous to self-regulation, and the outcome of developmental movement is mental model adaptation.

In Kegan's terms, developmental movement involves the person's gradual increasing awareness and reflection upon of his or her current organizing principles. A person's organizing principles represent their personal subjective lens through which they experience and interpret life. People think and behave in semi-automatic, habitual ways according to their mental worldviews, which are subject to their orders of development. Movement occurs when what was

once implicit and subjective becomes explicit and objective. In movement, the person becomes aware of his or her own perceptual rules and biases; they more objectively examine their own mental model. In this way, they create a new subjective organizing principle and a new worldview.

An example of a workplace scenario for mental model change is when technical workers (e.g., engineers, machinists) are promoted to their first leadership positions. Commonly, non-leaders share a narrow view about what it means to be in a leadership position: more authority, more pay, more status, and more autonomy. The yet-to-be leader's mental model for *leadership* is commonly weighed toward the aforementioned desirables. Thus, many first-time leaders experience a form of identity crisis when they step in to their new position (Charan, Drotter, & Noel, 2001). They are surprised by how much of their job becomes planning, organizing, coordinating, refereeing, communicating, and decision-making (Charan et al.). They spend more time at a desk than "on the floor" or "in the field," and do not get to practice their technical expertise. If these new leaders do not change their mental model for what it means to be a leader, or if they do not value the tasks of the new role, they may become micro-managers. They get involved at the technical level more often than they are supposed to, because that is still what they identify with most. In order for first-time leaders to succeed, they have to go through a developmental movement to change their mental model for their role in the organization: how they should be spending their time, who they have to interface with, which of their professional skills will be most useful or should take priority, what types of goals they should set, which time-frames they should meet for different tasks, etc.

Effective training or development programs initiate and support developmental movement. Authors that reflect on the constructive-developmental theory argue that well-

designed training programs provide individuals with significant lessons that initiate questioning and adapting existing ways of making sense of one's self and one's work (Berger & Fitzgerald, 2002; Day & Harrison, 2007; Drath & Van Velsor, 2006; Kuhnert & Lewis, 1987; McCauley, Drath, Palus, O'Connor, & Baker, 2006). Lessons, often experiential, should cause a temporary disequilibrium in trainees' meaning-making systems, opening a window into new ways of making sense of their selves in the world (Kegan, 1980). This all indicates that individuals' current meaning-making systems, or mental models, are a lynch pin for present and future behavior. Moreover, present behavior is subject to mental models, the experience of developmental programs is interpreted through the lens of mental models, and sustainable behavior change depends on the reorganization of mental models.

In this study, I am going to focus on the role of mental models in an early stage of the development process, the acceptance of feedback. The purpose of feedback is to guide a person in maintaining or increasing their effectiveness by helping the recipient to make what was once subjective, and assumed, an object that can be evaluated and changed (Bandura, 1991). Thus, the acceptance of feedback is a critical step in the developmental process, and understanding the conditions under which feedback is accepted is a central question for employee development (Brown, 2010; Ilgen, Fisher, & Taylor, 1979; Smither, London, Reilly, 2005).

The Importance of Feedback Acceptance

In order for development to occur as a result of feedback, the person must first accept and then act on the feedback. We have learned that a lot occurs psychologically before individuals act on their feedback (Anseel & Lievens, 2006; Anseel, Lievens, & Schollaert, 2009; Kluger & DeNisi, 1996; Smither et al., 2005). Often, feedback does not have the intended effects (Kluger & DeNisi). Formal feedback is often based on performance ratings. However, the performance

appraisal process has become a tense situation for many workers, on either side of the message (Jackman & Strober, 2003; Meyer, 1991). Feedback receivers often feel angered, underappreciated, confused, cynical, or de-motivated (Cron, Slocum, VandeWalle, & Fu, 2005; Ilgen, Mitchell, & Fredrickson, 1981; Meyer). Yet, when positive reactions do occur, they lead to increased motivation and performance (Anseel, Van Yperen, Janssen, & Duyck, 2011; Brett & Atwater, 2001; Kinicki, Prussia, Wu, & McKee-Ryan, 2004; Kuvass, 2006; O'Reilly & Anderson, 1980; Steelman & Rutowski, 2004). Researchers concerned with improving the performance appraisal process first focused on improving the quality of performance ratings.

A dense line of research has focused on the issues involved in accurately measuring performance (see DeNisi, 2010, and Wildman, 2010, for reviews). The psychological characteristics of performance raters, and their ability to make accurate performance judgments, became a large focus in the debate over how to improve the accuracy of performance measurement (Landy & Farr, 1980). Much of this issue involves variability in the accuracy of raters' mental models for observing and judging behavior. For example, one study on raters' cognitive complexity found that raters with more complex mental models for rating performance made less biased ratings (i.e., reduced halo, leniency, and severity; Schneier, 1977). To deal with this concern, rater training and rating formats evolved with the intention to decrease raters' cognitive load and increase the accuracy of their mental models (DeNisi, 2010; Kolk, Born, Van der Flier, & Olman, 2002; Woehr & Huffcutt, 1994). These steps helped to improve the quality of performance ratings, which is in turn important for communicating accurate performance data to performers. Just as raters' psychological characteristics affect the quality of their performance ratings and feedback messages, ratees' psychological characteristics affect their reception of feedback messages.

Ilgen et al. (1979) were among the first to draw attention to the psychological process individuals go through when they receive feedback. They outlined three steps in this process: perception, acceptance, and willingness to respond to feedback. Perception precedes acceptance as can be seen in Figure 1 below.

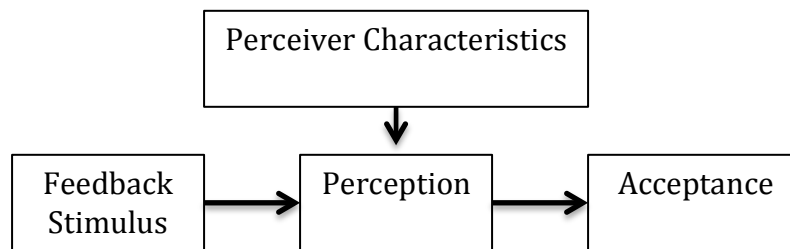


Figure 1: Effects of Feedback Elements (adapted from Ilgen, Fischer, & Taylor, 1979, p.352)

The authors explain that both the stimulus and the perceiver influence perception. The stimulus is the content and quality of the feedback information, and is comprised of the timing of feedback, the source, and the sign (positive or negative). The impact of the feedback source as useful information depends on the perceiver's operating frame-of-reference. The perceiver's frame-of-reference contains what they already know about the task, their own behavior, and associations between the two. Feedback is effective when it provides an increase in one's behavioral knowledge over and above the information already possessed, and reduces uncertainty about alternative explanations for one's behavior. This explanation indicates the role of mental models in perceiving feedback in that it references how feedback is interpreted through the way one currently makes associations about their behavior. If effective feedback reduces uncertainty about alternative explanations, then it will help a person make accurate associations and predictions about their behavior in the future.

Furthermore, Ilgen et al. (1979) defined feedback acceptance as "the recipient's belief that the feedback is an accurate portrayal of his or her performance" (p. 356). This further

indicates that an assessment of accuracy, or comparing the feedback information to what one already knows in their operating mental model, also occurs during the perception stage. Thus, mental models likely play a significant role in the perception and interpretation of feedback, which precedes potential feedback acceptance. Figure 2 shows how mental models might be a particular perceiver characteristic that could affect feedback acceptance via their influence on the perceptual stage.

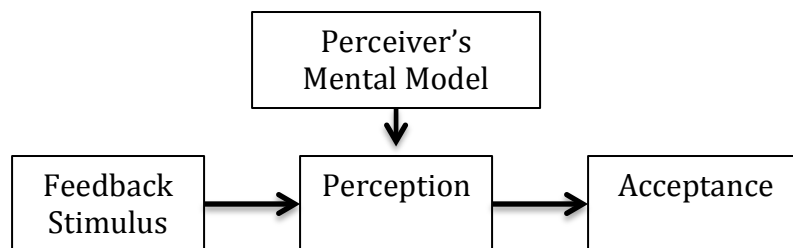


Figure 2: Role of a Perceiver's Mental Model in Feedback Perception and Acceptance

If feedback is not accepted, it loses its motivational function for development and performance improvement (Ilgen et al., 1979). Since feedback acceptance was defined in 1979, it has been examined as a key variable in many feedback reaction and performance improvement studies (e.g., Anseel & Lievens, 2009; Anseel et al., 2009; Anseel et al., 2011; Atwater & Brett, 2005; Atwater & Brett, 2006; Bell & Arthur, 2008; Fedor, Eder, & Buckley, 1989; Kinicki et al., 2004; Leung, Su, & Morris, 2001; McCarthy & Garavan, 2007). Hypotheses about why an individual may or may not accept feedback have been generated from many theoretical categories: social-cognitive (e.g., influence and conformity), cognitive (e.g., perceptions of accuracy and credibility), behavioral (e.g., external motivation), cognitive-behavioral (e.g., stages of change), personality (e.g., achievement motivation), and theories of self (e.g., self-efficacy). In the following sections I will briefly review research on feedback acceptance that has considered the role of feedback structure or trait-like variables. I will argue that while these

variables are important, cognitive variables, notably mental models, likely play a significant and uniquely practical role in the acceptance of feedback.

Structural Factors Affecting Feedback-Acceptance

Structural factors affecting feedback acceptance include characteristics of the feedback itself or the feedback situation. Ilgen and colleagues (1979) explain that feedback perception begins with interpreting the feedback stimulus. The feedback stimulus can vary in source, timing, and sign. These variables are related to the organization or the feedback giver, and are mostly beyond the feedback receiver's control.

Feedback source. People are more likely to accept feedback when they perceive the feedback source as credible (e.g., Halperin, Snyder, Shenkel, & Houston, 1976, Kudisch, 1996). There is evidence that negative feedback is more willingly accepted when provided by an expert source (Halperin et al.). Expertise can also be considered a type of credibility. Studies find that feedback from experts is rated more favorably (more accurate and useful) than feedback from peers (e.g., Albright & Levy, 1995). Feedback consistency, across sources and time, has also been found to be important. People are more likely to accept feedback and alter their self-perceptions when feedback is consistent (Sobieszek & Webster, 1973; Stone & Stone, 1985).

Feedback sign. Overwhelmingly, people are more likely to accept positive or favorable feedback (Kernis, 1994; Kluger & DeNisi, 1996; Stone & Stone, 1984; Van-Dijk & Kluger, 2004). It is well known that negative feedback sign is a threat to motivation and performance improvement (Cron et al., 2005; Kluger & DeNisi). This raises a practical issue. From a developmental perspective, acceptance of positive feedback is not nearly as important as acceptance of *negative* feedback. Negative feedback indicates a need for change or development. A person receiving positive feedback is already making the mark.

Multiple studies have investigated variables that might moderate the relationship between negative feedback sign and feedback acceptance (Jussim, Yen, & Aiello, 1995; Leung et al., 2001; Nease, Mudgett, & Quinones, 1999; Steelman & Rutkowski, 2004). The next sections will review personal traits and differences between individuals that can influence the relationship between feedback sign and feedback acceptance.

Trait-Like Factors Affecting Feedback Acceptance

Human behavior, such as reacting to feedback, is often influenced by an interaction between situational characteristics and personal characteristics (Hanges, Schneider, & Niles, 1990; Kenrick & Funder, 1988; Kluger & DeNisi, 1996; Tett & Burnett, 2003). Personal psychological characteristics that are relatively stable over time are called trait-like (McCrae, et al., 1999), and include personality and other dispositions, such as agreeableness (McCrae & Costa, 1987). Trait-like characteristics create patterned modes for thinking and behaving, such as how a person reacts in feedback situations. The trait-like variables *self-esteem*, *self-efficacy*, and *goal orientations* have received substantial attention in the feedback acceptance literature.

Self-esteem and self-efficacy. Self-efficacy is a set of beliefs that a person holds about their ability to perform (Bandura, 1982). Self-efficacy can moderate the effects of feedback sign on feedback acceptance. People with higher self-efficacy are less likely to accept repeated negative feedback, whereas people with lower self-efficacy are more likely to accept negative feedback (Nease et al., 1999). Similarly, people with low self-esteem have rated negative feedback as more accurate than positive feedback and those with high self-esteem have rated positive feedback as more accurate than negative feedback (Jussim et al., 1995). People with higher self-efficacy are also slightly more likely to engage in developmental follow-up behaviors regardless of feedback sign (Atwater & Brett, 2005).

Goal orientations. Different people have different preferences for the types of goals they pursue in achievement settings (Dweck, 1986). The two main classes of goal orientations are: (a) a learning goal orientation, which is to learn new information, acquire new skills, and master new situations, and (b) a performance goal orientation, which is to demonstrate and validate one's competence by avoiding negative situations and seeking favorable judgments (Dweck; Dweck & Leggett, 1988). Goal orientations can affect feedback acceptance through the type of feedback given. People with performance approach goals prefer task-referenced feedback and react more negatively to comparative feedback (Anseel et al., 2011). People with learning goal orientations do not respond as negatively to either type of feedback (Anseel et al.). Further, the interaction between feedback type and achievement goals affects future task performance indirectly through feedback reactions (Anseel et al.). In general, a person with a *performance goal orientation* interprets feedback as evaluative and judgmental, while people with *learning goal orientations* interpret feedback as useful information for correcting errors and developing skills for task mastery. As such, people with learning goal orientations are more likely to seek out feedback (Brett and Atwater, 2001; Payne, Youngcourt, & Beaubien, 2007) and have a developmental focus toward performance (Dweck, 1986).

Self-directed learning. A person with a developmental focus has a self-directed approach toward learning and development. Rather than waiting to be told that they need to develop, they take a proactive role in their development, and are more open to receiving and using feedback (London & Mone, 1999; Maurer, 2002). For example, feedback facilitator ratings of how “developmentally-focused” participants’ behavior appeared during a feedback giving process correlated positively with participant perceptions of feedback usefulness (Brett & Atwater, 2001).

Highly developmentally-focused individuals continuously search for new information about themselves and compare themselves to valued standards, through activities such as reading, finding mentors, setting goals, and seeking feedback (London & Mone, 1999; Maurer, 2002; Noe & Wilk, 1993). Feedback seeking has a positive relationship with task performance (Chen, Lam, & Zhong, 2007; Morrison, 1993). This implies that those who seek feedback also accept it to some degree, as feedback acceptance has been shown to mediate the relationship between feedback and performance (Anseel & Lievens, 2009; Kinicki et al., 2004).

Researchers have started to define, measure, and validate this learning disposition under various names, such as: motivation to learn (Noe, 1986; Colquitt & Simmering, 1998), training motivation (Kanfer, 1991), developmental readiness (Hannah, 2006), or readiness to develop (Walter, 2005). Walter conducted a validation study for readiness to develop, via a measure called Approach to Developmental Experiences (ADE), and found that ADE predicted developmental activity in a post-assessment follow-up evaluation. Similarly, individuals with higher initial positive attitudes toward feedback have been found to exhibit more motivation and positive emotional reactions to feedback than those with less positive attitudes, regardless of the type of feedback given (Atwater & Brett, 2005). Since readiness to develop has demonstrated close ties with feedback seeking and participation in developmental activities, I hypothesize that it will have a positive relationship with feedback acceptance independent of the cognitive factors that are the focus of this study. Further, because I hope to show that mental models can relate to feedback acceptance despite a person's predisposition toward development experiences, ADE will be used as a control in the current study.

H1: Participants' approach to development experiences will predict their acceptance of feedback.

Before a person accepts or rejects feedback, they first perceive and interpret it (Ilgen et al., 1979). A person's ability to interpret feedback depends on the *perceptual set* with which they approach the feedback, and this *set* is influenced by both personality and past experience (Ilgen et al., p. 355). The pervasiveness of personality and trait-like factors in feedback acceptance research was presented above. Next, I will discuss how a person's aggregate experience, codified as accumulated and organized knowledge, and the mental models therein created, can affect interpretation and reaction to feedback. Thus, I will argue that cognitive characteristics, specifically mental models, play a key role in people's acceptance of feedback via their ability to interpret and judge the accuracy of the feedback message.

Cognitive Factors Affecting Feedback Acceptance

Cognitive structures and processes play an important role in feedback acceptance and implementation (Brett & Atwater, 2001; Butler, 1987; Cross & Markus, 1994; Jussim, Soffin, Brown, Ley, & Kohlhepp, 1992; Kinicki et al., 2004; Kluger & DeNisi, 1996). A person's cognitive state and mental resources affect how they perceive, interpret, judge, learn from, and utilize feedback.

Several process models have outlined cognitive variables that mediate the relationship between receiving and reacting to feedback (Fedor, 1991; Ilgen et al., 1979; Kinicki et al., 2004; Kluger & DeNisi, 1996; Taylor, Fisher, & Ilgen, 1984). A longitudinal study by Kinicki and colleagues showed that a set of cognitive variables (perceived accuracy of feedback, desire to respond, and intentions to put forth effort) completely mediated the relationship between an individual's receipt of and reaction to feedback. Reflection, a cognitive task, has been shown to enhance task performance after feedback (Anseel et al., 2009). Reflecting entails a certain amount of paid attention and depth of processing (Craik, 2002). During reflection, a person mulls

over information and consults their internal reality (e.g., knowledge, self-views, beliefs, memories, attitudes, goals).

Self –views. Research on self-perceptions has shown that feedback reactions are not only contingent on the actual feedback, but how well the feedback matches the individual's self-view (Anseel & Lievens, 2006; Bandura, 1991; Dauenheimer Stahlberg, & Petersen, 1999; Korsgaard, 1996; Woo, Sims, Rupp, & Gibbons, 2008) and matters for their personal standards (Bandura, 1991). When people make comparisons between their self-views and external feedback, their reactions can be driven by different motives: self-verifying or self-enhancing (Jones, 1973; Shrauger, 1975). These motives can be transient, affected by cognitive resources such as attention capacity or self-view elaboration (Dauenheimer et al.; Hixon & Swann, 1993).

An experimental study showed that depriving people of time to reflect, through a cognitive load manipulation, interferes with their ability to assess their self-views and personal standards, which increases their preferences for favorable and self-enhancing feedback (Swann, Hixon, Stein-Seroussi, & Gilbert, 1990). Self-view elaboration, an indicator of certainty, complexity, and individual importance, is another variable that affects how people respond to feedback (Dauenheimer et al., 1999; Stahlberg, Peterson, & Dauengeimer, 1999.). People with highly elaborated self-views respond more favorably to feedback that they view as accurate (self-verify). In contrast, people with lower elaborated self-views are more concerned with the sign of feedback, feel more threatened by negative feedback, and reject the feedback via self-enhancing motives (Dauenheimer et al., 1999; Gross, Holtz, & Miller, 1995; Stahlberg et al., 1999). It seems that if a person has not taken the time to develop a well defined and certain self-view about something that is important to them, they feel more vulnerable and threatened in the face of external feedback.

Thus, feedback receivers consider their self-views alongside feedback from others when reacting to feedback, and both views (self and other) appear to relate to feedback acceptance. Self-views can be considered a part of a person's underlying mental model. I can have a self-view that I am a good leader or I have improved my leadership skills. However, my mental model for leadership encompasses my personal understanding of what leadership is, how I define it, how I value and weigh different aspects, how I relate it to other things, and my personal leadership goals. The complexity of a person's self-view may vary depending on the complexity or elaboration of their underlying mental model.

A highly elaborated self-view should be the product of a highly elaborated mental model of one's self in a system. With a highly elaborated mental model of a system, a person is more able to identify what it takes to have impact and behave successfully (Gary & Wood, 2011) and may also be more apt to see a value in relevant feedback and know how to use it. On the contrary, if feedback is too much of a departure from an individual's internal knowledge and reality, then the individual will struggle to make sense of or use of the feedback (Flavell, 1992; Illeris, 2004; Markus, 1977; Piaget, 1977).

If the individual cannot incorporate the feedback into what they already know, then many of the previously mentioned variables (i.e., feedback structure and personality traits) are irrelevant. Only if the individual is able to make sense of the feedback, or successfully change the way they think in order to incorporate the new information, will they be able to progress toward skill development.

Information processing. The act of thinking can also be called information processing. Our brains take in, react to, organize, and recall information. We are constantly processing information, thus our brains use the majority of the calories we consume (Mink, Blumenschine,

& Adams, 1981). Cognitive scientists have distinguished between two types of processing: automatic and controlled (Schneider & Shiffrin, 1977).

Automatic information processing is theorized to encompass evolutionarily old, low effort, rapid, stereotypical, and preconscious thinking. This type of information processing is called *automatic* because it does not require much mental energy or mulling over. Automatic processing includes for example: noticing stimuli through the senses, storing & retrieving memories, reacting to danger, or acquiring some forms of motor skills (Evans, 2008). Controlled information processing is slower and more effortful; it requires more energy and mental capacity, and is evolutionarily recent. Initially, complex behaviors, such as driving or leading, require more controlled processing. With practice, some complex behaviors can become more automatic, like driving a car. There is evidence that reacting to and processing feedback involves both automatic and controlled processing. (Swann et al., 1990).

Dual information-processing. There are theoretical propositions and empirical evidence that reacting to feedback may involve a multiple-step process, through dual information processing. First a person has an automatic, implicit emotional reaction to the sign of the feedback (Swann et al., 1990). This knee-jerk reaction doesn't take much effort (Evans, 2008). Then, if cognitive resources are available and engaged, a comparison is made between the feedback and one's current knowledge and self-view, contained within his/her mental models (Swann et al.). How the process proceeds from here likely depends on the complexity and accuracy of the person's domain-relevant mental models.

Mental Models

Learning, development, and other types of personal change involve building and modifying our mental models (Azevedo et al., 2005; Paquette et al., 2003; Piaget, 1977; Smith-

Jentsch, Cannon-Bowers, Tannenbaum, & Salas, 2008). Mental models are cognitive structures, domain-specific networks of associations between concepts in an individual's mind (Ward & Reingen, 1990). In laymen's terms people say: "when you change the way you look at things, the things you look at change." (Change quotes, n.d.).

People form mental models as they interact with their environments and reflect on causes and effects (Norman, 1983). People continually modify their models to maintain a functional, workable understanding of a system (Norman). Mental models are used to describe, explain, predict, and decide (Rouse & Morris, 1986). They include definitions of relationships between phenomena, such as cause and effect or relative comparisons.

In studying or comparing the knowledge structure of mental models, there are four aspects to consider: the *target system*, the *conceptual model*, the individual's *mental model*, and the *scientist's conceptualization* of the mental model (Norman, 1983, p. 7). The *target system* is what all individuals are conceptualizing. For example, all employees in an organization have their own idea about productivity. Thus, the target system would be productivity. A *conceptual model* is invented by teachers, scientists, or learning and development program designers to be the most accurate, consistent, and complete representation of the target system. For example, organizational subject matter experts create competency models and performance standards that describe what skills and behaviors are required for productivity. An *individual mental model* represents how any individual person conceptualizes the target system. All individuals have their own mental model, even if they helped construct the conceptual model. A *scientist's conceptualization* of a mental model is a meta-model, or a model of a model (Norman).

Mental models not only contain information about a system, but the person in relation to the system. They likely contain reactions to and emotions about parts of the system (Oatley &

Johnson-Laird, 1987; Pauen, 2006). As such, theorists have begun to distinguish between two types of mental model structures: *knowledge structures* and *belief structures*. Knowledge structures describe states of nature, while belief structures represent desired states influenced by expectations and preferences (Mohammed, Klimoski, & Rentsch, 2000). In a feedback context, knowledge structures contain information about the skills assessed, such as definitions, behavioral examples, scripts, and strategies. In comparison, belief structures contain preferences for having or developing various skills, which represent associated feelings, values, and expectations. There is evidence that these structures work together to describe, explain, predict, and decide (Bechara, Damasio, Tranel, & Damasio, 1997). Therefore, both structures (knowledge and belief) will be considered when measuring and comparing mental models in this study.

Research on knowledge structure comparisons has looked at two types of scenarios: situations where shared or similar structures are important, and situations where accurate structures are important. An assessment of accuracy is made when comparing an individual's mental model to a conceptual model (one that a set of experts determines is correct). Thus, accuracy is an assessment of correctness in comparison to the conceptual model. An assessment of similarity is made when two or more individual's models are compared. Figure 3 highlights these differences between knowledge structure similarity and accuracy.

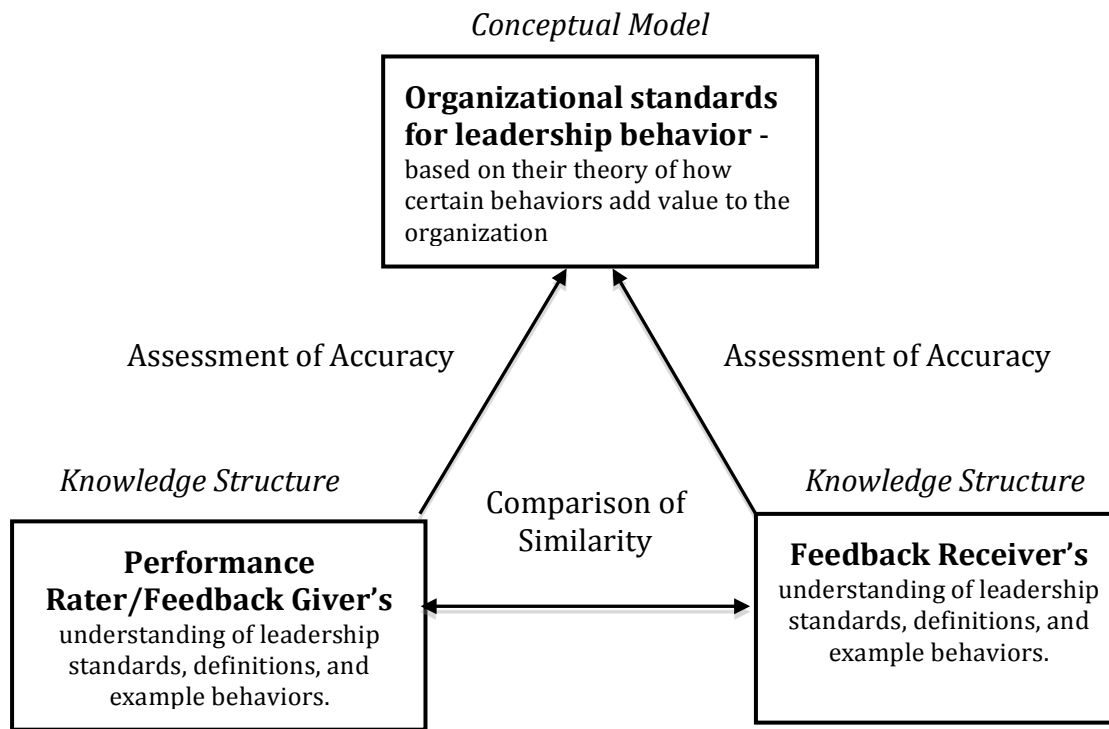


Figure 3: Knowledge Structure Accuracy vs. Similarity

To assess the correspondence between individual and expert belief structures, I will use the term alignment. As I will discuss in a later section, there are far fewer published studies examining belief structures, and therefore little precedent for terminology. Alignment will be the term used because beliefs are subjective, not absolute. Accordingly, individual mental models in this study will be examined in terms of their accuracy and alignment with the expert, conceptual model, and this data will be used to investigate relationships with feedback acceptance. This extends Ilgen et al.'s (1979) work by identifying and operationalizing mental model characteristics as variables to investigate in the perceptual stage of reacting to feedback. Thus, Figure 4 shows the potential role of mental models in the feedback-development process. The current study will focus on the relationship between mental models and feedback acceptance.

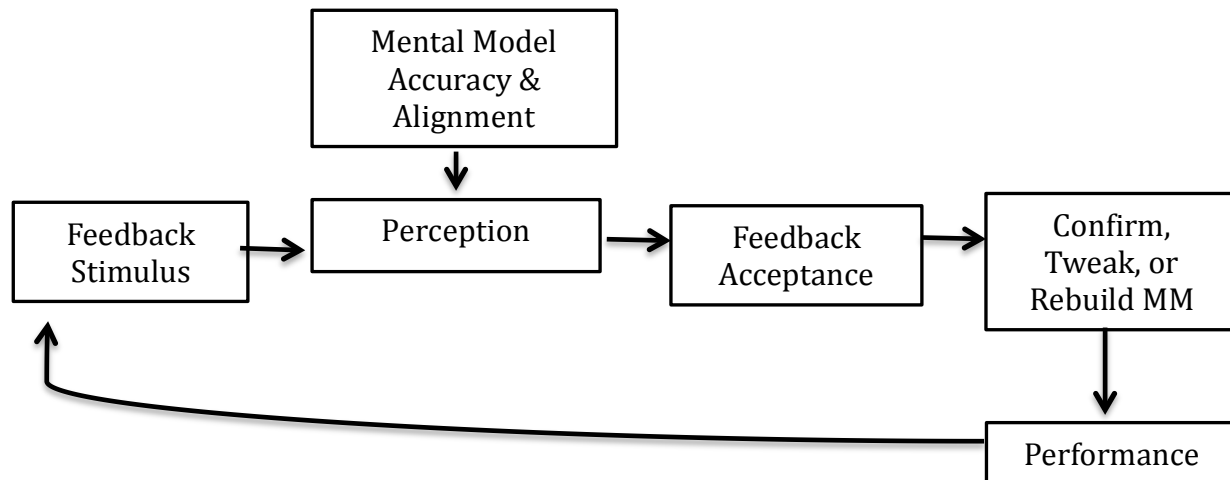


Figure 4: Conceptual Model of the Role of Mental Models In the Feedback-Development Process

Mental models and feedback. The experience of receiving feedback provides an opportunity for individuals to confirm, tweak, or rebuild their mental models. However, individuals are influenced by their current mental models when they process performance feedback. Mental models can help or hinder individuals depending on their accuracy and/or complexity. Consider a woman whose personal definition of *assertiveness* is: *being manipulative and bossy*. When she receives feedback from a supervisor that she needs to be more assertive, she is uninterested in pursuing this feedback due to the negative connotations in her mental model for assertiveness, which stemmed from her knowledge and belief structures. Figure 5a shows that the details of this woman’s metal model. Figure 5b shows that the organization she works for associates assertiveness with being confident and direct, which are characteristics they value. In the current study, knowledge structures will be compared and assessed for accuracy and belief structures will be compared in terms of alignment. In this example, the developpee’s definition of assertive as ‘manipulative and bossy’ represents her knowledge structure, and her belief structure: ‘not who I want to be,’ indicates that she does not value assertiveness. In

comparison to the organization's model, she does not have an accurate knowledge structure and her belief structure is not aligned with the organization.

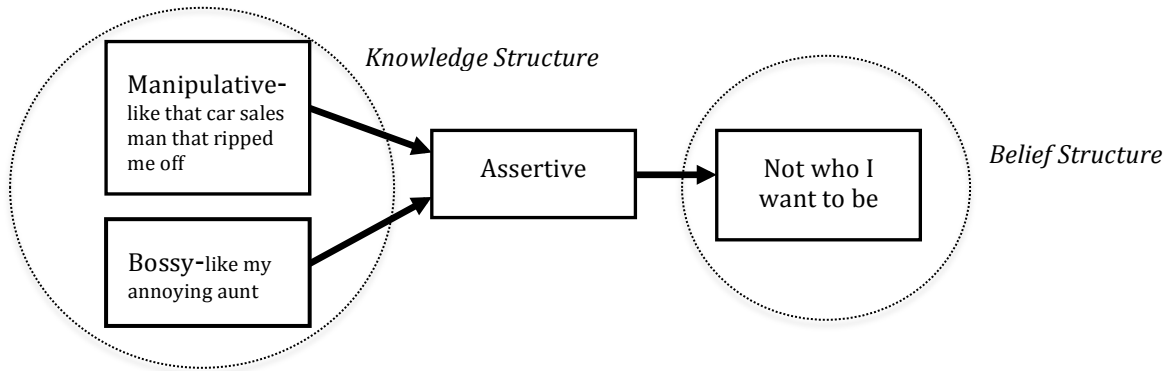


Figure 5a: Developpee's Mental Model

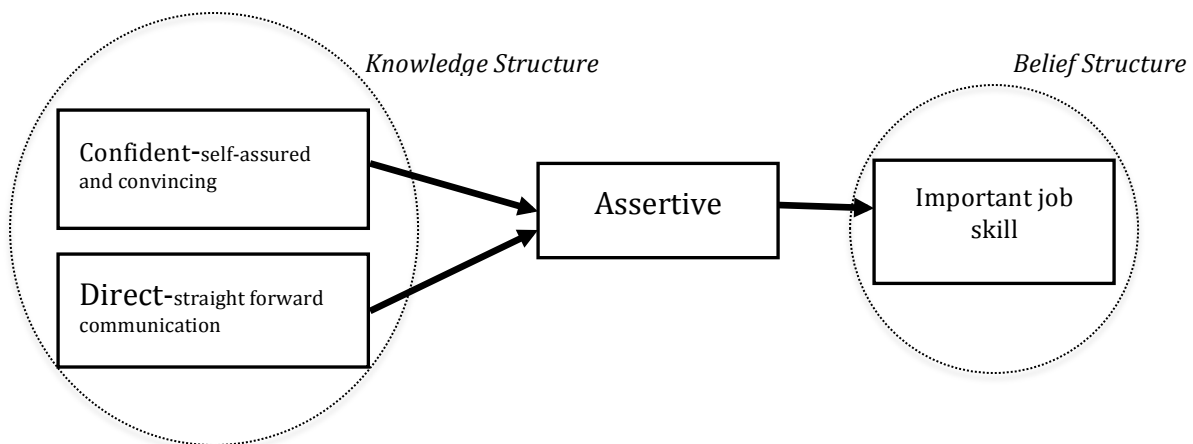


Figure 5b: Organization's Conceptual Model

In a more complex scenario, a supervisor tells a subordinate that he needs to improve his teamwork, but the subordinate thinks he is already being a good team player by doing his part and not getting in the way of others doing theirs (see Figure 6a). The problem is that the organization holds a more comprehensive, complex view of teamwork (see Figure 6b) than the subordinate, and the organization has not helped the employee align his mental model.

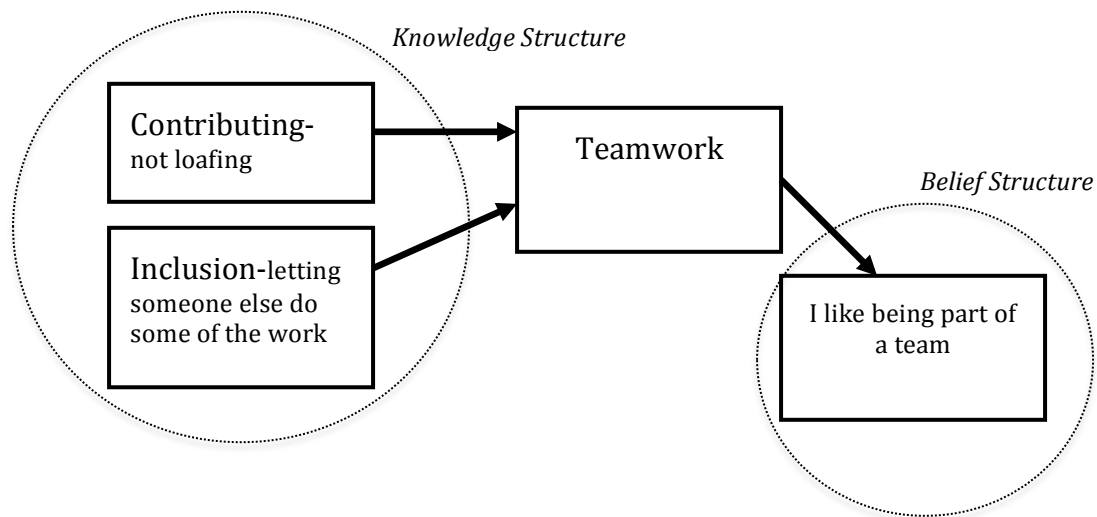


Figure 6a: Develepee's Mental Model

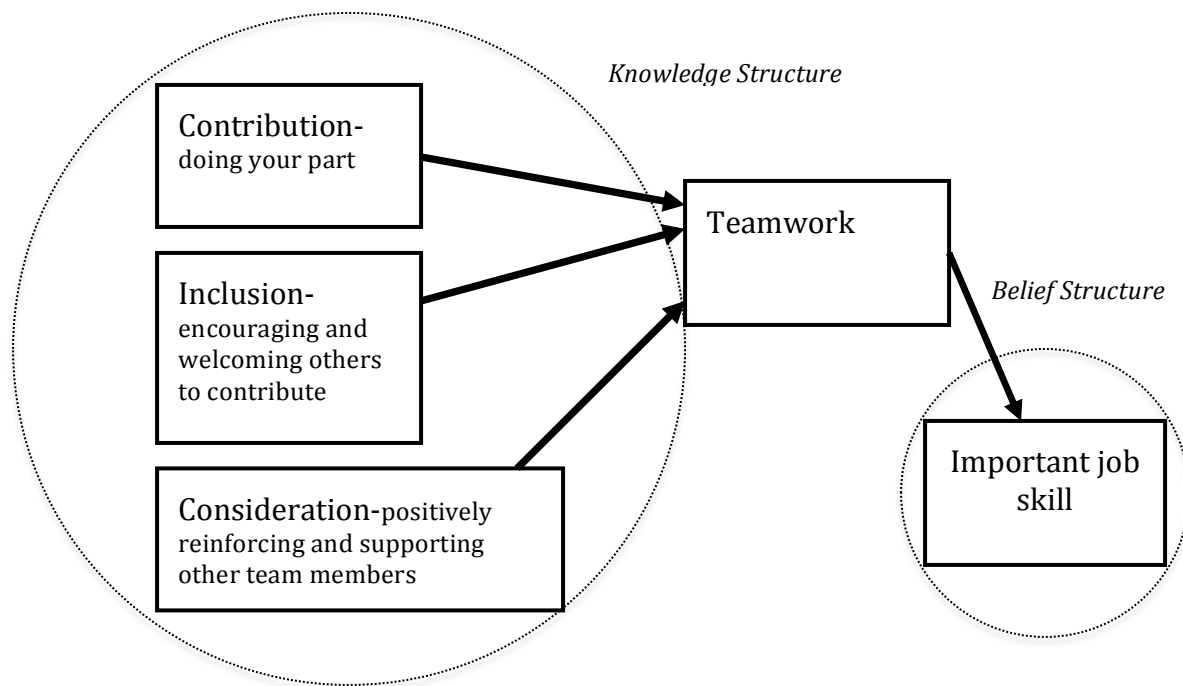


Figure 6b: Organization's Conceptual Model of Teamwork

In a more extreme, yet likely common, scenario, an organization gives highly specific performance and development feedback based on a rigorously developed competency model (see

Figure 7b) to an individual who has a very novice mental model for a particular skill (see Figure 7a). Thus, accepting and using the feedback will prove difficult. The individual will have a hard time incorporating and organizing the specifics, when their beginning model is simplistic.

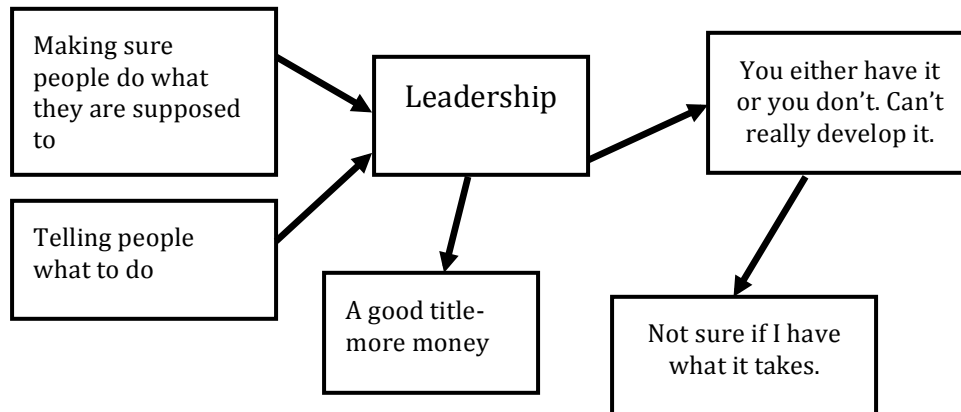


Figure 7a: Developpee's Mental Model

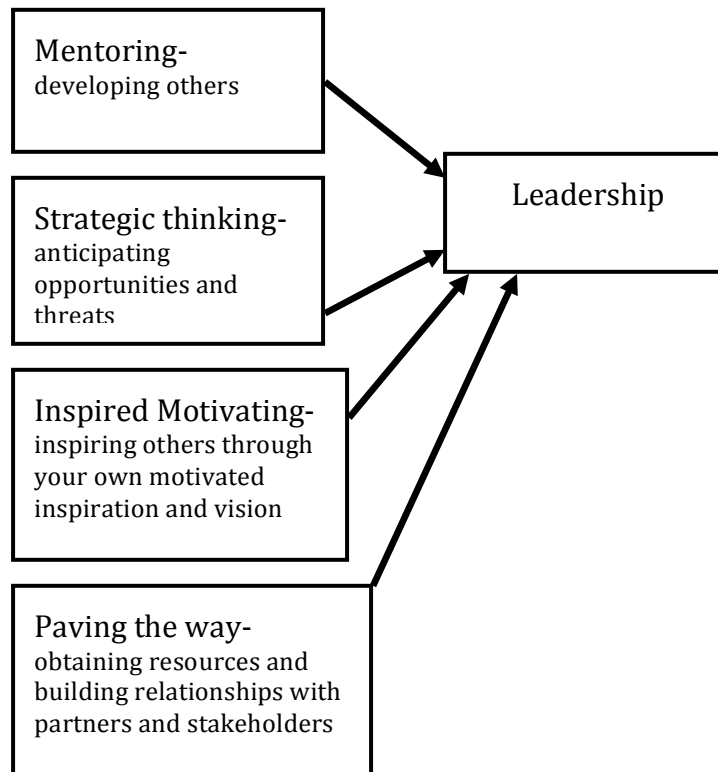


Figure 7b: Organization's Conceptual Model

These examples illustrate the possibility of discrepancy or mismatch between individual and organizational mental models. Many combinations of model mismatch have implications for worker productivity and organizational effectiveness. For example, mismatches can occur between team members, subordinates and superiors, decision-makers and non-decision makers, employees in different departments, etc. This may affect communication, coordination of efforts, and people “rowing in the same direction.” When it comes to developing people, getting on the same page about what skill competencies mean, what they look like, and why they are valued may have significant implications for feedback conversations and the acceptance of feedback.

The current study will focus on the accuracy and alignment of individual feedback receivers’ mental models for professional skills in comparison to an expert conceptual model. The expert conceptual model sets the criteria for skill performance and acts as a guide for feedback creation. The implication for performance management and feedback acceptance is that individuals’ current conceptualizations of a skill or task will influence their ability to accept feedback, depending on the difference between their current mental model for the task and the model that the organization is comparing them to. A quote from Ammons, in a paper about the effects of knowledge of performance, touches on the idea that individuals’ hypotheses about what they are supposed to be doing most likely affect their performance via an interaction with performance feedback:

One can be reasonably sure that performers will have hypotheses, and that these will interact in some way with knowledge of performance [feedback]. Since the hypotheses are often incorrect, the interaction will ordinarily lead to below-optimum performance (Ammons, 1956, p. 281).

Although Ammons shed light on this issue in 1956, the influence of mental model accuracy on feedback acceptance has yet to be explored. A better understanding of how accurate mental

models for performance criteria and feedback acceptance are related would be useful both theoretically and practically.

Measurement considerations. Mental models are complex and have been operationalized in a variety of ways (e.g., Johnson-Laird, 1983; Mohammed et al., 2000, Rouse & Morris, 1986; Wickens, 1984). In this study, I take a multidimensional approach to defining and measuring mental model accuracy and alignment. I will distinguish between knowledge and belief structures of mental models, and hypothesize relationships between multiple measures of mental model structures and feedback acceptance.

Knowledge Structures

The vast majority of work-specific mental model studies have focused on the knowledge structure of mental models (e.g., Mathieu, Heffner, Goodwin, Cannon-Bowers, & Salas, 2005). Knowledge structure represents the organization of concepts and the relationships between them. As such, it is a higher level of complexity than facts (declarative knowledge) and rules (procedural knowledge; Anderson, 1982). Knowledge structures help us build taxonomies, analogies, system knowledge, protocols, social scripts, theories, and heuristics (Pauen, 2006; Seel, 2006). A person's knowledge structure can be enhanced or limited by their experience with similar systems, their technical background, or their cognitive processing capacity (Norman, 1983).

For example, an experienced driver does not have to take time to remember what to do or weigh their options when they approach a red traffic light. An experienced driver has a solid, tried-and-true knowledge structure for operating a vehicle. Accessing and using the driving mental model is rapid and takes little effort. Yet, an experienced driver will spend significantly more mental energy when adjusting to driving in the opposite side of the car, on the other side of

the road, in a different country. The driver has to add new procedural rules to their driving concept. For example, “When I am driving in the UK, I enter the car from the right side. If I am driving from the right side of a car, I drive in the left lane. If I am driving in the left lane, I make turns into the left lane. If I am driving in the left lane, I read the signs on the left side of the road...” The driver will have to rehearse this new thinking until it becomes more automatic.

Modifying your knowledge structure can also be compared to reorganizing your desk to incorporate new files or supplies you acquired. You think about what things you might need to use together, when you might need to access them and how often, and you organize accordingly. Just as individuals construct unique ways of organizing their desks, people also develop their own unique, routine ways of thinking and behaving based on their knowledge structures.

Accurate knowledge structure. Accuracy is assessed when there is a known conceptual model, or a model that has been deemed “correct” by experts or authority figures. Accuracy is the correctness of a mental model compared to the conceptual model (Norman, 1983). Mental models can vary in accuracy. A study by Gary and Wood (2011) showed that differences in managerial mental models explained differences in strategy selection and performance. The manager’s mental models represented their knowledge and understanding of the strategic decision-making simulation system. Managers with more accurate mental models of the relationship between variables in a managerial simulation (the conceptual model) outperformed those with less accurate mental models. This is evidence of a link between accurate mental models and performance. Studies on increasing the accuracy of teamwork mental models provide a glimpse of the relationship between shared, accurate mental models and feedback acceptance.

Accurate knowledge structures should improve feedback acceptance. If team members change their knowledge structure to be more similar to an expert model, they increase

both their accuracy (to the expert model) and similarity (to each other). Smith-Jentsch et al. (2008) conducted an experiment to see if they could get teams to develop mental models of teamwork that were more similar to an expert model. Navy command and control teams were the focus of the study. Success for these teams requires high coordination of communication and action. The team members constantly feed information to each other that provides opportunities for behavioral adjustments (e.g., situation updates, requests for backup, offering backup). Essentially, they are giving each other feedback (information that they can act on to move closer to their goal).

During a performance debrief, the experimental group teams used guided team self-correction (Smith-Jentsch, Zeisig, Acton, & McPherson, 1998) to learn more about the expert teamwork model. During the debrief, the facilitator defined and described the performance dimensions and helped the team discuss (1) the successes and failures of their performance, and (2) how improvements could be made. This process of shared sensemaking led to an increase in shared understanding about the performance domain.

The experimental group showed more accuracy in their teamwork mental models compared to a control group that went through a standard debrief. A correlation was also found between teamwork mental model accuracy and similarity ($r = .78, p < .01$). Subsequently, teams that gained more accurate teamwork mental models from the guided self-reflection received higher teamwork scores in a following task simulation (Smith-Jentsch et al., 2008).

This study shows that people who share a common frame-of-reference are better able to coordinate their efforts because they have a shared understanding of the system, including the meaning of different types of information, and how best to act on various information. Thus, team members were more able to utilize the information provided to them by their teammates

(akin to accepting feedback). In the current study, participants received feedback about their individual behavior in a work simulation including how they performed and how to improve their skills. Similar to the study results described above (Smith-Jentsch et al., 2008), participants that have a more accurate frame-of-reference for the assessed skills should also have a greater capability for understanding and utilizing their feedback and, therefore, be more accepting of the information.

Measuring knowledge structure accuracy. Specifically, in this study, students participated in a leaderless group discussion and received feedback about their individual behavior on three career skills. Subject matter experts identified the most relevant skills and behaviors for effective performance and students received feedback based on the expert model. I predicted that participants' knowledge structure accuracy (comparison to the expert model) for the career skills would relate to their acceptance of feedback.

To measure knowledge structure, researchers have captured individuals' definitions of concepts and their beliefs about the relationships between concepts. Examples of tasks include: sorting concepts into piles (see Smith-Jentsch et al., 2008), judging the relationship between concepts (Barr, Stimpert, & Huff, 1992), semi-structured interviews followed by content analysis (Vandenbosch & Higgins, 1996), knowledge tests (Gary & Wood, 2011), or drawing out a model on paper (Hodgkinson, Brown, Maule, Glaister, & Pearman, 1999). This study included measures of multiple variables to capture individuals' knowledge structure: ability to identify criteria, skill judgment accuracy, and skill model accuracy.

Ability to identify criteria. Several research studies have shown that a person's ability to identify evaluation criteria (ATIC) accounts for substantial variance in predicting their performance (König, Melchers, Kleinmann, Richter, & Klehe, 2007; Melchers Klehe, Richter,

Kleinmann, König, & Lievens, 2009; Preckel & Schupbach, 2005). This is because people differ in how they assess the demands of social situations and adapt their behavior. ATIC represents the ability to make sense of complex situations and understand what behavior is required for success.

This variable is important because the ability to predict performance criteria should be related to the accuracy of a performer's mental model. Predicting performance criteria entails noticing things about a performance situation, such as the obstacles and opportunities. Past experiences and some learned knowledge help people create a memory and model for how particular situations operate and unfold (Lurigio & Carroll, 1985). People search their mental models for situations that have similarities with their current situation and make inferences about what to expect and how to perform (Vandierendonck, Dierckx, & Van der Beken, 2006).

A study by Jansen, Lievens, and Kleinmann (2011) showed that assessment center participants who were high on dimension-relevant traits, but who could not correctly identify the performance criteria (low ATIC), received lower assessment ratings than those who could identify the performance criteria. This could be analogous to owning the right golf clubs, but not recognizing when to use the right one for a particular shot. Given that ATIC is shown to relate to recognizing performance standards, I predict that it will also help people to recognize and accept the accuracy of performance feedback.

H2: Participants' ability to identify criteria will predict their acceptance of feedback.

Skill judgments. The drawback of ATIC when it comes to understanding feedback acceptance is that ATIC is a context-specific type of social effectiveness, and it is specific to short-term assessments (König et al., 2007; Melchers et al., 2009). The level of mental model complexity needed to identify performance criteria is probably less than what is needed for applying performance criteria for self-evaluation. Self-evaluation, which is a crucial step in self-

regulation toward goals, involves judging the effectiveness of one's behavior in comparison to performance criteria standards (Bandura, 1991). However, many performers do not possess enough mental model complexity in the requisite performance criteria domains to judge the effectiveness of their behaviors.

On the organizational side of the equation, best practices in performance evaluation call for systematically choosing and defining performance criteria. Professionals that design competency models and assessments spend a lot of time scrutinizing definitions of skills at multiple levels and choosing behavioral indicators that can be measured with a reasonable level of reliability (Landy & Farr, 1980; Lievens, Sanchez, & De Corte 2004; Shippmann et al., 2000). In essence, many skill and behavioral judgments are made to create an expert model that can serve as the standard of comparison for evaluating performers.

Most performers, on the other hand, do not participate in this expert sensemaking process and may not be exposed to the expert model until they receive feedback. On a daily basis, performers are influenced by their lay understanding (individual mental models) of what they need to do to perform and develop. Performers vary in how they judge the effectiveness of different behaviors and some of them will judge behaviors more similarly to experts than others. The accuracy of participant effectiveness judgments can serve as an indication of mental model alignment (see Webber, Chen, Payne, Marsh, & Zaccaro, 2000). In this study, I used a knowledge test to assess participant's judgments of the effectiveness of different behaviors and scored their answers against an expert model. Thus, a participant's score on the knowledge test indicates their level of agreement with how the experts judge behaviors. As such, participants that agree with how the experts judge behaviors in general should be more likely to agree with and accept the experts' judgment of their own behaviors.

H3: Participants' skill judgment accuracy will predict their acceptance of feedback.

Skill models. A traditional mode of evaluating knowledge structure involves eliciting and representing individual's mental models with a sorting procedure. Sorting activities are useful for capturing an individual's perspective on the relationship between and among concepts (Goldsmith & Kraiger, 1997). These relationships are elicited by having the individual "sort" concepts into piles based on a given or assumed framework (see Smith-Jentsch, Campbell, Milanovich, & Reynolds, 2001; Smith-Jentsch et al., 2008). For example, a researcher may give an individual the framework of "food groups" and a list of concepts that represent food items. Instructions for sorting activities tell people to put similar concepts in the same pile, and dissimilar concepts in a separate pile. Following the food example, a person might make piles that represent fruits, dairy, and meats. Thus, a representational model of how the person thinks about food groups can be built based on these sorting choices. In the current study, I was interested in how participants would sort a set of behaviors related to the focal skills in the expert model. The way in which participants sorted the behaviors represented what I called their skill model. Further, I compared participants' skill models to an expert model to determine accuracy. A positive correlation between the participant's model and the expert model will signify that a participant shows some agreement with the way the experts behaviorally operationalized the focal skills. Because the same behavioral examples served as anchors (on behaviorally anchored rating scales) for assessing participants' behavior (further explained in the methods section), participants that show agreement with the expert operationalization also, by definition, show agreement with the behavioral criteria. A participant that shows agreement with the behavioral operationalization of the focal skills, via a more accurate skill model, should be more likely to understand and agree with their feedback, as it is based on criteria they agree with.

H4: Participants' skill model accuracy will predict their acceptance of feedback.

Belief Structures

As mentioned previously, mental models not only contain information about a target system, but about the person in relation to the system (Oatley & Johnson-Laird, 1987; Pauen, 2006). The literature on mental model measurement has called for belief structures to be included alongside knowledge structures (Mohammed et al., 2000). The belief components of mental models help us create hierarchies of interests, values and goals, which affect motivations, priorities, and decision-making (Ward & Reingen, 1990). Belief structures represent desired states influenced by expectations and preferences, which have a subjective and evaluative nature (Mohammed et al.).

According to the social cognition literature, desired future states are formed by individuals' self-concepts (Markus & Nurius, 1986). The self-concept represents an individual's theory about who they are, including: who they were in the past, who they currently are, and who they might be in the future (Neisser, 1993; Oyserman, 2001). The forward-looking part of a person's self-concept includes *possible selves*. Possible selves represent notions of what an individual may want to become, or avoid becoming in the future.

Thus, the desired future states that possible selves can attain become directors and regulators of behavior, as they exert selective influence over behavioral choices and attention given to behavioral outcomes (Bandura, 1991). As mentioned previously, self-regulation requires performance feedback, or information about the current effects of one's behavior (Bandura). Consequently, research shows that the greatest increases in performance are made under the combined effect of performance goals and performance feedback (Bandura & Cervone, 1983).

The goals that individuals pursue are as diverse as individuals themselves, thus different people value and seek varying information about their behavior (Bandura, 1991). As such, individuals consult their self-concepts when interpreting, reacting to, and using feedback (Bandura; Jones, 1973) in order to answer questions such as: “Does this information pertain to a behavior I value? Will this information help me adjust my behavior to be more effective? Will my increased effectiveness help me obtain a desired future state?”. Therefore, when an organization provides individuals with performance feedback, the value of that feedback will vary for each individual depending on their self-concepts and desired states, which are factors of their belief structure. Furthermore, congruence between the feedback an organization gives and the feedback that an individual desires should create a belief/value alignment between the organization and the individual.

Aligned belief structures. When comparing and describing the relationship between individual and organizational belief structures, the word *alignment* is more appropriate than *accuracy*, given the subjective nature of values and goals. There are several lines of research that have looked at the effects of aligned belief structures in various forms. I will highlight a few studies in order to provide examples of how aligned belief structures have been investigated, and then explain how aligned belief structure should improve feedback acceptance.

Theories of person-culture fit propose that the interaction between individuals and situations combine to influence individual’s responses in a given situation (Chatman, 1989; Terborg, 1981). That is, an individual’s attitudes and behaviors can be influenced by the combined effects of their personal characteristics (e.g., personality, values, and expectations) and the facets of their situation, such as norms, expectations, incentives, and resources. Fit is

measured by looking at alignment between organizational and individual characteristics, such as values or goals.

Individuals seek to enhance their self-concepts and experienced meaningfulness and connectedness by working for organizations that share their values and goals (Ashforth & Mael, 1989). Value congruence between individuals and organizations indeed relates to increased organizational commitment, organizational satisfaction, and intent to stay with the organization (Cable & Edwards, 2004; Kristof-Brown, Zimmerman, & Johnson, 2005). Similarly, a recent study on goal congruence examined whether individuals' personal and work goals matched the goals of their organization. Goal congruence significantly predicted organizational commitment and job satisfaction. Goal congruence also explained additional variance in valued work attitudes over and above traditional measures of fit (Supeli & Creed, 2014).

Aligned belief structure should improve feedback acceptance. In their seminal article on the consequences of individual feedback on behavior, Ilgen et al. (1979) refer to the personal *information value* of feedback: "The usefulness of the feedback information to the recipient depends on both the nature of the feedback stimulus and the recipient. Recipients must be able to convert or transform the feedback message to units that are meaningful to them" (p. 351). Not surprisingly, research on the self has shown us that feedback reactions are not only contingent on the actual feedback, but also on how well the feedback matches the individual's self-view or self-concept (Anseel & Lievens, 2006; Dauenheimer et al., 1999; Korsgaard, 1996; Woo et al., 2008). Put another way, feedback with self-relevant information (indicating a belief alignment) is more likely to produce positive reactions, such as feedback acceptance.

As previously mentioned in the section on self-views, multiple personality feedback studies have examined the relationship between self-concept *elaboration* and feedback reactions.

Elaboration encompasses the self-concept dimensions of: perceived effectiveness, certainty of perceived effectiveness, and self-importance of effectiveness (Stahlberg et al., 1999). For example, Person A perceives that he is a highly effective communicator, he is moderately certain of his effectiveness, and this skill is mildly important to his self concept. In comparison, Person B believes she is a highly effective communicator, she is very certain of her effectiveness, and this skill is extremely important to her self-concept. Person B has a higher elaborated self-concept for communication.

Results of these self-concept studies have shown that self-concept elaboration moderates the effects of feedback on feedback reactions (Dauenheimer et al., 1999; Ennigkeit & Hansel, 2014; Markus, 1977; Stahlberg et al., 1999). People with higher elaboration for a skill or trait are more likely to have positive reactions to self-consistent information than self-inconsistent information. Thus, Person B, mentioned above, would have more positive reactions to self-consistent information about communication skills than Person A.

The relevant assumption about self-concept elaboration is that higher elaboration indicates the existence of more sophisticated personal standards, which help performers judge the self-relevance of feedback (Bandura, 1991). Moreover, because this variable is indexed by questions of personal beliefs and self-importance, it represents a measure of belief structure. In the current study, the measurement of belief structure alignment was influenced by these methods in the fit and self-concept literatures.

Measuring belief structure alignment. Although the distinction between knowledge and belief structure is present in a growing body of literature in multiple domains (Kihlstrom & Cantor, 1984; Markus & Wurf, 1987), a comprehensive theory or nomological network does not yet exist. Belief structure is an umbrella term introduced to the team mental model literature by

Mohammed et al. (2000), who described the concept as: “desired states that one prefers, expects, or demands” (p. 125). Mohammed and colleagues draw this distinction from an empirical study by Ward and Reingen (1990), in which they measure *sociocognitive structure*, operationalized as connections between attributes, inferences, and goals. Other studies mentioned in this line of investigation (Mohammed, Ferzandi, & Hamilton, 2010) measuring *belief structure* have looked at beliefs about a phenomenon (failure; Cannon & Edmonson, 2001), cognitive consensus based on shared assumptions and the interpretation of issues (Mohammed & Ringseis, 2001), and negotiated belief structure (Walsh, Henderson, & Deighton, 1988). My review of these studies did not offer a consistent definition or operationalization of belief structure, thus I had to extrapolate and decide what was best for the current study. As such, I designed a simple measure of belief structure by following the examples of the fit and self-concept elaboration literatures previously presented.

First, I defined the expert belief structure. I asked subject matter experts to select the focal skills of the study based on two criteria: (1) relevance/importance for effective performance in the leaderless group discussion and (2) importance for both academic and career success. Thus, the skills chosen represent the subject matter experts’ beliefs about the importance of these particular skills for effective performance in the LGD and for general success beyond the LGD.

To measure participants’ belief structures regarding career skills, they were given the opportunity to indicate which career skills were important for their planned careers. It was assumed that the career skills they believed were important for their planned careers held more personal value, in comparison to skills they did not indicate as important. Therefore, belief structure alignment was assessed in this study by examining agreement on career skill importance between feedback givers (LGD experts) and receivers (LGD participants).

Consequently, evidence of belief structure alignment would indicate that the participant agrees with the importance of the focal skills, to some degree. Following the propositions of the Social Cognitive and Person-Culture Fit theories (Bandura; Chatman, 1989; Terborg, 1981), I hypothesize that participants will be more accepting of their feedback, according to how much they believe the focal skills are important for their planned careers.

H5a: Participants' belief structure alignment (if they choose any or all of the focal skills as important for their career) will predict their acceptance of feedback.

Further, since receiving feedback on a performance domain for which people have self-selected goals predicts more performance increases than receiving feedback without goals (Bandura & Cervone, 1983), I hypothesize that participants with accurate knowledge structures will be more accepting of their feedback when they also have aligned belief structures, indicating that feedback acceptance is influenced by the interaction between accurate skill knowledge and the self-relevance of the focal skills.

H5b: The relationship between each of the knowledge structure variables and feedback acceptance will be moderated by belief structure alignment.

Incremental Value of Mental Models Over Other Predictors of Feedback Acceptance

In order to investigate the usefulness of mental model measures as a predictor of feedback acceptance, it is useful to examine their predictive influence in light of other influential variables: performance and readiness to develop.

Readiness to develop & feedback acceptance. Developmentally-focused individuals take a proactive role in their development. Previously, I described the positive relationships among readiness to develop and (1) feedback seeking and (2) participation in developmental activities. Approach to developmental experiences is being used as a control measure in this

study so that the role of mental models in explaining feedback acceptance can be examined independently of a person's prior inclination or preference for development. I expect that knowledge structure indicators will predict feedback acceptance beyond a person's interest in development because research shows that general cognitive ability predicts performance beyond a person's motivation for achievement (Wright, Kacmar, McMahan, & Deleeuw, 1995). In other words, the ability to interpret the feedback through an accurate knowledge structure may have incremental value beyond a person's desire to improve alone. An accurate knowledge structure should help a person who desires improvement to know how to use their feedback information, which should influence their acceptance beyond their predisposition for development.

H6: Knowledge structure indicators will predict feedback acceptance beyond Approach to Developmental Experiences.

Performance & feedback acceptance. It is well known that feedback sign affects the perception of feedback (Ilgen et al., 1979; Kluger & DeNisi, 1996). There is a strong, positive relationship between feedback sign and feedback reactions, with positive feedback predicting more positive reactions (Brett & Atwater, 2001; Kluger & DeNisi). Further, performance scores (whether explicitly reported in feedback or not) have a significant positive relationship with feedback acceptance (Anseel & Lievens, 2009). Given that the relationship between performance and feedback acceptance is so strong, researchers have looked for variables that influence feedback acceptance beyond feedback sign. I propose that the feedback receiver's ability to make sense of the feedback (that is, their knowledge structure accuracy) will relate to feedback acceptance beyond performance ratings.

H7: A group of knowledge structure indicators will predict feedback acceptance beyond performance scores.

Research questions. Mental models have been measured in a variety of ways, but most studies have used only a singular operationalization. Multiple measures are included in this study in order to capture more of the complex nature of mental models. Thus, some exploratory tests will be conducted with relative weights analysis to investigate two research questions.

Research Question1: How does each knowledge structure indicator uniquely add to the prediction of feedback acceptance?

Research Question 2: Does the belief structure indicator add unique variance to the prediction of feedback acceptance above and beyond the knowledge structure indicators?

Method

Overview

Participants. Participants were 244 undergraduates (151 males and 96 females), taking a psychology course, at a large university in the Rocky Mountain region. Students participated in the study for partial fulfillment of course credit.

Assessors. Assessors were ten upper-level, undergraduate psychology students who enrolled in the lab to be trained as research assistants and gain research credit. Following best practices for assessor training, assessors were trained for ten hours on the assessment center method, behavioral observation, exercise details, dimension definitions, providing feedback, and ethics (Woehr & Huffcutt, 1994). Assessors also participated in frame-of-reference training to minimize common rating errors (e.g., halo, missing the middle, stereotype bias). During training and actual assessment, assessors were required to discuss ratings to exact agreement. Ratings were made on a 4-point scale ranging from 1=Ineffective to 4=Outstanding. To track interrater agreement and identify the “expert” skill effectiveness model, assessors individually completed a behavioral rating task at two points in time, the second & eighth weeks of assessing participants. The behavioral examples in the rating task were representative of behaviors that would likely be seen in the leaderless group discussion and the assessors rated the effectiveness of these behavioral examples (See Appendix A).

Dimensions. *Dimension* is the term used in assessment centers for the aspects of performance that are being assessed, such as leadership, critical thinking, planning, teamwork, or adaptability. Any given exercise in an assessment center can elicit a variety of skill dimensions; however, simulation designers choose which dimensions to evaluate based on a competency

model and the purpose of the assessment (e.g., hiring, promotion, skill development). To ensure that the assessors would rate the most relevant dimensions, I sought the input of subject matter experts familiar with assessment center exercises. Nine subject matter experts were asked to read through the participant exercise materials and select the three *most* and three *moderately* relevant dimensions for *effective* performance in the simulation exercise. These SMEs were five graduate and four undergraduate psychology students with previous assessment center experience. The SMEs choose these six dimensions from a list of commonly used assessment center dimensions (Thornton & Rupp, 2006). These choices allowed me to identify the most relevant, moderately relevant, and least relevant dimensions for effective performance. The three dimensions rated as most relevant (communication, teamwork, and planning/organizing) became the focus for assessment and feedback in this study. The other dimensions identified were utilized in two of the study measures-ATIC and Career Skill Importance.

Procedure

All participants experienced the same protocol. The study was introduced as an investigation to understand more about how people respond to performance feedback. A short orientation was given and written informed consent was obtained from all participants. Next, the participants responded to a measure of their approach to developmental exercises (Appendix B; Walter, 2005). All survey measures in this study were administered electronically via Qualtrics. After responding to the Approach to Development measure, the participants were given a career stimulus.

The purpose of this stimulus was to foster engagement in the study. As mentioned previously, the subjects in this study were invited to participate in research studies, of their choosing, for college course grade points. Volunteer status (volunteer versus non-volunteer

research subjects) has been shown to relate to differences in study performance and responding, with non-volunteers showing less participation motivation (Cox & Sippelle, 1971).

The participants in this study could be considered quasi-volunteers because they had an alternate choice for receiving grade points (writing papers), but this alternate choice is commonly considered a less desirable option. Further, examinations of lab studies using college students have shown that the lack of real consequences can threaten realism, and the meaning that subjects assign to the situation is very important for internal and external validity (Berkowitz & Donnerstein, 1982). Finally, people are more likely to behave in line with their personal standards when they are made self-aware (Duval & Wicklund, 1972). Thus, students were given a single-page stimulus with quotes from corporations, taken from real news articles, which pointed out the trend in recent college graduates lacking career skills. Below these quotations were two blank spaces for participants to list their academic major and planned career field (See Appendix C). The content of this stimulus should address the issues mentioned above by bringing to light a relevant, real-world consequence and making the current situation personally relevant.

After reading and filling out the career stimulus form, participants were given written instructions for a leaderless group discussion (LGD), see Appendix D. Participants had eight minutes to review the materials and 12 minutes to engage in the discussion. An administrator kept track of time and escorted participants to a conference room for the discussion. Discussions took place in groups of 2-4 participants. Each participant was observed by two trained assessors and each assessor rated 1-2 participants. For example, a group of four participants was observed by four assessors, each of who rated two participants.

The exercise. The simulation exercise asked participants to imagine that they were resident advisors for a fictional residence hall, and informed them that they must work together with other resident advisors to plan a hall activity. In this role, they were asked to do several things: review background information about the demographic makeup of the residence hall and past activities, brainstorm new ideas with fellow group members for the best activity, and formulate a brief plan for the activity. The trained assessors observed participants' behavior during the group discussion and compared their observations to clearly defined performance standards. Later these comparisons and evaluations were used to generate real feedback. It was made clear to participants that the feedback they received on their performance was not “fake” or experimentally manipulated in any way.

Pre-feedback measures. At the end of the discussion, participants were told that the skill assessment portion of the study was over and that I wanted to survey them about their experience and opinions. In order, they completed an open-ended ATIC measure, a sorting task, a measure of career skill importance, a closed-ended ATIC measure, and measure of their skill effectiveness judgments. These measures are explained in detail below. The participants were told that their group discussion feedback would not be influenced by any of the additional measures.

Distractor task. A pilot study revealed that the participants had downtime between finishing the pre-feedback surveys and waiting to receive their feedback. This provided the opportunity to add a distractor task to: (a) keep them occupied while they waited and (b) direct their attention away from the mental model measures they completed before they responded to the final measure, feedback acceptance. Accordingly, participants were given a choice between a

Sudoku puzzle or a “copy the image” drawing task to work on during the downtime (Sitzman, Rhodes, & Tauber, 2014).

Feedback. After completing the individual measures, each participant received a personalized, written feedback report. The feedback provided to participants was real and customized. In the feedback report, participants received one of four skill level labels ranging from “Developmental Focus” to “Strength” for each dimension (rather than the raw numerical rating), and a list of effective and ineffective behaviors they displayed for each dimension during the LGD. The level of performance on each skill was also graphically displayed in a chart. The design of this report was deliberately chosen to mimic the layout of 360-degree feedback reports commonly used in organizational practice (See Appendix E).

Participants also received a list of developmental suggestions based on their lowest-rated dimension. A group of SMEs previously created the developmental suggestions for each dimension and entered them into the feedback database. Developmental suggestions were then drawn from the database according to a participant’s dimension scores. Consequently, participants with the same lowest-rated dimension would receive the same developmental recommendations. Thus, participants received quasi-individualized recommendations.

Post-feedback measure. Participants were told to take a few minutes to review their feedback. After the participants read their reports, they were asked to complete a measure of their reactions to the feedback (Feedback Acceptance). Finally, participants were debriefed and dismissed. The total study time ranged from an hour to an hour and fifteen minutes.

Measures

Order of measurement. I carefully deliberated the order in which the measures would be presented in this study. Due to the necessary repetition of various mental model measures,

caution was taken with the order of presentation to avoid revealing the expert model or bringing participant mental models more in line with the expert model. If participant mental models changed to be more similar to the expert model during this process, that would have eliminated some of the expected variance and predictive information of individual differences in mental model accuracy.

Participants were never told that there was an expert model or that their answers were to be scored against a *correct response*. The instructions for each measure were carefully worded to avoid sounding like a test of knowledge, but rather a survey of perspectives, preferences, or beliefs. The measures varied in how much information they contained from the expert model (e.g., skill definitions, dimension names, behavioral examples), and the order of presentation followed from least to most information revealed in order to restrict exposure to the expert information for as long as possible. Further, the connection to the expert model was never made explicit. The measures are listed and described below in the order that they were presented.

Approach to development. The Approach to Developmental Experiences (ADE) measure was created to assess an individual's interest in developmental activities and self-directed development (Walter, 2005), also known as the psychological construct *Readiness to Develop* or employee learning and development orientation (ELDO, Maurer, 2002). The scale consists of 19 items that assess attitudes and experiences regarding developmental activities on a 5-point scale (1=Not at all like me and 5= Just like me). See Appendix B. Example items include: "I search for new ways to develop myself" and "I try to see what others are doing, so I can learn from them." In this study, the internal consistency of this scale was $\alpha = .84$.

Performance. In pairs of two, assessors were assigned to independently rate performance for each participant in the LGD. Assessors observed participants in real time and recorded

dimension-relevant behaviors, including behavioral omissions (missed opportunities). Subsequently, assessors compared their observations to a 4-point, behaviorally anchored rating scale (BARS). On the BARS, each dimension was broken down into three subdimensions and each subdimension was represented by several behavioral examples (categorized by ineffective, minimally effective, effective, and outstanding). See Appendix F. The assessors used the BARS as a guide for rating each subdimension and their ratings were entered into a database. Each participant received ratings from two assessors. Once both assessors entered their observations in the database an automated agreement check was run. The database flagged subdimensions where ratings were not in agreement. In cases of disagreement, the assessors discussed the difference and came to a consensus about the final rating. The database then calculated dimension scores by averaging the ratings on the subdimensions. Participants did not receive the raw scores; rather, they were presented with summary labels for each dimension (scores above 3.45=Strength, 3.44-2.45=Competence, 2.44-1.45=Developmental Opportunity, and 1.44 and below=Developmental Focus). A total performance score (sum of scores on the three dimensions) could reach a maximum of 12.

Open-ended, ability to identify criteria. Similar to previous studies measuring ATIC (Kleinmann, 1993; König, Klaus, Melchers, Kleinmann, 2006), participants were asked to generate their own hypotheses about what was being evaluated in the exercise, using the prompt: “Activities like the one you just participated in are often used in organizations to evaluate participants on many different kinds of skills. In the activity you just completed, what do you think we were trying to assess? Be as specific as you can.” Participants were given space to write their answer.

Sorting task. The task of sorting, or putting concepts in the same pile or group that are assumed to “be similar” and putting concepts assumed to be dissimilar into separate groups, is a way to elicit judgments of conceptual relationships and capture structural knowledge (Goldsmith & Kraiger, 1997). To define the domain, two SMEs generated a list of behaviors that represented each of the three focal dimensions of this study (communication, planning/organizing, and teamwork). Both effective and ineffective behavioral examples were included. A small pilot test with two current college students, two non-students, and one SME helped to clarify and reword the behavioral examples. Based on this feedback the list was finalized to sixteen behaviors.

To elicit participant judgments of the conceptual relationships among the behaviors, the “Pick, Group, and Rank” survey feature in Qualtrics was used. Participants were instructed to sort the list of behaviors into groups that represent different professional skills. Further, they were told that they could create between 1 and 5 groups and that behaviors put in the same group should be considered evidence of the same skill, while behaviors sorted into different groups should be evidence of differing skills (See Appendix G).

Based on the features and functionality of Qualtrics, it was decided that leaving the number of groups totally open to participants was not a user-friendly option, especially if a participant wanted to change part of their response mid-sort. Thus, the fixed range of 1-5 groups was set, centered on the content domain of the 3 dimensions (3 skill groups, plus or minus 2). The task was pilot tested with 25 people (mostly undergraduate psychology students) and respondents created between 2 and 5 groups (4%-2 groups, 24%-3 groups, 44%-4 groups, 28%-5 groups). Thus, the 1-5 range was retained.

Responses were scored based on sorting methods used in previous research (Smith-Jentsch et al., 2001; Smith-Jentsch et al., 2008). Points were assigned to every potential

behavioral pair (every possible pairing of the 16 behaviors). Accordingly, 120 cells were arranged in a matrix to represent the 120 potential behavioral pairs. Behaviors that were sorted into the same group received a “1” in their overlapping cell. Behaviors not sorted into the same group received a “0” in their overlapping cell. A final score was calculated for each participant by correlating the individual participant’s sort response to an expert response. Because participants’ models are compared to the expert model (of which there is an exact correct response) and not one another, this is an index of accuracy, not similarity.

The expert response was determined by having the assessors complete the sorting task. Nine of the research assistants involved with this study completed the sorting task. Their agreement on the 120 behavioral comparisons was sufficient, $ICC(3) = .86$, $\alpha = .87$, $p < .01$. As such, the mode of the expert responses was treated as the “correct” response for each behavioral comparison.

Career skill importance. The purpose of this measure was to identify if any of the focal dimensions were self-relevant for the participants in order to assess belief structure alignment. Participants were shown a list of twelve professional skills and asked to choose and rank the three most important skills for their planned career. The list contained the 3 focal dimensions of this study plus nine other common professional skills (See Appendix H). The skill chosen as most important was scored a “3”, the next most important skill was scored a “2”, and the third most important skill was assigned a value of “1”. The nine skills not chosen were assigned values of “0”. Overall perceived career importance for the three dimensions assessed in this study was calculated by summing scores on communication, teamwork, and planning/organizing. Therefore, total scores for career skill importance could range from 0 to 6. For example, if a participant chose communication, leadership, and teamwork, in order from most to least

important, their answer would be scored a 4. Communication is one of the focal skills and it was ranked highest, so it is scored a 3. Leadership is not one of the focal skills, thus it is scored 0. One point is assigned for choosing teamwork as the third most important. In this way, an answer such as: leadership, motivation, and communication, would be scored a 1.

Closed-ended ability to identify criteria. After the participants completed the sorting task and career skill importance measures, they completed a closed-ended measure of ATIC (Speer, Christiansen, Melchers, König, & Kleinmann, 2014). Participants were shown ten skill dimensions with corresponding definitions. They were instructed to consider what skills might be important in an activity like the one they completed. They were asked: “Which three skills are MOST RELEVANT for effective performance in this particular exercise?” Participants responded by rank ordering the three skills they choose. Three of the dimensions were those actually assessed in the LGD and the others were distracter dimensions. The distracters were the four dimensions that SMEs identified as moderately relevant, and the three that were identified as least relevant for the LGD. See Appendix I for an example. Participants received 2 points for every dimension they correctly identified as most relevant, 1 point for any dimension they choose that the SMEs rated moderately relevant, and 0 points for choosing any of the least relevant dimensions. This scoring leads to a potential maximum of 6 points. They were not shown this score. Next, the participants repeated this rank-order task for the skills they perceived as least relevant for effective performance in the exercise. They were shown the same ten dimensions and definitions. In this second ranking, they received 2 points for correctly identifying any of the least relevant dimensions, 1 point for choosing any of the moderately relevant dimensions, and 0 points for choosing any of the most relevant dimensions. Again, a

perfect score is worth 6 points. A total ATIC score was calculated by summing scores on the two rankings. Thus, scores could range from 0 to 12.

Skill effectiveness ratings. A rating task/knowledge test has been used in previous mental model studies (Gary & Wood, 2011; Webber et al., 2000). Similar to Webber et al., a list of actions was developed to discriminate between effective and ineffective performance. The actions were behaviors that could be enacted in the leaderless group discussion based on the instructions and demands of the task. The actions developed fit into four categories of effectiveness (1=Ineffective, 2=Minimally Effective, 3=Effective, and 4=Very Effective). This mimics the 4-point scale that the assessors used to rate behaviors in the task. Participants were given a list of 16 behaviors and they rated the effectiveness of each behavior for the leaderless group discussion on the 4-point scale (See Appendix A). Participant responses were compared to an expert response. To identify the “expert” skill effectiveness model, the assessors individually completed the behavioral rating task at two points in time, the second and eighth weeks of assessing participants. At Time 1, $ICC(3)=.84$, $\alpha=.98$. At Time 2, $ICC(3)=.88$, $\alpha=.99$. Assessor responses were averaged and then rounded to obtain the final expert rating for each behavior. Error scores were calculated on this measure for each participant by summing the absolute differences between each participant response and the expert response per item.

Feedback acceptance. Feedback acceptance was measured using a multidimensional scale developed by Kedharnath, Garrison, and Gibbons (2009). See Appendix J. This scale consists of 28 items that correspond to seven dimensions of feedback reactions. Participants were asked to think about the feedback they received and to rate their agreement with each item using a 5-point Likert scale (1=Strongly Disagree, 5=Strongly Agree).

The seven dimensions captured by the feedback acceptance scale are accuracy, specificity, self-awareness, fairness, achievability, clarity, and intent to use. In the current study, Cronbach's alpha coefficient was .95.

Results

Data Set

244 individuals participated in this study. I used multiple methods to screen and clean the data of erroneous responses. This was important because, again, it is common to have less engagement from student populations who are quasi-required to participate in research (Cox & Sippelle, 1971). Further, data collected via the self-report method are known to contain non-valid responses due to multiple response biases (Podsakoff & Organ, 1986). Post-hoc statistical remedies, such as identifying and removing outliers, are suggested for managing these non-valid responses (Podsakoff & Organ).

For scales used to measure latent constructs (AD, ATIC, & FA), box plots and histograms showed that the data were fairly normal and did not contain any extreme outliers. For the ADE and Skill Effectiveness Ratings measures, three participants' responses had standard deviations of 0. This is problematic, because both of these measures include negatively worded items; if participants gave the same rating to oppositely worded items; their responses are contradictory and not interpretable. Thus, I eliminated these participants from any analyses involving these measures.

I also calculated a count of missing data for each participant. Three participants had more than 20 missing answers (out of 94 answers total); they were completely eliminated from the data set. After eliminating these participants, the highest number of missing responses from any participant was 2. In the sorting task, sixteen participants sorted less than 15 behaviors (out of 16 behaviors). This resulted in 29, or more, blank cells out of the 120 to be scored. I eliminated these participants from any analyses involving the sort score. It should also be noted that some

performance scores could not be matched to the correct individual because some participants were erroneously assigned a duplicate identification number for the LGD. For analyses involving performance, the sample size decreased to 218 participants. Thus, the sample size ranged from n=207-239 on subsequent analyses.

Descriptive Statistics

Means, standard deviations, and intercorrelations of the study variables are presented in Table 1. The means, standard deviations, and internal consistencies of the previously established measures (Approach to Development Experiences and Feedback Acceptance) are consistent with what would be expected based on previous studies (Martin, 2013; Kedharnath et al., 2009; Walter, 2005). Additionally, the distribution of the Closed-Ended ATIC scores is very similar to what was found in a previous study (Martin).

Table 1

Means, standard deviations, reliabilities, and correlations of key variables.

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. ADE (Scale:1-5)	3.65	.43	(.84)															
2. Total Performance (Scale:0-12)	8.72	1.37	.09	--														
3. TW Performance (Scale:0-4)	3.02	.61	.08	.85*	--													
4. COM Performance (Scale:0-4)	2.99	.43	.13	.78*	.51*	--												
5. P/O Performance (Scale:0-4)	2.71	.60	.04	.86*	.57*	.55*	--											
6. Model Accuracy (Scale: -1-1)	.09	.17	.22*	.07	.02	.08	.08	--										
7. Total Belief Alignment (Scale=0-9)	2.23	1.61	.04	.01	-.02	.10	-.03	.10	--									
8. Personal TW Skill Importance (Scale=0-3)	.53	.92	.04	-.01	-.01	.07	-.07	.04	.40*	--								
9. Personal COM Skill Importance (Scale=0-3)	1.08	1.20	.04	.11	.09	.07	.01	.07	.57*	-.20*	--							
10. Personal P/O Skill Importance (Scale=0-3)	.63	1.02	-.02	-.09	-.13	.02	-.09	.03	.54*	-.04	-.09	--						
11. Total ATIC-Closed (Scale=0-12)	9.83	1.26	-.05	-.03	.00	-.04	-.04	.08	.16*	-.05	.20*	.07	--					
12. ATIC-TW (Scale: 0 or 1)	.67	.47	.00	.11	.17*	.10	.02	-.03	.02	.03	.08	-.08	.42*	--				
13. ATIC-COM (Scale: 0 or 1)	.54	.50	-.02	-.05	-.02	-.03	-.07	.06	.16*	-.07	.19*	.09	.20*	-.16*	--			
14. ATIC-P/O (Scale: 0 or 1)	.63	.49	-.01	-.07	-.12	-.01	-.02	.07	.11	.02	.01	.14*	.26*	-.18*	-.29*	--		
15. SJ Accuracy (error) (Score: 0-38.2)	9.12	2.11	-.13	-.11	-.12	-.00	-.12	-.07	.01	-.01	-.01	.03	-.13	-.10	.01	-.02	--	
16. Feedback Acceptance (Scale: 1-5)	3.82	.49	.29*	.43*	.40*	.32*	.35*	.21*	.07	.02	.01	.09	.10	.04	.06	-.02	-.21*	(.95)

Note. ADE: Approach to Development Experiences, TW: Teamwork, COM: Communication, P/O: Planning and Organizing, SJ: Skill Judgments *p<.05

Feedback Acceptance

Using R, I conducted a series of confirmatory factor analyses to verify the acceptability of treating the feedback acceptance measure as a general factor. By imposing different constraints on the number of factors (See Table 2), and the correlations between them, I tested how well each model captured the covariance between the items in the measure. The results of the tests of three models are presented in Table 2. In general, the results suggest that treating the measure as a higher-order factor is reasonable (RMSEA=.08, CFI=.90), though interpreting the scales as distinct factors is also defensible (RMSEA=.07, CFI=.92). However, I did not make predictions about the individual scales, thus it makes theoretical sense to treat feedback acceptance as a unitary construct. Overall acceptance of feedback was moderate, with a mean of 3.8, and a standard deviation of .49. Total feedback acceptance ranged from 1.7 to 5. Looking at the seven scales, Clarity and Achievability showed the highest means, $M=4.2$ and $M=4.0$ respectively.

Mirroring the findings of previous studies (Brett & Atwater, 2001), feedback acceptance was significantly correlated with performance, $r = .43$, $p < .01$, and performance scores significantly predicted acceptance of feedback, $F(1,218)=48.53$, $p < .01$, $\beta = .43$.

Table 2
CFA Goodness-of-fit indices

Model	Description	C^2	df	ΔC^2	Δdf	CFI	TLI	RMSEA
1 Factor	Single factor	2170.39	350	--	--	.62	.59	.15
7 Factors	7 factors	723.89	329	1446.50	21	.92	.91	.07
7 Factors	7 factors and one general factor	839.49	343	115.60	14	.90	.89	.08

Note. CFI=Comparative fit index, TLI=Tucker-Lewis index, RMSEA=Root Mean Square Error of Approximation

Hypothesized Predictors of Feedback Acceptance

For all regression statistics, see Table 3. Hypothesis 1 proposed that a participant's approach to development would positively predict their acceptance of feedback. This hypothesis was supported, $F(1,239)=21.3, p<.01, \beta=.29$. Hypothesis 2, that closed-ended ability to identify criteria would predict feedback acceptance, was not supported, $F(1,239)=2.18, p>.05, \beta=.10$. Further, ability to identify criteria did not significantly correlate with any of the seven feedback acceptance scales. To explore these unexpected results further, I made comparisons with the open-ended ATIC responses. I had a subject matter expert conduct an initial coding of the responses and then a second subject matter expert coded half of the total responses for a quality check. The agreement between the two SMEs was 97%. Thus, I used the total coded responses of the first SME for comparative analyses. First, a simple correlation analysis revealed no relationship between the two versions of ATIC ($r=-.00, p=.97$). Second, a regression of open-ATIC on feedback acceptance revealed additional null results, $F(1,239)=.09, p=.76, \beta=.02$.

Next, the hypothesis for skill effectiveness judgments, Hypothesis 3, was tested. Again, skill effectiveness was scored as amount of error made in comparison to the expert responses, thus a negative relationship would be expected. The hypothesis was supported; participants' ability to correctly judge the differences in behavioral effectiveness (scored as a sum of errors) significantly predicted their acceptance of feedback, $F(1,239)=10.44, p<.01, \beta=-.21$.

Furthermore, the analysis of Hypothesis 4 revealed that participants' model agreement also predicted their feedback acceptance, $F(1,223)=10.42, p<.01, \beta=.21$. Thus, participants who more accurately sorted the set of behavioral examples into the correct professional skill groups, as compared to the expert model, were more likely to accept the feedback they

received about their performance in the LGD.

Hypothesis 5a, that belief structure alignment (participant identification of any or all of the focal skills as important for their chosen career) would predict acceptance of feedback, was not supported in this study, $F(1,239)=1.24, p>.05, \beta=.07$. To explore this null result, I tested an alternate scoring procedure for belief structure alignment, by dichotomizing the scores. This removed the rank order values (degree of importance), and potential noise, by exclusively examining whether or not the participant found each of the focal skills important for their potential careers. For each of the three skills that a participant chose, the skill was scored a “1” if it matched one of the focal skills and a “0” if it did not. This scoring method did not change the result. Hypothesis 5b proposed that belief structure alignment would moderate the relationship between each of the knowledge structure variables and feedback acceptance. Support was not found for this hypothesis. None of the interaction terms made significant contributions to the model: Model Accuracy x Interest, $R^2 \text{ change}=.001, F(3,223)=.34, p>.05$, Skill Judgment Accuracy x Interest, $R^2 \text{ change}=.003, F(3,239)=.66, p>.05$, ATIC x Interest, $R^2 \text{ change}=.002, F(3,239)=.40, p>.05$.

To test Hypothesis 6, I conducted a hierarchical regression to examine if the knowledge structure indicators would predict feedback acceptance beyond the contribution of participants’ approach to developmental activities (ADE). This hypothesis was supported. The group of variables significantly predicted feedback acceptance, $F(3,223)=11.55, p>.01, R^2=.14$, and the knowledge structure variables significantly improved the prediction of feedback acceptance beyond ADE, $R^2 \text{ change}=.04, F(3,223)=4.47, p<.05$.

Hypothesis 7, that the knowledge structure indicators would predict feedback acceptance beyond performance scores, was conducting with another hierarchical regression.

This hypothesis was also supported as the entire group of variables significantly predicted feedback acceptance, $F(3,206)=19.13, p<.01, R^2=.22$, and the knowledge structure variables significantly improved the prediction of feedback acceptance beyond performance, R^2 change=.03, $F(3,206)=4.44, p=.01$.

Table 3*Regression Statistics*

Hypothesis 1: Approach to Developmental Experiences Predicting Feedback Acceptance								
		<i>B</i>	<i>SE B</i>	β	F	p	R^2	ΔR^2
Model 1	ADE	.29	.07	.33	21.3	< .01	.08*	--
Hypothesis 2: Closed-Ended ATIC Predicting Feedback Acceptance								
		<i>B</i>	<i>SE B</i>	β	F	p	R^2	ΔR^2
Model 1	ATIC	.10	.03	.04	2.18	=.14	.01	--
Hypothesis 3: Skill Effectiveness Judgments Predicting Feedback Acceptance								
		<i>B</i>	<i>SE B</i>	β	F	p	R^2	ΔR^2
Model 1	SEJ	-.21	.02	-.05	10.44	<.01	.04*	--
Hypothesis 4: Model Agreement Predicting Feedback Acceptance								
		<i>B</i>	<i>SE B</i>	β	F	p	R^2	ΔR^2
Model 1	MA	.21	.18	.60	10.42	<.01	.04*	--
Hypothesis 5a: Belief Structure Alignment Predicting Feedback Acceptance								
		<i>B</i>	<i>SE B</i>	β	F	p	R^2	ΔR^2
Model 1		.07	.02	.02	1.24	=.27	.01	--
Hypothesis 5b: Belief Structure Alignment Moderating the Effects of Model Agreement on Feedback Acceptance								
		<i>B</i>	<i>SE B</i>	β	F	p	R^2	ΔR^2
Model 1	Importance	.05	.02	.01	5.45	=.01	.05*	--
	MA	.21	.19	.58				
Model 2	Importance	.05	.02	.01	.34	=.56	.05	.001
	MA	.20	.19	.57				
	Importance X MA	.04	.03	.02				

Hypothesis 5b: Belief Structure Alignment Moderating the Effects of Skill Judgment Accuracy on Feedback Acceptance

		<i>B</i>	<i>SE B</i>	β	F	p	R ²	ΔR^2
Model 1	Importance	.07	.02	.02	5.90	<.01	.05*	--
	SJA	-.21	.02	-.05				
Model 2	Importance	.07	.02	.02	.66	.42	.05	.003
	SJA	-.21	.02	-.05				
	Importance X SJA	.05	.03	.03				

Hypothesis 5b: Belief Structure Alignment Moderating the Effects of ATIC on Feedback Acceptance

		<i>B</i>	<i>SE B</i>	β	F	p	R ²	ΔR^2
Model 1	Importance	.06	.02	.02	1.48	=.23	.11	--
	ATIC	.09	.03	.03				
Model 2	Importance	.07	.02	.02	.40	=.53	.12	.002
	ATIC	.07	.03	.03				
	Importance X ATIC	-.04	.03	-.02				

Hypothesis 6: Knowledge Structure Indicators will Predict FA Beyond Approach to Development Exercises

		<i>B</i>	<i>SE B</i>	β	F	p	R ²	ΔR^2
Model 1	ADE	.32	.07	.35	24.92	<.01	.10*	--
Model 2	ADE	.27	.07	.30	4.47	=.01	.14*	.04*
	SJA	-.12	.02	-.03				
	MA	.14	.18	.40				

Hypothesis 7: Knowledge Structure Indicators will Predict FA Beyond Performance Scores								
		<i>B</i>	SE <i>B</i>	β	F	p	R ²	ΔR^2
Model 1	Performance	.43	.02	.15	46.93	<.01	.19*	--
Model 2	Performance	.41	.02	.14	4.44	=.01	.22*	.03*
	SJA	-.09	.01	-.02				
	MA	.16	.17	.43				

Note. β = Unstandardized coefficient, *B*=standardized coefficient, MA: Model Accuracy, ADE: Approach to Development Experiences, SJA: Skill Judgment Accuracy *p<.05*p<.05

Unique Contributions to Predicting Feedback Acceptance

I used relative weights analysis (Johnson, 2000) to estimate the unique contribution of several of the predictor variables on feedback acceptance. Relative weights analysis is similar to regression analysis, but it is favored for its ability to handle multicollinearity among predictors (Johnson). Thus, the relative weight of any variable represents the proportionate contribution the predictor makes to R^2 , in light of both its unique contribution and its contribution when combined with other variables (Johnson). Results of this analysis are presented in Table 4.

Table 4

The relative importance of study independent variable measures in predicting feedback acceptance

Variable	β	RW	95% CI	RI (%)
ADE	.33	.11*	[.04, .11]	34.38%
Performance	.54	.17*	[.09, .17]	53.13%
ATIC-Closed	.01	.00	[-.01, .00]	0%
Skill Judgment Accuracy (scored as error)	.03	.01	[-.01, .01]	3.13%
Model Accuracy	.06	.02*	[.00, .02]	6.25%
Belief Structure Alignment	.02	.01	[-.01, .01]	3.13%
Total Model R^2	.32			
N	207			

Note. β =Regression Coefficient, RW=Relative Weight, RI=Relative Importance, as a percentage of total R^2 .

* $p < .0$

Each of the four columns represent important data for each predictor/outcome combination. The first column presents the standardized regression coefficient (β) from a multiple regression model containing all predictors. The second column shows the raw weight from the relative weights analysis, or the amount of unique variance in feedback acceptance that is explained by the predictor, after controlling for its correlations with the other predictor variables. The raw weight values for each predictor sum to the total model R^2 .

Sometimes the unique contribution of a particular predictor can be so small that it is difficult to interpret. Thus, following the recommendations of Tonidandel, LeBreton, and Johnson (2009), I included a random variable in the model to facilitate subsequent comparisons between the raw weights of each predictor of interest and the raw weight of the random predictor variable (Tonidandel et al.). A random variable should not account for a meaningful amount of variance in the criterion. The third column presents bootstrapped, 95% confidence intervals for the difference between each raw weight and the weight of the random variable. If the confidence interval excludes zero, this indicates that the real variable explains a significant amount of variance (Tonidandel et al.). Predictors that met this standard are indicated by an asterisk next to their raw weight value. The fourth column shows relative importance values, which are calculated by dividing the raw weight of a predictor by the total R^2 for the model. This number represents the proportionate contribution each predictor makes to R^2 . As such, relative importance values make clear what proportion of the explained variance each predictor accounts for.

Research Question 1 asked how each knowledge structure indicator unique adds to the prediction of feedback acceptance. To answer this question, I looked at the relative importance values for ATIC-Closed, Model Accuracy, and Skill Judgment Accuracy. Model

Accuracy, how accurately participants sorted the skill behaviors compared to the expert model, accounted for the largest proportion of the explained variance (2% of total variance, 6.25% of proportionate variance). Skill Judgment Accuracy accounted for next largest proportion of explained variance at 3.13%; however, its confidence interval does include zero, so the significance of this contribution should be interpreted with caution. Participants' ability to identify criteria did not account for any unique variance in predicting feedback acceptance.

The purpose of Research Question 2 was to investigate the unique contribution of belief structure in predicting feedback acceptance beyond the contribution of knowledge structure. Given that belief structure was not found to relate to feedback acceptance, the test for this question was not conducted.

Discussion

The purpose of this study was to investigate how feedback receivers' mental models for professional skills relate to their acceptance of professional skill feedback. Feedback acceptance has been found to be an integral step in the feedback-development process. The goal of performance management systems, to help employees adopt more effective behaviors and develop their skills, hinges on employees' acceptance and use of feedback. This study examined a variable that could offer more practical solutions to increasing feedback acceptance compared to previously studied antecedents and moderators of feedback acceptance (e.g., personality variables).

The results of this study support the propositions of multiple theories. The theory of Adaptive Control of Thought (ACT) explains that skill acquisition follows a process of mental model development from learning facts to understanding how and when to use them (Anderson, 1982). Whereas previous studies have shown support for the relationship between mental model accuracy and performance, this is the first study to show the significant role of mental model accuracy at an early stage of development-feedback acceptance. This result is also in line with what would be expected from the Social Cognitive Theory of Self-Regulation, which states that the ability to compare feedback to an internal standard is essential for regulating behavior (Bandura, 1991). Further, Ilgen et al.'s (1979) stages of feedback processing outline that feedback perception precedes feedback acceptance and that perception is influenced by properties of both the stimulus and receiver. While many previous studies focused on the mechanisms that affect the quality of the feedback stimulus (e.g., selection criteria and rater cognition) this study uniquely looked at the receiver's potential

ability to perceive and interpret feedback via their mental model accuracy. As predicted, mental model accuracy (a property necessary for interpretation) was positively related to feedback acceptance.

Contributions

As scientist-practitioners, we research variables and functional relationships that not only have potential for theoretical contributions, but also for practical application. Previous research has shown the potential of mental model transformation for realizing gains in performance effectiveness (Azevedo et al., 2005; Smith-Jentsch et al., 2008). The current findings lend promise to the value of understanding and influencing mental models for employee learning and development. A person's current mental model acts as a filter through which they interpret and incorporate new information. Knowing the current state of that filter, through mental model assessment, can uncover the source of misunderstandings (knowledge gaps), which can provide clues to a way forward, toward shared understanding. The identification of knowledge gaps in mental models can serve as a form of training needs assessment. Additionally, the identification of a belief structure misalignment could explain why a person with an accurate mental model (high potential) is not meeting performance expectations.

The contribution of accurate knowledge structure to accepting feedback goes beyond that of interest in development. Even if a person has an interest and desire to develop, they may not accept feedback that they do not have a reference for. This is analogous to the finding that people with a high desire for achievement, but low ability ('g') are outperformed by those with a high desire for achievement and high ability (Wright et al., 1995). A desire for

achievement or development is not sufficient on its own. The possession of an accurate knowledge structure, or the ability to form one, is also necessary for skill acquisition.

Further, the contribution of accurate knowledge structure for predicting feedback acceptance also went beyond the influence of performance level. Research shows that the ability to sustain effective performance on complex tasks requires higher levels of self-regulation and mental model sophistication (Kanfer & Ackerman, 1989; Zimmerman & Martinez-Pons, 1986). Regardless of a person's initial performance level, the accuracy of their mental model can help them make sense of feedback and recognize its usefulness. Therefore, those who have an accurate, useful cognitive context for the task are able to more quickly identify strategies for adapting their behavior (Kanfer & Ackerman; Zimmerman & Risemberg, 1997), which buffers potential feelings of helplessness (Zimmerman, Bonner, & Kovach, 1996). As such, performers are able to keep their attention focused on the task and avoid the infusion of ego struggle (Ackerman, 1987; Forgas, 1995; Kanfer & Ackerman) that can lead to self-enhancing motives to reject feedback (Forgas, 2008; Swann, Chang-Schneider, & McClarty, 2007).

The current study further contributes to the mental model literature by extending the investigation of the implications of shared cognitive structure to a new domain (feedback acceptance) and a new context (feedback giver and receiver). The effects of mental model alignment and misalignment are as plentiful as the number of social ties and interdependencies in an organization. The consequences of every instance of communication (understanding, learning, agreement, adopted strategy, etc.) rely on the status and negotiation of shared mental models. This is the first study to look at how the accuracy of knowledge

structures in the performance domain relates to the communication and acceptance of feedback.

A final contribution of this study lies in the assessment of knowledge complexity using multiple measures. In comparison to traditional knowledge assessments of how many facts someone knows, structural assessment provides a richer source of information about *what* a person knows. This representation of knowledge is then more valuable for understanding reactions to learning and development activities and further directing remediation or training (Goldsmith & Kraiger, 1997). The three knowledge structure measures utilized in this study captured knowledge at differing levels of complexity. The ATIC measure elicited information at the lowest level of complexity by merely asking people to identify what they thought was important by selecting the skills from a list. Next, the skill judgments measure captured participants' ability to discriminate the level of effectiveness for various behaviors in regard to the LGD. At the highest level of complexity, the sorting measure tapped participants' understanding of the relationships between skill behaviors and provided the most discriminating evidence of participant knowledge. As such, the sorting measure was the most predictive of feedback acceptance. This provides strong evidence that studying higher levels of knowledge complexity, by assessing mental models, is uniquely useful for predicting reactions to feedback.

Limitations

Design and sample. This study employed a quasi-experimental design in a lab with quasi-volunteer, student sample. Although many steps were taken to increase realism and engagement, the possibility remains that that this subject pool did not represent the general population of people engaged in professional development activities. This could be due to the

lack of real and immediate consequences for their performance and development on the focal skills of this study. In a field sample, I would expect people to have more complex knowledge structures for career skills and stronger belief structures. For these reasons, I would expect the field sample to have more defined personal standards and scrutinize their feedback to a greater degree, which would entail more variability on acceptance of feedback. If the variance in feedback acceptance increases, then the variance it shares with the independent variables could also increase. Consequently, I would expect the hypothesized relationships in this study to show larger effects. In addition, the effect of knowledge structure accuracy and belief structure alignment on feedback acceptance could be further parsed and examined in a true experimental design where mental models could be controlled and manipulated.

Although this sample and study design may have limited my ability to find true population effect sizes, I made several strategic methodological choices to encourage subject engagement through increased realism. First, the student-participants were asked to reflect on statistics about college graduates entering the workforce and to provide information about their planned career. This primed them to think about their career goals and preparedness. Second, the LGD scenario was specific to college student life: planning a residence hall event.

Further, the dimensions chosen for assessment and feedback were selected by SMEs for this particular student-oriented LGD. Likewise, the input of subject matter experts helped to customize multiple measures for this study. The behavioral examples generated for the BARS (performance rating scales), sorting task, and effectiveness ratings task were specific to the LGD used.

Finally, the feedback provided was real and relatable. While the feedback could be useful for the student's future career, it was also realistically applicable to their current

academic career. The customized developmental recommendations referred to actual courses and student group activities available at this school.

Mental models and performance. Myriad studies have shown positive relationships between accurate mental models and performance (Diekhoff, 1983; Goldsmith & Johnson, 1990; Mathieu et al., 2005; Smith-Jentsch et al., 2001; Smith-Jentsch et al., 2008). Somewhat surprisingly, this study did not find a relationship between mental model accuracy and performance, but there are at least two plausible explanations for this null result. Several previous studies (Acton, 1991; Azevedo et al., 2005; Smith-Jentsch, et al., 2008), have found positive relationships with performance *after* instructions were given to improve people's mental models, but this study did not involve such instructions. In this study, I measured participants' lay, uninstructed, models. As such, many participants did not have accurate working knowledge of the focal skills; the skill model accuracy scores were low overall with a mean correlation of $r = .09$ between individual and expert models. This near-zero mean indicates that due to individual's low knowledge, they are more likely guessing. Guessing creates more random error in the sort score and pushes the correlation with performance towards .00.

Furthermore, even if a participant was able to sort many of the behaviors correctly, resulting in a higher model accuracy score, they still may not have known how to apply the information in the leaderless group discussion, because it is an ill-defined problem (Reitman, 1964). The leaderless group discussion has a large number of open constraints and possible solutions. In addition, roles are not assigned and participants are not told which skill dimensions they will be evaluated on. Knowing what behaviors matter for displaying skill effectiveness is not the same as knowing when or how to display them, which requires

expertise and correct strategy selection (Anderson, 1982; Sternberg, 2005). Effective strategy choice and execution comes with expertise developed through experience, thus experts perform better than novices in ill-defined tasks (Schunn, McGregor, & Saner, 2005). As such, even having a moderately accurate mental model may not have been sufficient for effective performance. Some previous studies linking mental model accuracy to performance have used well-defined tasks (Azevedo et al., 2005; Goldsmith, Johnson, & Acton, 1991), which might explain the discrepancy between their results and those of this study. However, many jobs, for which it is important and difficult to develop people, are ill defined. Thus, it is important to explore the role of mental models in performance on ill-defined tasks

Measurement of ATIC. ATIC is a more traditional knowledge assessment in that it asks people to identify facts. It does not capture whether the person knows how to enact the skills (procedural), or if the person understands the similarities and differences between the skills and what behaviors would be representative (knowledge organization). It would not be surprising if the ATIC measure showed less of a relationship with FA in comparison to the other knowledge structure measures (which capture a higher level of knowledge complexity), but the current study was not able to show any relationship between ATIC and FA at all.

This result could be due to construct confusion surrounding ATIC, including its operationalization. The closed-ended, quantitative version of ATIC used in this study was based on the recent measurement recommendations of Speer et al. (2014). Previously, researchers used a method where responders were first asked to list their hypotheses about what was being measured (open-ended ATIC), then the responders were given a list of dimensions and definitions and asked to match their responses, in essence coding their own answers. The quantitative version simplifies this process by removing the matching and

coding onus from the responder. Further, it takes into account the correct identification of both the most important skill dimensions and the least important skill dimensions. Although this study focused on responses to the newer, quantitative version of ATIC, open-ended responses were also collected for comparison. Analyses comparing the open- and closed-ended versions of the measure showed null results. The two versions of ATIC appear to be measuring different things, and neither of them relate to feedback acceptance.

An unpublished master's thesis (Martin, 2013) that investigated the relationship between ATIC and feedback acceptance also failed to find a significant relationship between these variables. Further, in the previous study as well as this current one, all three domain-specific ATIC measures were negatively correlated with each other. In other words, if a participant correctly identified any of the focal skills, they were less likely to identify any of the others. This result is conceptually opposite from what would follow from the propositions of ATIC. It should be noted that the only existing published articles involving ATIC have come from one group of researchers.

Measurement of belief structure. Contrary to expectations, belief structure did not exhibit a relationship with feedback acceptance in this study. One possible explanation regards the developmental stage of the study participants. As mentioned previously, the subjects in this study were in the early stages of their academic careers; many of them were three or more years away from finishing degrees and entering the workforce. It is possible that professional skill competence did not hold much weight for their present self-concepts. Meeting performance expectations and the anticipation of being reviewed, promoted, or terminated based on career skill competence may not be part of their daily lives, or a proximal concern. Even though many participants chose the focal skills (i.e., communication,

teamwork, and planning/organizing) as important for their planned careers, it is possible that this *importance* does not hold much weight yet.

Measurement decisions could offer another explanation for the lack of relationship between belief structure and feedback acceptance. I chose not to examine participant self-knowledge or self-certainty because of concern that a self-rating task could have done more harm than good with a young, pre-career sample. Having people self-rate can increase the probability of negative feedback reactions because many people over-rate themselves and then feel disappointed about their feedback (Brett & Atwater, 2001). Thus, asking people with less elaborated self-concepts to self-rate is risky because without a well-defined self-concept they cannot self-verify the information (Gross et al., 1995; Stahlberg et al., 1999). This puts them in a situation where they are likely to experience ambiguity and helplessness (Forgas, 2008; Zimmerman, Bonner, & Kovach, 1996). Yet, information about participant self-knowledge and self-certainty could have helped explain the lack of relationship between importance and feedback acceptance.

Measurement of feedback acceptance. The Feedback Acceptance measure employed in this study contained all positively worded items. A well-regarded practice of self-report procedure is to include both positively and negatively worded items so as to not lead the responder toward a particular frame of thought (positive or negative). Further, including both types of items is helpful for identifying non-valid responses (very small or zero standard deviation). The design of this measure could have limited the overall variance of responses.

Implications

Feedback acceptance is greatly subject to performance (feedback sign), but a person's ability to understand the feedback and incorporate it into their mental models is also

significantly influential. An accurate mental model can help a person recognize the accuracy and usefulness of feedback. Although the effect of the relationship between accurate mental models and feedback acceptance might be small, the time and cost involved to achieve that effect could be equally small, making an increase in the accuracy and alignment of employee's mental models a realistic goal for performance management.

Organizations have multiple opportunities to help members build accurate mental models. Transparency in how skill competencies are chosen, defined, and evaluated could help individuals build conceptual knowledge about how behaviors (at varying levels of effectiveness) represent and relate to particular skills (at varying levels of effectiveness). Presenting multiple representations of information through various mediums (e.g., written, verbal, visual diagram, metaphor) has also been shown to improve mental model accuracy and sophistication (Mayer, 2005).

Practices of shared sensemaking (Weick, Sutcliffe, Obstfeld, 2005) and participative decision-making in performance management would provide even more significant opportunities for stakeholders to build similar structural knowledge for effective performance. Two cross-sectional studies have shown that people react more favorably to feedback messages if they have insight into the procedures used (Jawahar, 2007; Leung et al., 2001). Further, a study by Roberts (2002) reported that involvement in developing a scale related to stronger motivations to improve and that motivation was highly correlated ($r=.57$) with actual performance improvements.

During performance review meetings, feedback givers can use a sensemaking approach to help the receiver interpret their feedback and encourage transformative learning. Transformative learning occurs through questioning, exploring, and critically reflecting on

current meaning schemes (knowledge structures; Mezirow, 1991). In a performance management system, this would involve reviewing the focal skills and discussing current understandings, including: definitions, behavioral examples, role expectations, and behavioral opportunities in the organization (opportunities to perform). Further, the feedback giver could initiate a discussion about the receiver's values or goals concerning the focal skills.

Additional opportunities exist for developing employee mental models in any supervising, mentoring, or coaching relationship. Externally regulated learning, which is the process of regulating one's learning with external guidance (a person other than one's self), has been found to be more effective than self-regulation alone (Azevedo, Moos, Greene, Winters, & Cromley, 2008). An external guide can prompt learners to self-reflect on the connections between their behaviors and the consequences of their actions. Further, they can help learners choose and practice alternative strategies. This type of actively monitored learning has been shown to predict performance beyond the influence of prior knowledge (Greene & Azevedo, 2009), which again lends promise to the practicality of improving development through improving mental models.

Most of these recommendations, many of which would involve either an extended or more detailed conversation, would not require a significant increase of an organization's resources. For example, an organization could involve and take input from more stakeholders when developing their criteria and model (e.g., people at multiple levels). Another opportunity lies in communicating how the criteria were chosen and how performance will be evaluated (Jawahar, 2007; Leung et al., 2001) by offering behavioral examples and explaining any rating or evaluation tool.

This information would be most effective if it were shared before the performance review takes place so that people have time to consult their mental models and make adjustments.

Further, before performance reviews take place, managers or those who will be giving feedback, could have conversations with those who will be evaluated in order to assess how they are thinking and feeling about the skill criteria and evaluation procedure. Managers could clarify misunderstandings about the model or process, answer questions, and give tips on how to display the organizationally valued skills. If the organization has documented critical incidents (highly effective and ineffective examples of behavior; Butterfield, Borgen, Amundson, & Maglio, 2005), these would help foster a discussion about skill criteria and put it in more concrete terms. Additionally, managers could ask subordinates to think through what the valued skills would look like at different levels of effectiveness in their jobs and facilitate a conversation to make sure that they see the skills in the same way. In essence, brainstorm critical incidents and behavioral examples if those don't already exist.

The purpose of this study was to investigate a variable that held promise for being practically applicable and influential in the process of developing employees. Previous performance levels and multiple personality variables have shown moderate effects in their relationship with feedback acceptance, yet these variables are difficult for organizations to influence. This study showed that the knowledge structures of mental models have a relationship with feedback acceptance beyond the influence of these less malleable variables. Therefore, organizations have a greater opportunity to influence the feedback and development process if they take some time to help people align their mental models with the organization's model.

Future Research

These results provide a first step in understanding the role of mental models in performance management and professional development. Several steps can be taken to further the research in this area. First, belief structure could be operationalized in other ways in order to continue the investigation of the role of personal desired states in accepting feedback. It would be useful to measure the professional skill development goals of actual development participants in an organization. Further, self-schema elaboration (Dauenheimer et al., 1999) could be examined as a moderator between knowledge structure and feedback acceptance, by measuring perceived self-competence, certainty of self-competence, and personal importance of competence.

Another recommendation for future research is to conduct an experiment in which mental model accuracy is manipulated through providing an experimental group with frame-of-reference training. The experimental group would receive the same frame-of-reference training that the assessors experience in order to develop their knowledge and understanding of the focal skills (e.g., dimension definitions, behavioral examples, practice rating behavioral effectiveness). First, differences in mental model accuracy gains could be assessed between the experimental and control groups. If the manipulation works, comparisons could be made between the groups on their acceptance of feedback for the focal skills.

Finally, the implications of shared mental models should be investigated in more organizational scenarios. For example, between employees working in different functional areas, especially areas that are moderately to highly interdependent. In this scenario, shared mental models should have implications for collaboration and the efficiency of coordinated work.

In summary, this purpose of this study was to demonstrate that feedback receivers' mental models play a uniquely significant role in an early stage of the development process-feedback acceptance. The hypotheses and research questions proposed were influenced by multiple prominent theories of human development, skill acquisition, social cognition, information processing, and feedback acceptance. Not only did mental model accuracy predict feedback acceptance, but the combined effects of multiple knowledge structure indicators predicted feedback acceptance beyond predictors that have been well-established in the literature (approach to developmental experiences and performance). The findings lend promise to the practical value of understanding and influencing mental models for employee learning and development.

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APPENDIX A

Skill Effectiveness Judgment Ratings

Instructions: Imagine that you are trying to evaluate someone else in this task. Think about how someone might behave effectively or ineffectively in this task.

How would you judge each of the following behaviors?

1-Ineffective
2-Minimally effective
3-Effective
4-Outstanding

1. Proposes a strategy for structuring the group decision (vote, consensus, etc.).	1	2	3	4
2. Used informal language with a lot of slang/Net lingo	1	2	3	4
3. Follows group's lead; agrees with others' suggestions but offers few of his or own	1	2	3	4
4. Makes clear, organized points that others understand	1	2	3	4
5. Suggests steps that need to be taken to make the event happen or to complete the exercise	1	2	3	4
6. Says: "Money is no object when it comes to planning the best event."	1	2	3	4
7. Maintains a professional presence and communication style when other group members are being inappropriate. Sets an example.	1	2	3	4
8. Speaks very little, and seldom offers an opinion (e.g., "I don't care")	1	2	3	4
9. Spends most of the exercise time talking about how to market the event to multiple types of students	1	2	3	4
10. Restates ideas in another way to help others understand more fully. Helps others understand each other.	1	2	3	4
11. Regularly seeks input from others, sometimes uses open-ended questions ("What do you think?")	1	2	3	4
12. Behavior toward teammates is neutral – most positive feedback offered to others is by saying: "OK"	1	2	3	4
13. Entertains another member of the group by discussing pop culture and showing them youtube videos on their phone.	1	2	3	4
14. Contributes some ideas or suggestions; accepts responsibility for some portion of the task at teammate's suggestion	1	2	3	4
15. Discusses points that other group members have already made. Doesn't hold the group back from moving forward.	1	2	3	4
16. Suggests realistic, creative ways to obtain new resources or align current resources.	1	2	3	4

APPENDIX B

Approach to Developmental Experiences

Instructions: We are interested people's experiences and preferences for skill development. You've probably had opportunities to develop your skills in something that matters to you, whether it's sports, academics, hobbies, or work. Please answer the following questions about your experiences and preferences for skill development.

1-Not at all like me...3-Neutral...5-Just like me

I seek feedback about my skills	1	2	3	4	5
I participate in learning or development programs even when they aren't required.	1	2	3	4	5
I get upset when someone suggests how I could do things differently.	1	2	3	4	5
I take advantage of opportunities to better myself.	1	2	3	4	5
I look forward to new challenges.	1	2	3	4	5
I ask others to suggest ways I can improve myself.	1	2	3	4	5
I seldom try new ways to do things.	1	2	3	4	5
I am aware of my development needs.	1	2	3	4	5
I set highly competitive goals.	1	2	3	4	5
I don't go to presentations or programs about how to improve.	1	2	3	4	5
I search for new ways to develop myself.	1	2	3	4	5
I regularly evaluate my goals.	1	2	3	4	5
I read about ways to develop my skills.	1	2	3	4	5
I actively search for ways to advance myself.	1	2	3	4	5
I take opportunities to improve my job related skills.	1	2	3	4	5
I get angered when someone comments on my performance	1	2	3	4	5
I am interested in improving my skills.	1	2	3	4	5
I try to see what others are doing, so I can learn from them.	1	2	3	4	5
I seldom think about ways to improve my skills.	1	2	3	4	5

APPENDIX C

Career Stimulus

According to recent research, many hiring organizations do not feel that recent college grads are ready for the workforce.

- A new poll from Reuters shows nearly 40 percent of recent college graduates are unemployed and require additional training to find a career track.

“There’s always been a gap between what colleges produce and what employers want,” said Manpower Group Executive Vice President of Global Strategy and Talent Mara Swan.

-According to a survey conducted by the Accrediting Council for Independent Colleges and Schools, less than 10 percent of employers thought colleges did an "excellent" job of preparing students for work.

-Recruiters explain that the new college grads are knowledgeable about their field of study, but lack general practical and professional skills.

Organizations sometimes use work simulations to help employees develop the professional skills they are lacking.

In this study you will participate in a type of work simulation and then receive feedback that can help you develop your professional skills.

We are interested in learning more about how this skill feedback process works and how to improve it.

To help put this in context, please write down your participant ID, planned major, and something about the career you are hoping for.

Participant ID: _____

Major: _____

Career: _____

APPENDIX D

LGD Exercise Materials

EXERCISE OVERVIEW

In this exercise, you will need to review the materials provided, participate in a discussion with a group of other resident assistants, and come to a consensus regarding planning a social event for Thornton Hall.

The exercise will last a total of 23 minutes:

8 minutes to review the materials and prepare for the discussion, and
15 minutes to participate in the group discussion.

Your exercise packet contains the following materials:

This overview sheet (1 page)
Instructions (1 page)
Event planning guidelines (2 pages)
List of past fall programs (1 page)

The group has been given the following materials:

Group planning worksheet (1 page)

You may also refer to any background information provided about Thornton Hall and the resident assistant program. Utilizing relevant information from multiple sources is an important objective of this exercise.

The following items are available for your use in this exercise:

Paper
Pens

If you have any questions at any point, please ask an administrator.

PARTICIPANT INSTRUCTIONS

You are a new resident assistant (RA) in Thornton Hall, a coed residence hall at a mid-sized public university. In this exercise, you and several other RAs (one from each floor in Thornton) have been asked to work together to plan your hall's first major social program of the semester. Your Residence Director is unable to attend the meeting, but has provided some general guidelines for the event, as well as a list of past hall programs. You may use this as a starting point for ideas or come up with new ideas on your own. You have also been given a profile that describes in a general way the residents of your floor. You should try to consider *all* of the residents of Thornton in planning your event, because the goal is to have as many students as possible in attendance.

The first social event of the year is considered very important for creating a positive, welcoming atmosphere and fostering good relationships among residents. Thornton Hall has acquired a reputation over the past several years as one of the best places to live on campus because of the high level of social interaction and the great RA staff. As an RA, you will be required to attend the event and promote it to your residents, so it is important to choose an event that you personally can be enthusiastic about and involved in. If the event is a success, your job as an RA will be much easier because your residents will have a positive first impression of you and of the hall. As an additional incentive, your resident director, Chris, has offered to pay for a pizza party for the floor with the most residents attending.

You do not need to plan every detail of the event within the meeting time, but you must **decide what the event will be**. Also, you should **determine which group member(s) will be responsible for which aspects of the event** (e.g., publicity, decorating, obtaining supplies, etc.). The specific tasks that need to be done will depend on the event that you choose, but every group member should be responsible for some part of the preparation for the event, and you need to be sure that all of the necessary tasks will be done. You should try to divide the tasks as fairly as possible.

All members of your group must agree on the choice of event and on the assignment of tasks. You have been given a worksheet with space for a brief description of the event and a list of the tasks assigned to each group member. You will turn in this worksheet at the end of the exercise. All group members should **write their participant ID numbers** (please do NOT sign your name or use your initials!) in the space provided on the worksheet to indicate that they agree with the decisions made. If any group member is unwilling to agree with the plan, the group should keep discussing and make changes to the plan if necessary to arrive at a plan that all members can agree to.

Remember that you will have **8 minutes** to read these materials and prepare for the discussion and then **15 minutes** for your discussion. During your preparation time, try to read all of the materials you have been given carefully. You may want to make notes about important points or begin generating some ideas before you begin discussion.

You may use the white board and markers that are present in the room to structure your discussion if you so desire.

EVENT PLANNING GUIDELINES

Hey gang –

Please keep these things in mind when planning the social. Some of these things are university policy; others are just things we've learned from past events. Within these guidelines, anything goes! I'm looking forward to a fantastic program!

*- Chris Conway
Thornton Residence Director*

- We have a very diverse group here at Thornton – including international students, athletes, fraternity & sorority members, honor students, etc. – so please choose an event that will appeal to lots of people.
- A major goal of fall events is to encourage interaction between upper- and underclassmen. Right now we have 187 residents in the hall: 113 freshmen, 48 sophomores, 17 juniors, and 9 seniors. I'd like to see at least 100 people attend the event – more if possible! The floor with the most attendance will receive a free pizza party at the end of the semester!
- The event needs to take place sometime in the month of September. September days here are usually warm, but evenings can be quite cool. This may be important if you are planning an outdoor activity.
- We have a budget of \$500 for the event, which must cover everything (food, decorations, entertainment, etc.). You do not need to create a detailed budget right now, but you should keep the budget in mind when deciding what event to plan so that it will be feasible (for example, taking all hall residents to Cancun for the weekend would be a very popular event, but is not very feasible).
- The facilities within the residence hall will be available for your use. This includes common lounges on each floor (which can only hold 60 people), residence lounges (which can hold 200 people), a cafeteria (can hold 200+ people), and 2 outdoor courtyards. While these areas can be used, they must be kept clean and in good condition (if, for example, you choose to plan a water fight, make sure you do not do this in the lounges or cafeteria).
- You are allowed to hold the social outside of the designated residence areas, on- or off-campus, but keep in mind that transportation problems may limit attendance at off-campus locations.
- According to school policy, no alcohol is permitted at official hall events. You cannot provide alcohol to residents or allow them to bring their own. This is taken very seriously – another hall last year lost all their activity funding when two residents were found with

beer at a floor program.

- Last year, two students were seriously injured as a result of hazing activities conducted by two different organizations (including another residence hall). As a result, the university has a new, *very* strict hazing policy. In this policy, hazing is defined as any activity with the potential to harm students physically or emotionally (e.g., embarrassment, humiliation, etc.). The penalties for violating the policy are pretty harsh, so we want to avoid this if at all possible! We don't want anything that could be perceived as hazing in any way.

PAST FALL SOCIAL PROGRAMS

2011 – Bonfire and marshmallow roast at Russel Woods, about 3 miles away from campus.

Attendance: 95

Cost: \$200 to reserve site, \$150 for marshmallows, graham crackers, chocolate, chips, and cookies, \$20 for publicity.

Reaction: Those who attended enjoyed the event. There were a few complaints about how quickly the food ran out. Several students indicated that they would have come but did not have transportation.

2010 – Water Wars on the front lawn, including water balloon games, water guns, and slip-n-slide.

Attendance: 96

Cost: \$300 for slip-n-slide, water balloons, and water guns, \$150 for prizes (in the form of gift cards to local businesses), \$25 for publicity.

Reaction: Very positive, except for the incident in which a freshman sprained her ankle in one game. Residents also remarked that they thought the prizes were chosen well.

2009 – Pizza and “Battles of the Sexes” (trivia game with two teams of hall residents).

Attendance: 145

Cost: \$350 for pizza and soft drinks, \$50 for decorations and publicity.

Reaction: Mostly positive. About 35 students ate pizza but did not stay for the program. One Women’s Studies major said she thought the program was offensive.

2008 – “Images of Thornton” – mural painting in the common room.

Attendance: 43

Cost: \$100 for paint, \$150 for painting supplies, \$150 for chips, pretzels and candy, \$15 for publicity.

Reaction: Positive among attendees, but attendance was low. Many students were (and still are) critical of the completed mural.

2007 – Capture the flag tournament (north wing v. south wing) and cookout.

Attendance: 98

Cost: \$30 for equipment, \$200 for t-shirts, \$250 for food (chips, burgers, hot-dogs), \$15 for publicity.

Reaction: Very positive. Floors interacted, competition was friendly, and almost all attendees stayed for the cookout that followed the game.

2006 – Attended home football game with tailgate party.

Attendance: game, 35; party, 97

Cost: \$350 for hot-dogs, burgers, chips, chicken, and soft drinks, \$100 for two grills, \$50 for decorations and publicity. Residents had to purchase their own tickets to the game, but did not need to attend the game to attend the party.

Reaction: Moderately positive. The home team lost 42-3, but the weather was nice and residents seemed to enjoy the party. The people grilling didn’t have much chance to interact

and later remarked that they wished there were more people to help cook the food.

2005 – Karaoke and open mic comedy night.

Attendance: 132

Cost: \$225 for equipment rental, \$200 for snacks (chips, pretzels, candy, soft drinks), \$20 for publicity, \$50 for prizes (in the form of CDs)

Reaction: Positive, though several students complained that song availability was limited. One of the winners expressed displeasure with their prize.

GROUP WORKSHEET

Give a brief description of the event:

Who is doing what to prepare for this event?

RA Number:	Task(s):
1)	
2)	
3)	
4)	

Sign your RA number (not your name) to indicate your agreement with the plan described above:

APPENDIX E

Example Feedback Report

Feedback Report for participant # 10001 10/21/13

As part of your participation in this research study, we have prepared a feedback report describing your performance in the group exercise. Your behavior was observed and evaluated by a group of highly trained assessors who used specific behavioral standards to evaluate your performance. In this exercise, we were focusing on three core skills:

Planning and Organizing, Oral Communication, and Teamwork.

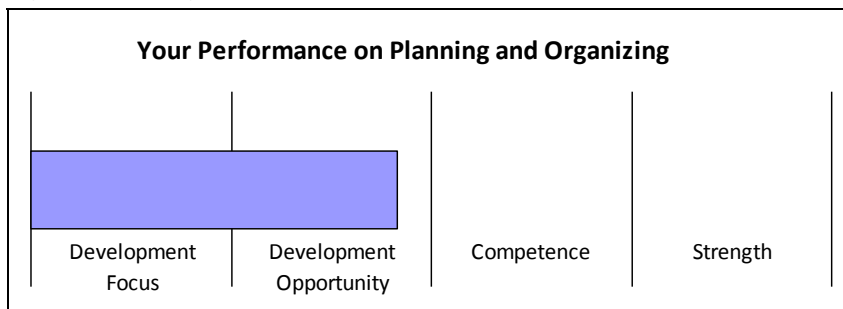
These skills are consistently identified as important for a variety of careers. You indicated at the beginning of this study that your current major is:

Psychology

As you review the feedback, we encourage you to consider how these skills are important for success in your particular field.

Planning and Organizing

Effective planning and organizing includes identifying strategies, goals, and priorities; identifying, finding, and aligning resources; and staying focused on a task to complete objectives in a timely manner.



Here are some examples of the behaviors we observed that led to this assessment:

Contributes ideas to what has already been touched on, but seldom suggests new steps or ideas.

Able to stick to flow of the conversation.

Offers minimal opinion, such as needing a freezer for the Ice cream, and paying \$200 to reserve a site.

Referred to the resources needed a few times.

Touches on points already been made, such as when the event will be held, and the roasting of marshmallows.

Did not hold back from completing the exercise.

Oral Communication

Effective oral communication includes speaking with clarity in message, pitch, volume, and gesture; conveying a message that is straightforward and concise, so that meanings can be easily understood; and using an appropriate communication style for the audience.

APPENDIX F

Planning & Organizing BARS

Dimension			
Planning/Organizing : Goals & Strategy: Identifies a strategy, goals, and priorities Identifying & Aligning Resources: Identifies, aligns, and finds resources Completing requirements: Stays focused on the task to complete objectives in a timely manner			
Goals & Strategy			
Ineffective Competent Minimally Competent			Outstanding
1	2	3	4
Distracts from discussion about goals and strategy. Fails to consider steps that will clearly be necessary for proposed event to succeed.	Participates in discussion about strategy or goals. Is able to stick to “the plan.”	Suggests steps that need to be taken to make the event happen or to complete the exercise	Proposes a clear, overall strategy for completing the task and/or planning the event. Talks a lot about the steps they need to take, goals, etc. to complete the task.
Identifying & Aligning Resources			
Ineffective Competent Minimally Competent			Outstanding
1	2	3	4
Does not give input on resources or distracts from the discussion on resources. Has unrealistic ideas about resources.	Is able to participate in a discussion about resources and offer a minimal opinion.	Accurately discusses currently available resources. Effectively weighs the pros and cons of current resources.	Suggests creative ways to obtain new resources or align resources that could be highly effective.
Completing Requirements			
Ineffective Competent Minimally Competent			Outstanding
1	2	3	4
Significantly delays group by bringing up irrelevant issues or comments.	Discusses points that other group members have already made. Doesn't hold the group back from moving forward.	Helps move the completion of the task forward by suggesting that they move on or by bringing up a relevant idea or requirement that wasn't yet mentioned.	Restates the requirements of the exercise. Refers back to the strategy, reviews objectives, and checks the group's progress. Reminds the group what still needs to be accomplished.

APPENDIX G

Sorting Task

Below is a list of behaviors that someone might display in this type of exercise.

Please sort these behaviors into categories that would represent different professional skills.

Behaviors put in the same category should be examples of the same skill.

Some behaviors are negative examples of a skill, but they should still be put in the skill category that they represent.

For example:

Category 1 (Cooking Skill Behaviors):

Behavior: Cleans and chops vegetables

Behavior: Sautés vegetables

Behavior: Overcooks the cream sauce (negative)

Category 2 (Gardening Skill Behaviors):

Behavior: Mulches the flower bed

Behavior: Overwaters the spruce (negative)

Behavior: Prunes the roses

You decide how many professional skill categories are represented by these behaviors and then sort/match the behaviors to the corresponding skill.

Behaviors:

- Disagrees with others or disregards others' suggestions without reasonable explanation.
- Lacks a strategy for completing the task, missuses time
- Explains ideas fully and logically
- Has unrealistic goals for accomplishing some part of the task
- Meets the objectives of the meeting
- Restates ideas in another way to make sure others understand
- Contributes to the task through offering ideas and volunteering to be responsible for some part of the event.

- Makes consistent, appropriate eye contact
- Communicated relevant information at the right times
- Offers positive feedback & encouragement to others
- Offers several ideas, but doesn't respond to others' ideas
- Proposes a method for accomplishing the task
- Seeks the input of other group members, even those who have been silent
- Talks about ways to get additional resources
- Agrees with others' suggestions, but offers few of his/her own
- Uses very formal language and complex sentences

APPENDIX H

Personal Career Skill Importance

Instructions: What professional skills will be most important for your planned career? Choose 3 from the list below and rank them by level of importance.

Most Important: _____

Next most important: _____

Important: _____

- Problem solving
- Creativity
- Planning & Organizing
- Adaptability
- Stress tolerance
- Conscientiousness
- Motivation
- Oral Communication
- Written Communication
- Listening
- Persuasiveness
- Emotional intelligence
- Leadership
- Teamwork
- Conflict Management

APPENDIX I

Closed-Ended ATIC

About the Activity12344

Activities like the one you just participated in are often used in organizations to evaluate participants on many different kinds of skills. In the activity you just completed, what do you think we were trying to assess? Be as specific as you can.

More test data here

About the Activity12344

Below are some examples of different skills that might be assessed in an activity like the one you just completed. Please read the description of each skill carefully, then think about which three would be MOST RELEVANT for effective performance in this particular activity.

Career Ambition	The expressed desire to advance to higher job levels with active efforts toward self-development for advancement.	Development of Subordinates	Developing the skills and competencies of subordinates through training and development activities related to current and future jobs
Initiative	Active attempts to influence events to achieve goals; self-starting rather than passive acceptance. Taking action to achieve goals beyond those called for; originating action	Job Motivation	The extent to which activities and responsibilities available in the job overlap with the activities and responsibilities that result in personal satisfaction.
Judgment	Developing alternative courses of action and making decisions based on logical assumptions that reflect factual information	Leadership	Utilization of appropriate interpersonal styles and methods in guiding individuals (subordinates, peers, and superiors) or groups toward task accomplishment.
Oral Communication	Effective expression in individual or group situations (includes gestures and nonverbal communication).	Planning . Organizing	Establishing a course of action for self and/or others to accomplish a specific goal; planning proper assignments of personnel and appropriate allocation of resources
Range of Interests	Breadth and diversity of general business related knowledge- well informed.	Sensitivity	Actions that indicate a consideration for the feelings and needs of others.
Technical and Professional Knowledge	Level of understanding of relevant technical and professional information.	Written Communication	Clear expression of ideas in writing and use of good grammatical form.

Which three skills are MOST RELEVANT for effective performance in this particular exercise?

Most Relevant Skill:

Initiative

Second Most Relevant Skill:

Job Motivation

Third Most Relevant Skill:

Sensitivity

Next Page

APPENDIX J

Multidimensional Feedback Acceptance Scale

Think specifically about the feedback you received and rate your agreement with each item using a 5 point scale (1 = Strongly Disagree, 5 = Strongly Agree).

1. The feedback I received about my performance is accurate.
2. The feedback I received about my performance adequately captures my performance.
3. I agree with the feedback I received about my performance.
4. The feedback I received about my performance fits with my assessment of my performance on the assignments.
5. The feedback I received about my performance fits with my assessment of my performance in everyday life.
6. The feedback I received about my performance was specific.
7. The feedback I received about my performance was detailed.
8. The feedback I received about my performance taught me something about myself.
9. I believe I am now more aware of my developmental needs.
10. I believe I am now more aware of my skill strengths.
11. I believe I will be more aware of my performance on these skills in the future.
12. I believe that the feedback criteria are fair.
13. I feel that this feedback process has been fair.
14. The procedures used to evaluate my performance were fair.
15. This feedback leads me to believe that I can improve.
16. I believe I can successfully improve my behaviors.

17. I believe I can successfully improve on the behaviors suggested in the feedback.
18. The developmental recommendations in my feedback are specific.
19. The developmental recommendations in my feedback are detailed.
20. The feedback is easy to understand.
21. The way the feedback is presented makes sense.
22. The feedback was well organized.
23. I have identified at least one skill I want to develop.
24. I am likely to consider this feedback the next time I am at work or looking for work.
25. I am likely to consider this feedback when I encounter opportunities to develop.
26. The feedback I received will influence my effort in the future.
27. I plan on using this feedback to improve my performance in the near future.
28. I plan on following these recommendations in the future.