Is It Time to Update and Expand Training Motivation Theory?
A Meta-Analytic Review of Training Motivation Research in the 21st Century

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Abstract

Colquitt et al.'s (2000) integrative theory based on meta-analysis and model testing has served as the foundation for our understanding of training motivation. However, the applicability of the theory today may be limited for several reasons. There has been significant growth in training motivation research since Colquitt et al.'s (2000) proposed and tested their theory. Also, advances in meta-analysis and model testing allow for a more complete and rigorous test of the theory than was previously possible. As a result, we propose and test a contemporary and comprehensive theory of training motivation based on Colquitt et al. (2000) and other studies conducted over the last 20 years. To do so, we conducted an updated meta-analytic review of 167 independent studies and tested a mediation model of training motivation theory using both conventional meta-analytic structural equation modeling (MASEM) and full-information meta-analytic structural equation modeling (FIMASEM). The results support a partially mediated model of training motivation that includes additional antecedents (e.g., openness to experience, extraversion, agreeableness, and goal orientation) and learning outcomes (e.g., turnover intentions and job satisfaction) not included in Colquitt et al. (2000). Additionally, we conducted exploratory analyses to understand the relative importance of the antecedents of both motivation to learn and learning outcomes and the moderating role of training and studying characteristics on the relationships between motivation to learn and its antecedents and consequences. Finally, we discuss the implications of the results for theory, practice, and future research directions.

Keywords: training motivation; motivation to learn; learning; meta-analysis

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Training is an important human resource practice that can help firms achieve their strategic goals. U.S. organizations spent approximately $83 billion on formal training programs in 2020, and investment in training is expected to continue to grow in the long term (Training Industry Report, 2020). Investment in formal training programs can provide employees with the skills they need to successfully perform their jobs and help attract and retain talented employees. Through their investment in human capital resources, firms can realize improvements in their performance and thus achieve a sustainable competitive advantage (Crook et al., 2011; Noe et al., 2014).

An important factor of the effectiveness of formal training programs is "training motivation" (Bell et al., 2017), which refers to the direction, intensity, and persistence of learning-directed behavior in training contexts (Colquitt et al., 2000; Kanfer, 1990). Colquitt et al. (2000) took the first step toward developing a theory of training motivation with motivation to learn being the central focus. "Motivation to learn" refers to trainees' desire to master training content and to apply newly acquired skills in the work setting (Hicks, 1984; Noe, 1986; Noe & Schmitt, 1986). Colquitt et al. (2000) used a traditional narrative review and a meta-analytic model testing to develop their integrative theory of training motivation. Their review included the results of studies of the antecedents and consequences of motivation to learn based on 25 years of research. In the past two decades, researchers have primarily used their theory to examine training motivation (Bell et al., 2017).

However, for several reasons it is time to revisit and update Colquitt et al.'s (2000) integrated theory of training motivation. First, there has been an increase in the use of technology-based training delivery methods, such as online learning, which gives learners

greater control over when and where they learn than traditional instructor-led learning (Ho, 2019). Also, organizations have increasingly offered employees more voluntary learning opportunities, allowing them to tailor their skill development to match their career interests and personal needs (Dachner et al., 2019). This trend toward greater learner control over where, when, and what to learn suggests that individual differences (e.g., personality) and situational characteristics (e.g., managerial support) may have a stronger influence on training motivation than they did 20 years ago. Second, Colquitt et al. (2000) readily acknowledged the preliminary nature of their theory of training motivation. They emphasized that their work should be replicated and extended after researchers had more fully examined potential predictors and outcomes of motivation to learn. We answer this call to determine if the significant individual differences and situational characteristics identified by Colquitt et al. (2000) are still influential antecedents of motivation to learn and learning outcomes and whether new variables should be included in training motivation theory. Third, Colquitt et al.'s (2000) test of integrative training motivation theory was incomplete because they had to omit several variables from model testing due to an insufficient number of studies. Also, they were unable to examine whether different parts of the integrative theory varied as functions of moderators such as different training methods and settings. Twenty years later, the availability of more studies of the antecedents and consequences of motivation to learn makes it possible to corroborate and extend training motivation theory.

The purpose of this study is to propose and test a comprehensive and contemporary theory of training motivation. We develop and test an updated theory of training motivation based on a meta-analytic review of studies included in Colquitt et al. (2000) and those conducted over the last 20 years. As a result, we provide a more complete understanding of the nomological

network of motivation to learn, potential moderators, and evidence-based recommendations (Bell et al., 2017). Specifically, Colquitt et al. (2000) included 19 articles (22 independent effect sizes) that examined the relationships of motivation to learn with other variables. Our meta-analysis included these 19 articles and 132 additional articles (145 independent effect sizes), yielding a total of 167 independent effect sizes from 151 articles. The number of studies available for this meta-analysis has increased by almost seven times compared to Colquitt et al. (2000) (i.e., 694%; from 19 to 151), which allows us to include more variables not included in Colquitt et al. (2000) (e.g., organizational commitment). Further, we examine whether several new antecedents over the last two decades (e.g., goal orientation, Payne et al., 2007; five factor model [FFM] personality traits, Major et al., 2006) and outcomes (e.g., turnover intentions; Shih et al., 2011) of motivation to learn should be included in training motivation theory.

In this study, we used advanced meta-analytic techniques and applications now available to test models to produce integrative knowledge (Oh, 2020). We examined the extent to which the relationships between individual differences, job/career variables, situational characteristics, motivation to learn, and training outcomes have remained stable or have changed by comparing the effect sizes of the relationships examined by Colquitt et al. (2000) to those based on studies conducted since 1999. We used meta-analytic structural equation modeling (Viswesvaran & Ones, 1995) to test our training motivation model and verified the results with full information meta-analytic structural equation modeling (FIMASEM; Yu et al., 2016), which can provide more robust and rigorous model testing than 20 years ago. To broaden our understanding of training motivation, we explored the relative importance of individual and situational characteristics for predicting motivation to learn and learning outcomes. Also, we examined the

moderating role of both training methods and study characteristics on the relationship between motivation to learn and its antecedents and outcomes.

Several recent meta-analyses have expanded our understanding of some relationships examined in Colquitt et al. (2000). For example, Bauer et al. (2016) meta-analyzed the relationships between different types of motivation in learning contexts (e.g., intrinsic motivation, motivation to learn, motivation to transfer) and training outcomes. Hughes et al. (2020) focused solely on the relationships between work environment support (i.e., peer, supervisor, and organizational support), motivation to transfer, and training transfer. Payne et al. (2007) investigated the nomological network of goal orientation and several variables included in Colquitt et al.'s (2000) training motivation theory such as learning and job performance. However, our study goes beyond these meta-analyses by proposing and testing a comprehensive and contemporary theory of training motivation. Figure 1 shows the proposed model based on our theory of training motivation. We summarize the proposed relationships in Table 1. Below, we provide an overview of our proposed model, its theoretical and empirical foundations, and the study hypotheses.

Overview of Proposed Integrative Model of Training Motivation

We propose a baseline fully mediated model of training motivation in which the antecedents influence the distal and proximal outcomes and transfer of training only through their relationship with motivation to learn. Previous research has identified two broad categories of factors influencing trainees' training motivation: individual characteristics and situational characteristics (Colquitt et al., 2000; Tannenbaum & Yukl, 1992). Based on these two categories, we identify six sets of antecedents of motivation to learn including personality traits, knowledge and skills, individual motivation, job/career variables, climate variables, and trainees'

demographic characteristics. Furthermore, we organize outcomes of motivation to learn into two different categories: proximal learning outcomes and distal outcomes. “Proximal learning outcomes” refers to those that directly result from training and manifest themselves either immediately after or a short-time following training (Klein & Weaver, 2000). “Distal outcomes” refers to outcomes that occur as a direct or indirect result of achieving the proximal learning outcomes (Klein & Weaver, 2000). They usually manifest themselves and are assessed after trainees complete the training program.

Colquitt et al. (2000) examined the relationship between motivation to learn and proximal outcomes including reactions, post-training self-efficacy, declarative knowledge, and skill acquisition, based on Kirkpatrick (1976) and Kraiger et al. (1993). We also included learning satisfaction, turnover intentions, and job satisfaction. These proximal outcomes have been examined in studies conducted since Colquitt et al. (2000). We then grouped all proximal outcomes into four broad categories: affective, cognitive, skill-based, and work attitudes. Similar to Colquitt et al. (2000), we examined the relationships between motivation to learn and distal outcomes including training transfer and job performance. “Training transfer” or “transfer of training” refers to “the degree to which trainees effectively apply the knowledge, skills, and attitudes gained in a training context to the job” (Baldwin & Ford, 1988, p. 63). Lastly, “Job performance” contributes to “the organization’s technical core, either by executing its technical processes or by maintaining and serving its technical requirements” (Motowidlo & Van Scotter, 1994, p.476).

Theoretical Background

Colquitt et al.’s (2000) Integrative Theory of Training Motivation

Colquitt et al.’s (2000) training motivation theory was rooted in needs-motive values, cognitive choice theories of motivation (e.g., expectancy theory), research on training motivation

(e.g., Mathieu & Martineau, 1997), and training outcomes (Kraiger et al. 1993). The theory also incorporated other proposed models of training motivation (e.g., Mathieu et al., 1992; Noe, 1986). Need-motive-value theories stress that between-person differences in motivation are caused by personality, values, and motives (Kanfer, 1990). Colquitt et al. (2000) emphasized that individuals' personalities and values create differences in self-set goals and the cognitive construction of individuals' environments, which in turn influence learning motivation and outcomes achieved. Cognitive choice theories emphasize the cognitive processes involved in decision-making and provide insights into the mechanisms through which personality, values, and motives influence motivation to learn (Kanfer, 1990). Colquitt et al. (2000) adopted Vroom's (1964) expectancy theory as the basis for understanding motivation to learn. That is, motivation to learn is influenced by trainees' beliefs concerning the likelihood that effort put forth in training will result in mastery of training content (i.e., expectancies) and their preferences and value placed on outcomes resulting from participation in training (i.e., valence).

Based on these underlying theories and research, Colquitt et al.'s (2000) training motivation theory proposed that personality (e.g., locus of control, anxiety, conscientiousness, achievement motivation), job/career variables (e.g., job involvement, organizational commitment, career planning, career exploration), self-efficacy, age, cognitive ability, and valence are all significantly related to motivation to learn. Recognizing the important influence of situational characteristics on individual behaviors, Colquitt et al. (2000) included climate, manager support, and peer support as antecedents of motivation to learn (e.g., Birdi et al., 1997; James & Jones, 1974; Tracey et al., 1995). In turn, they proposed that motivation to learn was related to training outcomes including declarative knowledge, skill acquisition, post-training self-efficacy, reactions, transfer of training, and job performance. Their meta-analytic review showed

that almost all of the antecedents examined had significant relationships with motivation to learn, except for cognitive ability, and motivation to learn was positively related to training outcomes, except for job performance.

To better understand the theoretical structure underlying these variables, Colquitt et al. (2000) proposed and tested two alternative models of training motivation: a full mediation model and a partial mediation model. Meta-analytic path analysis results supported the partial mediation model of training motivation. Specifically, the results showed that motivation to learn, and not just cognitive ability, had a positive influence on learning outcomes. Self-efficacy, valence, personality (e.g., locus of control, anxiety), age, and climate were positively related to motivation to learn. In addition, locus of control, anxiety, age, and climate had a positive relationship with proximal (e.g., reactions, post-training self-efficacy, skill acquisition, declarative knowledge) and distal outcomes (e.g., training transfer, job performance).

Antecedents of Motivation to Learn

Personality Traits

"Locus of control" refers to the extent to which individuals believe that they have control over the outcome of events in their lives rather than external forces (Rotter, 1990). Individuals with an internal locus of control tend to have more positive attitudes toward training because they believe they can benefit from training participation (e.g., Cheng, 2000; Noe, 1986). Internal locus of control is positively related to motivation to learn (Colquitt et al., 2000). "Anxiety" or "target specific anxiety" refers to the concern of having to participate in a specific activity or experience. Individuals who are anxious about attending training or using a new training method likely have more negative attitudes toward training and lower levels of motivation to learn. Anxiety has a negative relationship with motivation to learn (e.g., Colquitt et al., 2000; Webster

& Martocchio, 1993). As a result, we hypothesize the internal locus of control is positively related to motivation to learn, and anxiety for learning is negatively related to motivation to learn.

Due to the lack of primary studies, Colquitt et al.'s (2000) meta-analytic review only included the personality trait conscientiousness. "Conscientiousness" describes the degree to which an individual is responsible, dependable, hardworking, and cautious (Costa & McCrae, 1992; Mount & Barrick, 1991). We hypothesize a positive relationship between conscientiousness and motivation to learn because individuals with high levels of conscientiousness have confidence in their learning ability and a heightened level of self-efficacy to master training content (e.g., Colquitt & Simmering, 1998; Colquitt et al., 2000; LePine et al., 2004; Martocchio & Judge, 1997).

Since Colquitt et al. (2000), researchers have investigated the relationships between motivation to learn with the other four PPM traits: openness to experience, extraversion, agreeableness, and neuroticism. "Openness to experience" refers to the extent to which an individual is curious, broad-minded, imaginative, intelligent, imaginative, and artistically sensitive (Barrick & Mount, 1991). Individuals high in openness to experience tend to be intellectually curious and willing to seek new opportunities or experiences (Choi et al., 2015; Costa & McCrae, 1992). Also, they have a higher motivation to learn because of their positive attitudes toward acquiring new knowledge and skills in training programs (e.g., Major et al., 2006; Rowold, 2007). Therefore, we hypothesize a positive relationship between openness to experience and motivation to learn.

"Extraversion" describes the extent to which an individual is talkative, sociable, active, assertive, and gregarious (Barrick & Mount, 1991). A notable characteristic of extroverts is their

positive affectivity (Watson & Clark, 1997). This likely shapes trainees' positive perceptions of training programs. Other notable characteristics of extroverts include their communication and relationship-building capabilities (e.g., Roberts et al., 2008; Wanberg & Kammeyer-Mueller, 2000; Wanberg, Kanfer et al., 2000). Such characteristics influence extroverted trainees to actively interacting with instructors or trainers, which in turn enhances their learning motivation (Major et al., 2006). As a result, we expect that extraversion has a positive relationship with motivation to learn.

"Agreeableness" refers to the degree to which an individual is cooperative, courteous, trusting, good-natured, soft-hearted, tolerant, and flexible (Barrick & Mount, 1991). Agreeable individuals tend to get along with others and likely engage in behaviors intended to cultivate positive interpersonal relationships (e.g., Chiaburu et al., 2011). Following this line of logic, exhibiting high motivation to learn may represent agreeable trainees' effort to maintaining a harmonious relationship with the instructor, the trainer, or other trainees. Research has shown that agreeable trainees exhibit high levels of motivation to learn in training programs to demonstrate their cooperativeness (Rowold, 2007). Thus, we expect agreeableness to be positively related to motivation to learn.

"Neuroticism" describes an individual's degree of being anxious, depressed, worried, insecure, angry, embarrassed, and emotional (Barrick & Mount, 1991). Participating in training programs imposes new challenges on employees. Individuals with high neuroticism are predisposed to experience worry or a lack of control in new situations (Watson & Clark, 1984). Individuals high in neuroticism have also been found to attend training programs unenthusiastically and have low motivation to learn (LePine et al., 2014; Rowold, 2007). Thus, we expect neuroticism to be negatively related to motivation to learn.

Knowledge and Skills

Cognitive ability is the most commonly examined variable in the training literature (e.g., Ackerman, 1999; Hunter, 1986; Kanfer & Ackerman, 1989). Cognitive ability is positively related to many learning outcomes including declarative knowledge, skill acquisition, and training performance (Colquitt et al., 2000; Hunter & Hunter, 1984; Salgado & Moscoso, 2019). However, previous meta-analyses on the relationship between cognitive ability and motivation to learn have found inconsistent results. Colquitt et al. (2000) found a nonsignificant negative relationship between cognitive ability and motivation to learn, but Van Iddekinge et al. (2018) found a weak positive relationship between cognitive ability and motivation in a training context. As a result, we examine the relationship between cognitive ability and motivation to learn in this study but we do not provide a directional hypothesis.

Although education is typically treated as a control variable in training research, we proposed that trainees' education level is positively related to motivation to learn. Trainees with a high education level have a more positive experience with learning and therefore have higher confidence in learning or are more capable of learning than do those with a low education level (Illeris, 2006). In addition, highly educated individuals may possess higher levels of desirable characteristics for learning, such as conscientiousness (e.g., Lodi-Smith et al., 2010; Ng & Feldman, 2010). Thus, we propose that highly educated trainees are more motivated to learn.

Individual Motivation Variables

"Valence" refers to beliefs regarding the desirability of training outcomes. Individuals who believe they will gain beneficial outcomes from training tend to have a high level of motivation to learn (Colquitt et al., 2000; Colquitt & Simmering, 1998; Tharenou, 2001). "Pretraining self-efficacy" refers to individuals' belief in their capability of performing well in

training, given a specific set of demands (Bandura, 1982). Studies have consistently shown a positive relationship between pretraining self-efficacy and motivation to learn (Carlson et al., 2000; Colquitt et al., 2000; Warr & Bunce, 1995; Webster & Martocchio, 1993). As a result, we propose that both valence and pretraining self-efficacy have positive relationships with motivation to learn.

Moreover, studies conducted since Colquitt et al. (2000) have examined the relationships between other individual motivation variables (such as goal orientation) and learning motivation (see Payne et al. [2007] for review). According to Dweck and Leggett (1988), there are two main types of goal orientation−learning goal orientation (LGO) and performance goal orientation (PGO). "LGO" refers to an individual's desire to increase and develop competence by acquiring new knowledge and skills, whereas "PGO" refers to their desire to demonstrate competence by obtaining positive judgments. LGO is expected to have a positive relationship with trainees' training motivation. Given their focus on increasing competence, trainees with high LGO are motivated to learn new skills and master challenging situations (Dweck, 1986; VandeWalle et al., 2001). Individuals with high PGO focus on demonstrating their competence rather than being motivated to obtain new knowledge and skills from training. In fact, Payne et al.'s (2007) meta-analysis found a negative relationship between PGO and employee learning. Therefore, we hypothesize that valence, pretraining self-efficacy, and LGO are positively related to motivation to learn, and PGO is negatively related to motivation to learn.[1]

Job/Career Variables. We focus on two job/career variables in this study: job

[1] VandeWalle (1997) argued that PGO can be partitioned into two dimensions: prove performance goal orientation (PPGO) and avoid performance goal orientation (APGO). VandeWalle defined PPGO as "the desire to prove one's competence and to gain favorable judgments about it" and APGO as "the desire to avoid the disproving of one's competence and to avoid negative judgements about it" (p. 1000). We conducted supplementary analysis of the PPGO−motivation to learn and APGO−motivation to learn relationships, which is provided in the Results section.

involvement and organizational commitment. *Job involvement* refers to the importance of work to an individual's self-image and the extent to which an individual identifies psychologically with work (Brown, 1996; Lodahl & Kejner, 1965). "Organizational commitment" is the extent to which an individual identifies with an organization (Meyer et al., 1993). Trainees with high job involvement believe that training will increase their self-worth and thus are motivated to learn (Cheng, 2000; Colquitt et al., 2000; Mathieu et al., 1993). Moreover, trainees who have high levels of organizational commitment are likely to be motivated to learn in training programs. Their high level of organizational commitment means they believe training will benefit the organization, resulting in enhanced motivation to learn (Colquitt et al., 2000; Cunningham & Mahonehy, 2004; Tannenbaum et al., 1991). As a result, we hypothesize that job involvement and organizational commitment are positively related to motivation to learn.

Supportive Climate

Climate variables capture the situational characteristics influencing training (Tracey et al., 1995). A supportive climate can shape workers' positive attitudes toward training opportunities, influence their perceptions of the potential benefits that can be obtained from participating in training opportunities, and increase their understanding of their skill strengths and weaknesses, which in turn enhances their motivation to learn (Kozlowski & Hults, 1987; Noe & Wilk, 1993). Research has shown that four climate variables are positively related to motivation to learn: (a) "manager/supervisor support"; (b) "peer support" (i.e., reinforcement, feedback, or encouragement provided by a supervisor or peer to encourage learning; Brown, 1996; Tews et al., 2013); (c) "organizational support" (i.e., perceived level of support and encouragement from the organization for learning activities; Choi & Jacobs, 2011); and (d) "continuous learning culture" (i.e., "a pattern of shared meanings associated with multiple

methods for knowledge acquisition and application"; Chiaburu & Tekleab, 2005; Tracey et al., 1995, p. 242). Colquitt et al. (2000) found a positive relationship between supervisor support, peer support, climate (which included organizational support and continuous learning culture), and motivation to learn. They included organizational support and continuously learning culture as part of the climate variable because too few primary studies were available to separately examine their relationship with motivation to learn. In this study, we can separately examine the relationships of organizational support and continuous learning culture with motivation to learn. We expect that manager/supervisor support, peer support, organizational support, and continuous learning culture are positively related to motivation to learn.

Demographic Variables

As Colquitt et al. (2000) noted, demographics are treated as control variables because of the lack of theoretical support for their relationships with motivation to learn. However, the authors did explore the relationships of age and gender with learning motivation and found that age only had a small negative relationship with motivation to learn. Later studies confirmed these findings and suggested that individuals become less interested in learning in the workplace as they get older (Guerrero & Sire, 2001; Niessen, 2006; Warr et al., 1999). There is little or no underlying theory to hypothesize the relationship between gender and motivation to learn given the inconsistent results in the literature (Webster & Martocchio, 1995). Therefore, we view our examination of the relationships of age and gender with motivation to learn to be exploratory and do not hypothesize the expected direction of the relationships.

Outcomes of Motivation to Learn

Based on Kirkpatrick's (1976) model of training effectiveness and Kraiger et al.'s (1993) theory of training outcomes, researchers have examined the relationships between motivation to

learn and post-training self-efficacy, training reactions, declarative knowledge, and skill acquisition. There are positive relationships between motivation to learn and these learning outcomes (Colquitt et al., 2000). To extend research on outcomes of motivation to learn, we include several categories of learning outcomes in our theory of training motivation.

Proximal Learning Outcomes

Our theory includes broad categories of outcomes based on Kraiger et al.'s (1993) theory of learning outcomes. We chose not to adopt Kirkpatrick's (1976) framework because of several notable limitations (e.g., discrepancies between the concepts of the learning outcomes and their assessment). We include proximal learning outcomes, including affective-based, cognitive-based, and skill-based outcomes. "Affective outcomes" refers to outcomes used to assess trainees' attitudes and reactions after the training. Our theory includes trainees' self-efficacy following training, training reactions, and learning satisfaction. "Post-training self-efficacy" refers to a belief that a person can cope with the challenging situations after training (Bandura, 1977; 1982). "Training reactions" refers to the perceived usefulness of training content (Brown, 2005; Warr & Bunce, 1995). "Learning satisfaction" is the extent to which a trainee likes the subject matter and believes they have acquired skills from the training program (e.g., Debowski et al., 2001; Orvis, Horn et al., 2009). "Cognitive learning outcome" refers to outcomes used to determine the degree to which trainees are familiar with the facts, procedures, and processes emphasized in the training program. For example, knowledge acquisition determined by achievement test scores administered at the end of training is a common cognitive learning outcome used in the training domain (e.g., Orvis, Fisher et al., 2009). "Skill-based learning outcome" refers to outcomes used to evaluate the trainees' technical skills and behaviors. If trainees have learned the skills from the training program, work samples or observations can be

conducted to assess their behaviors. This outcome is different from the acquisition of declarative knowledge (i.e., cognitive learning outcome) because skill-based learning outcome assesses an individual's behavior or learned skills. We also consider academic performance a skill-based learning outcome because it indicates how a person performs on a variety of academic tasks, not just the evaluation of knowledge acquisition (e.g., Klein et al., 2006). Lastly, we include a new category of proximal outcomes labeled "Work attitudes" (e.g., turnover intention, job satisfaction) to group those outcomes primarily examined in studies of motivation to learn since Colquitt et al. (2000). In their meta-analysis, Harrison et al. (2006) found that work attitudes strongly predict behavioral outcomes desirable for one's work role including task performance. Thus, we consider work attitudes as a broad proximal outcome with a positive influence on distal outcomes including training transfer and job/task performance.

Research has shown that motivated learners are more likely to experience positive affective outcomes such as feeling more capable because of the knowledge and skills obtained from training (e.g., Bell & Kozlowski, 2008; Colquitt et al, 2000; Stanhope et al., 2013), and exhibiting more favorable evaluation of the usefulness of the training (e.g., Bell & Ford, 2007) and satisfaction toward the training (e.g., Colquitt et al., 2000; Orvis, Fisher et al., 2009). As a result, we hypothesize that positive relationships exist between motivation to learn and affective outcomes including post-training self-efficacy, training reactions, and learning satisfaction.

Furthermore, we hypothesize a positive relationship exists between motivation to learn and both cognitive-based and skill-based outcomes (e.g., Colquitt et al. 2000; Klein et al., 2006; Orvis et al., 2008). This has been supported by research showing that motivated learners tend to have more positive reactions to learning (Baldwin & Karl, 1987; Baldwin et al., 1991) and are likely to invest more time and effort to acquire knowledge and skill via the learning process.

Research suggests that motivation to learn is significantly related to turnover intentions and job satisfaction (e.g., Bartlett, 2001; Birdi et al., 1997) because employees' motivation to learn reflects their interest in learning and willingness to participate in training programs, which can positively influence their performance and career. For example, Shih et al. (2011) found that when employees are motivated by or are interested in the training opportunities provided by the organization, they are less likely to consider leaving the organization. Georgellis and Lange (2007) found that participation in training programs offered by the organization can increase employees' job satisfaction. In an exploratory analysis, Birdi et al. (1997) found a positive relationship between motivation to learn and job satisfaction. Thus, we hypothesize that motivation to learn is negatively related to turnover intentions and positively related to job satisfaction.

Distal Outcomes

We hypothesize that proximal outcomes mediate the relationship between motivation to learn and transfer of training for several reasons. As motivation to learn is positively related to each of the proximal outcomes, we noted that Blume et al. (2010) found that individuals who experience high affective-based outcomes have a higher transfer of training due to their positive attitudes toward training programs. They also found that cognitive-based and skill-based outcomes have positive relationships with training transfer because they influence the individual's capability to generalize and maintain learning experience. Also, work attitudes influence individuals' willingness to intentionally apply the knowledge and skills gained in the training to their job to benefit the organization (Zumrah & Boyle, 2015). As a result, work attitudes are positively related to transfer of training.

Last, we hypothesize that transfer of training has a positive relationship with job/task performance. Transfer of training involves the generalization and maintenance of knowledge and skills over time on the job. As a result, studies have consistently shown it is positively related to trainees' job/task performance (Blume et al., 2010; Ford et al., 1988). Because training transfer is necessary for enhanced job performance, we expect it to mediate the relationship between motivation to learn and job performance.

Insert Table 1 about here

Exploratory Research Questions

Our primary focus is on providing and testing a contemporary and comprehensive theory of training motivation. The new studies of motivation to learn conducted since Colquitt et al. (2000) provided us with a sufficient sample to examine three exploratory research questions. The results of these research questions can help inform future research directions.

First, although previous research (Colquitt et al., 2000; Hughes et al., 2020) has examined the relationships among individual and situational characteristics, motivation to learn, and learning outcomes (e.g., declarative knowledge, job/task performance), little is known about the simultaneous effects or relative importance of these antecedents. Thus, we explore the simultaneous effects and relative importance of individual and situational characteristics in predicting motivation to learn and proximal and distal outcomes.

Research Question 1: What is the relative importance of individual and situational characteristics in predicting motivation to learn and proximal and distal outcomes?

Second, previous meta-analyses on training (e.g., Bauer et al., 2016; Hughes et al., 2020; Sitzmann et al., 2008) have suggested that the relationships between motivation to learn and its

antecedents and outcomes may be influenced by study and training characteristics. We examined whether study characteristics (e.g., sample population, publication status, study design) and training characteristics (e.g., training type, training motivation type) moderate the relationships between antecedents and training motivation and between training motivation and learning outcomes. Exploring these moderators can help us better understand the relationships between training motivation and its antecedents and learning outcomes. As a result, we propose the following research questions:

> *Research Question 2*: Do study characteristics (e.g., sample population, publication status, study design) and training characteristics (e.g., training type, training motivation type) influence the relationships between training motivation and its antecedents?
>
> *Research Question 3*: Do study characteristics (e.g., sample population, publication status, study design) and training characteristics (e.g., training type, training motivation type) influence the relationships between training motivation and its outcomes?

Method

Literature Search and Sample of Studies

We took several steps to systematically identify studies for the current meta-analysis. First, we searched for papers from 1999 through June 2020. We chose 1999 as the starting year for our search because it was the ending year for Colquitt et al.'s (2000) literature search. We searched for empirical articles published from online research databases (e.g., Business Source Complete, JSTOR, PsycINFO, Science Direct, Web of Science, and Wiley Online Library). Specifically, we used search terms based on the key variables in our study including "*training", "learning", "training motivation", "pretraining motivation", "motivation to learn",* and *"learning motivation"*. Second, we manually searched for more articles from multiple peer-reviewed journals among various academic disciplines including management, education, and

psychology (e.g., *Academy of Management Journal, Administrative Science Quarterly, Human Resource Development Quarterly, International Journal of Training and Development, Journal of Applied Psychology, Journal of Educational Psychology, Journal of Management, Journal of Organizational Behavior, Journal of Vocational Behavior, and Personnel Psychology*). Third, we included empirical articles from the reference lists of previous meta-analyses including motivation to learn (e.g., Bauer et al., 2016; Colquitt et al., 2000). Fourth, we used multiple methods to identify unpublished studies to mitigate the threat of publication bias and the possibility of a *"file drawer"* problem (Rosenthal, 1979). We identified unpublished dissertations from ProQuest Dissertation online database and conference manuscript/proceedings from major conferences in the field (e.g., Academy of Management, Society for Industrial and Organizational Psychology) from 2000 to 2020. Additionally, to obtain working manuscripts and in-press articles we personally contacted several researchers in the field of training and learning and used the listservs of the Academy of Management Human Resources Division and Organizational Behavior Division.

Inclusion Criteria and Sample for Studies

We used several criteria for including studies in the meta-analysis. First, all included articles needed to include our key study variable — training motivation (e.g., "*motivation to learn", "pretraining motivation", "learning motivation",* or *"training motivation"*). Second, included articles needed to report sample size and at least one correlation between *"training motivation"* and its antecedents or consequences proposed in our model. This inclusion rule ensured that we had sufficient information to calculate sample size-weighted effect sizes. We thus excluded non-empirical studies such as narrative review articles or conceptual papers (e.g., Bell & Kozlowski, 2010). Third, we focused on individuals' training motivation and thus

excluded studies examining training motivation at the unit level of analysis (e.g., Walsh & Magley, 2020). Fourth, due to our focus on adults' training motivation we only included studies with participants at or older than 18 years old, including those from both work (e.g., employees in the workplace) and school settings (e.g., undergraduates or graduates in college). We excluded studies that examined training motivation for high school or younger students (e.g., Aydin, 2016). Lastly, when the same sample was used for multiple studies (e.g., conference proceedings and journal publication), we only included the one with more statistical information. If a study included multiple independent samples we coded them separately.

Insert Figure 2 about here

Overall, our final dataset included 167 independent studies (from 153 articles) including a total sample size of 52,061. Among the overall studies included in our analysis, 82.04% of motivation to learn measure was based on expectancy theory (137 studies) and 17.96% was based on self-determination theory (30 studies). Also, 68.26% used samples of working employees (i.e., adults' samples; 114 studies) and 31.73% used samples of college students (53 studies). The identified studies included both field surveys (82.04%; 137 studies) and lab studies (17.96%; 30 studies). Additionally, 78.44% (131 studies) were published in journals, and 21.56% (36 studies) were unpublished papers. In terms of training delivery methods, 20.96% (35 studies) used technology-based methods (e.g., e-learning), 72.46% (121 studies) used traditional classroom instruction, and 5.39% (9 studies) used blended learning (i.e., a mixture of face-to-face classroom learning and online learning). Two studies did not report the training delivery method. Figure 2 presents a flowchart showing the process we used to conduct the systematic search for articles and our inclusion and exclusion criteria. Studies included in the meta-analysis

are provided in the online supplemental materials.

Variable Coding Procedures

We followed Lipsey and Wilson's (2001) coding procedure. We created a coding scheme for correlational coefficients, reliability coefficients, and sample sizes. The first and the second author independently coded a random selection of 30% of studies and reached a high level of coding agreement (99%). When the two coders had any discrepancies they discussed and resolved the ambiguities through discussion with the third author (Kong et al., 2014). After they reached agreement in the 30% of articles they independently coded, the remaining articles were coded by the first author. Any remaining coding issues experienced by the first author were discussed with the second author to reach consensus.

Coded Variables

Motivation to learn. In the identified articles, motivation to learn was assessed using measures based on expectancy theory (e.g., Noe & Schmidt, 1986) and self-determination theory (Ryan & Deci, 2000). For example, *expectancy theory-based* measures used Noe and Schmidt's (1986) motivation to learn scale or items adapted from it. Motivation to learn measures based on *self-determination theory* included those assessing intrinsic and extrinsic motivation (e.g., Ryan & Deci, 2000), and the Academic Motivation Scale (AMS; Vallerand et al. [1992]) and Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich et al., [1993]).

Antecedents. The Big Five personality facets (e.g., *openness to experience*, *conscientiousness*, *extraversion*, *agreeableness*, and *neuroticism*) were commonly measured using the Personality-item pool (Goldberg, 1999) and NEO-Five Factor Inventory (Costa & McCrae, 1992). Measures of *locus of control* include established scales such as the scales of Andrisani and Netle (1976) and Spector (1988). Measures of *anxiety for learning* included those

assessing pressure and tension toward a specific target such as learning task (e.g., Warr & Bunce, 1995) and computer (e.g., Martocchio & Webster, 1992; Webster & Martocchio, 1993). *Valence* was measured with scales assessing individuals' perceptions of the desirability or importance of outcomes obtained from training (e.g., Colquitt & Simmering, 1998; Zaniboni et al., 2011). *Cognitive ability* was typically measured using the GMA (i.e., General Mental Ability) score assessed by college GPA (e.g., Orvis, Fisher et al., 2009) or the Specific Qualification test (e.g., Stanhope et al., 2013). *Education* was measured using participants' self-reported educational level. Both *pretraining* and *post-training self-efficacy* were measured with scales assessing an individual's confidence in performing specific training-related activities before and after the training (e.g., Switzer et al., 2005; Wen & Lin, 2014). Measures of *goal orientation* included those assessing individual's desire to acquire the knowledge and skills (i.e., LGO) (e.g., VandeWalle, 1997) and desire to obtain positive judgement (i.e., PGO) (e.g., Button et al., 1996). Measures of o*rganizational commitment* included established scales such as the three-component commitment scale of Meyer and Allen (1991) and Meyer et al. (1993). *Job Involvement* was assessed by measures of individuals' perceptions of the importance of their job or work and its importance for their personal identity (e.g., Tracey et al., 2001). For supportive climate, as defined by previous research (e.g., Brown, 2005), we first coded s*upport-related* variables. Manager, peer, and organizational support measures focused on the extent to which each source of support (e.g., managerial) provided feedback, encouraged use of learned skills on the job, or removed obstacles that could inhibit learning and training participation such as inadequate funding or time pressures (e.g., Al-Eisa et al., 2009; Chiaburu & Tekleab, 2005; Morrell & Korsgaard, 2011; Newman et al., 2011). Measures of learning culture assessed the positive and supportive work characteristics in the learning environment (e.g., Chiaburu & Tekleab, 2005).

For demographic variables, both *age* and *gender* were reported by the participants.

Outcomes. Consistent with Colquitt et al.'s (2000) we operationalized proximal and distal outcomes using several criteria. We did so by reviewing each study and determining which outcome(s), if any, were included. Measures of *training reactions* included perceived benefits of training (e.g., Bartlett & Kang, 2004) and utility toward jobs (e.g., Clark et al., 1993). *Learning satisfaction* was measured by assessing individuals' overall satisfaction with the training content (e.g., Orvis, Horn et al., 2009). An outcome was coded as *declarative knowledge* when it assessed cognitive outcomes based on the training content or results of quizzes, tests, or knowledge. An outcome was considered indicative of *learning performance* when it was a skill-evaluation outcome (e.g., course letter grade). Following Jiang, Liu et al. (2012), *turnover intentions* were coded if the study included measures of intentions to leave, turnover, exit, quit, or stay (reverse coded). We also coded a distal outcome as *job satisfaction* when it assessed an individual's attitude toward one's job (Judge et al., 2017) or used an overall job satisfaction measure. *Transfer of training* was coded if the study included applying knowledge and skills achieved during the training to the job (Blume et al., 2010). Lastly, we coded *job and task performance* if trainees' performance was evaluated following transfer of training (e.g., Tziner et al., 2007).

Variable Categorization for Mediating Effects of Motivation to Learn

To test the proposed relationships in our model, we combined variables with similar meanings into broad categories. [2] First, we combined manager support, peer support,

[2] We did not include PGO in the mediation model although its relationship with motivation to learn was hypothesized and tested in the meta-analysis. We did do because there were insufficient number of studies to estimate the relationships between PGO and other variables included in the mediation model. Also, there was not enough previous meta-analytic results on PGO to impute meta-analytic correlations to the analysis. We did not include valence and anxiety for learning in the model for similar reasons.

organizational support, and learning culture into the category *support* variables because they represent support from different sources. Second, based in Kraiger et al.'s (1993) categorization, we combined post-training self-efficacy, training reactions, and learning satisfaction into affective-based learning outcomes (i.e., trainees' attitudes and reactions after the training). Also, we included cognitive-based (i.e., declarative knowledge; trainees' acquisition of knowledge assessed through tests with multiple choices or free-recall exams) and skill-based (i.e., learning performance; trainees' skill development after the training intervention) learning outcomes. Lastly, we combined turnover intentions (reverse coded) and job satisfaction into *work attitudes* outcomes because they both reflect individuals' evaluation of their job and/or the organization (Holmes et al., 2020). Because each of the four categories is representative of the outcomes subsumed in it, this approach is a valid method to assess learning outcomes at a higher level of conceptualization (Schmidt & Hunter, 2015; Viswesvaran & Ones, 1995). This categorization approach has been used in recent meta-analyses on other research topics (e.g., Crawford et al., 2010; Harrison et al., 2006; Humphrey et al., 2007; Jiang, Lepak et al., 2012).

Computation of Meta-Analytic Effect Sizes and Mediating Model-Testing Procedures

Psychometric Meta-Analytic Approach. We adopted Schmidt and Hunter's (2015) approach to meta-analyze the correlations between training motivation and all other variables. We corrected for measurement error by using the internal reliability (i.e., Cronbach alpha) of the variables in the observed correlations. When the reliability information of a variable was not reported in a primary study, we used the weighted average reliability of this variable from other studies to impute the missing value (see Table 2). For objective measures of age, gender, education, and course grades, we used a reliability of 1.00 by following the procedure outlined by Riketta (2008). Lastly, if studies had multiple estimates of the relationship (e.g., Noe & Wilk,

1993) between the predictors and the outcomes, we used the psychometric meta-analytic formula to create an estimate as suggested by Schmidt and Hunter (2015). We then corrected for sampling error by using Schmidt and Hunter's (2015) approach to calculate the sample-size-weighted correlations ($\bar{r}$) and estimate of weighted mean correlation corrected for measurement error ($\hat{\bar{\rho}}$) among studied variables. As shown in Table 3 and 4, following the suggestion of Schmidt and Hunter (2015), we also calculated sample-size weighted observed standard deviation of the correlation (SDr) and standard deviation of the corrected correlations (SDρ), 95% confidence intervals (CIs), 80% credibility intervals (CRs), and the percentage of variance of observed correlations attributable to sampling error and measurement error (%Var). Then, we evaluated whether there were statistically significant differences for the relationship between motivation to learn and other variables between studies included in Colquitt et al.'s (2000) and those conducted since 1999. To do so we used a comparative interpretative approach. This approach involved using Colquitt et al (2000) as the preexisting benchmark and contrasting the effect sizes and variability in effect sizes with our results (Bosco et al., 2015; Carlson & Ji, 2011; Greer et al., 2018). We utilized a z-test to determine the statistical significance of the difference in magnitude between the corrected correlations (Chiaburu et al., 2013).

Insert Table 2 about here

Meta-Analytic Structural Equation Modeling. In order to examine the proposed research model, we used MASEM procedures as suggested by previous research (e.g., Combs et al., 2019; Oh, 2020; Viswesaran & Ones, 1995). We verified the results using FIMASEM procedures proposed by Yu et al. (2016). First, we created a meta-analyzed correlation matrix including training motivation and all other related variables by using Schmidt and Hunter's (2015)

approach described above. For correlations with insufficient number of studies (i.e., $k < 3$), we first examined whether those relationships have been previously meta-analyzed and, if available, we used the results from other meta-analyses to form the correlation matrix (Viswesvaran & Ones, 1995). For example, we used Park et al.'s (2020) estimates for the correlations among the Big-Five personality traits because their estimates were based on a much larger number of studies. In addition, for correlations that were not available from previous meta-analytic reviews, we obtained the values using the "metaBus" dataset (http://metabus.org/). The "metaBus" is an open source web-platform system which provides study information (e.g., correlation, standard deviation, samples, etc.). However, it is worth noting that readers should interpret the estimates based on the metaBus database with caution because the metaBus platform includes only published and single-coded primary study data (Oh, 2020; Steel et al., 2019). For relationships that were not available from previous meta-analyses or metaBus, we searched for and identified additional studies and conducted a separate meta-analysis. All of the studies used for estimating each correlation are available in the online supplementary materials. Next, based on the correlation matrix we used traditional MASEM procedures to test the overall relationship among motivation to learn and its antecedents and outcomes. We conducted the analyses using LISREL 8.72 (Jöreskog, & Sörbom, 2005). We calculated a harmonic mean for the correlational sample sizes because there were no identical sample sizes for different correlations from the dataset (Viswesvaran & Ones, 1995). Because not all correlations reported by previous meta-analyses and the metaBus dataset were corrected for measurement error, uncorrected estimates were used for analyzing the path analysis model.

Additionally, we used the random-effects FIMASEM approach (Yu et al., 2016) to overcome the limitations of Viswesvaran and Ones' (1995) fixed-effect MASEM approach. The

conventional MASEM approach only relies on meta-analytical correlations, but FIMASEM assumes that there is an effect size or model heterogeneity across the samples (Yu et al., 2016). FIMASEM provides results showing the effect size heterogeneity (i.e., credibility interval) around the mean path coefficient estimates (see Goering et al., 2017 and Greer et al., 2018). We used the FIMASEM approach suggested by Yu et al.'s (2016) open source online-software (https://mgmt.shinyapps.io/masem) to test the model. We created the matrices for mean correlations and standard deviations to specify the model. For relationships with no available SD information, zero-value was used for its estimation. We chose 1,000 iterations when running FIMASEM approach.

Relative Importance Analyses. To examine Research Question 1, we first conducted relative weight (RW) analyses (Johnson, 2000) to explore the relative importance of the antecedents in predicting training motivation as well as the relative importance of training motivation and other variables in predicting learning outcomes. The RW analyses were based on the MASEM and allowed us to estimate the unique contribution of each predictor and its incremental contribution when controlling for the other predictors (Johnson & LeBreton, 2004; Oh, 2020). This approach has been commonly used in previous meta-analyses to understand the relative importance of different variables when predicting an outcome (e.g., Chiaburu et al., 2011; Gonzalez-Mule et al., 2014; Oh et al., 2014). However, researchers have recently questioned the statistical principles underlying the RW method (e.g., Thomas et al., 2014; Tonidandel & LeBreton, 2011). Thomas et al. (2014) showed that the high correlations among a large number of predictors may reduce the accuracy of RW analysis but have no effect on the accuracy of relative importance analysis using the general dominance (GD) method. Compared with the RW method, the GD method is based on the average squared semipartial correlation

across all subsets of the predictors (Thomas et al., 2014). This approach uses a GD weight to indicate the average contribution of each variable to the overall model R^2. We, therefore, conducted the GD analyses to replicate the results of the RW analyses. Specifically, by using meta-analytic correlations as the input, we conducted the GD analyses with the "dominanceanalysis" *R* package developed by Navarrete and Soares (2020).

Meta-Regression Analyses. We conducted the multilevel meta-regression analyses using the "metafor" package in the statistical software *R* (Viechtbauer, 2010) to examine the moderating effects of sample and training characteristics. Analogous to multilevel modeling, multilevel meta-regression accounts for the nested data structure in which effect sizes are nested within independent samples. In the multilevel meta-regression analyses, we used the reliability-corrected effect sizes as the dependent variable and examined how the moderators were simultaneously related to the corrected effect sizes. This approach can help address the limitations of subgroup analysis when there are enough effect sizes (Gonzalez-Mulé & Aguinis, 2018; Oh, 2020). It has been increasingly used in management research to examine moderators in meta-analyses (e.g., Greer et al., 2017; Holmes et al., 2020; Park et al., 2020).

Results

Main Meta-Analytic Results

Table 1 summarizes the results of the hypothesized relationships. This summary is based on the overall meta-analytic relationships between motivation to learn and its antecedents and outcomes presented in Table 3 and Table 4.

When a 95% confidence interval (CI) around the mean corrected correlation includes zero, the effect size is not significantly different from zero at the level of .05. Additionally, we adopt Cohen's (2013) rule to interpret the magnitude of effect sizes, such that ρ = .10 is

considered to be a small effect size, ρ = .30 is a moderate (or medium) effect size, and ρ = .50 is a large effect size. Lastly, we reported meta-analytic estimates for subgroups of publication years to compare the effect sizes for studies included in Colquitt et al. (2000) and studies after their meta-analysis. Because we did not have access to the coding scheme used by Colquitt et al. (2000), we recoded all of the studies they used with our coding scheme. As a result, the meta-analytic correlations shown for Colquitt et al. (2000) in Tables 3 and 4 were based on our analysis and may differ from the results they reported. We include data from all of the studies used to estimate the correlations in the online supplemental material (see the Excel file).

Insert Tables 3 and 4 about here

Antecedents of Motivation to Learn. We examined six types of antecedents of motivation to learn. The results for the *personality traits* variables show that openness to experience ($\hat{\bar{\rho}}$ = .34; 95% CI = [.09, .59]), conscientiousness ($\hat{\bar{\rho}}$ = .31; 95% CI = [.14, .48]), and neuroticism ($\hat{\bar{\rho}}$ = −.07; 95% CI = [−.13, −.04]) had significant relationships with motivation to learn, but extraversion and agreeableness did not because their 95% CIs included zero. We also found that locus of control ($\hat{\bar{\rho}}$ = .06; 95% CI = [−.30, .42]) and anxiety for learning ($\hat{\bar{\rho}}$ = −.06; 95% CI = [−.23, .10]) were not significantly related to motivation to learn as their 95% CIs included zero. For *knowledge and skills*, we found that cognitive ability was negatively related to motivation to learn ($\hat{\bar{\rho}}$ = −.05; 95% CI = [−.12, −.01]), while education had a significant positive relationship with motivation to learn ($\hat{\bar{\rho}}$ = .15; 95% CI = [.08, .23]). For the *individual motivation* variables, we found valence ($\hat{\bar{\rho}}$ = .58; 95% CI = [.45, .71]), pretraining self-efficacy ($\hat{\bar{\rho}}$ = .50;

95% CI = [.44, .55]), LGO ($\hat{\rho}$= .48; 95% CI = [.40, .56]), and PGO [3] ($\hat{\rho}$= .20; 95% CI = [.12, .28]) all had positive and significant relationships with motivation to learn. The results for the *job/career variables* indicated that both organizational commitment ($\hat{\rho}$ = .50; 95% CI = [.38, .63]) and job involvement ($\hat{\rho}$= .43; 95% CI = [.26, .61]) were positively related to motivation to learn. For the *supportive climate variables*, motivation to learn was positively related to manager support ($\hat{\rho}$= .35; 95% CI = [.27, .42]), peer support ($\hat{\rho}$= .36; 95% CI = [.27, .44]), organizational support ($\hat{\rho}$= .25; 95% CI = [.17, .33]) and learning culture ($\hat{\rho}$= .34; 95% CI = [.21, .47]). Lastly, for *demographic variables*, age was negatively related to motivation to learn [$\hat{\rho}$= −.06; 95% CI = −.11, −.01], whereas gender ($\hat{\rho}$= −.03; 95% CI = [−.08, .01]) was not significantly related to motivation to learn.

Proximal Learning Outcomes and Distal Outcomes of Motivation to Learn. As shown in Table 4, motivation to learn was significantly related to both proximal learning outcomes and distal outcomes. Specifically, motivation to learn was positively related to affective outcomes (e.g., post-training self-efficacy [$\hat{\rho}$ = .31; 95% CI = .22, .40], training reactions [$\hat{\rho}$ = .48; 95% CI = .44, .52], learning satisfaction [$\hat{\rho}$ = .53; 95% CI = .42, .64]), and cognitive/skill-based outcomes (e.g., declarative knowledge [$\hat{\rho}$ = .11; 95% CI = .06, .16], learning performance [$\hat{\rho}$ = .22; 95% CI = .16, .27]). Also, as hypothesized, we found that motivation to learn was negatively related to turnover intentions ($\hat{\rho}$ = −.40; 95% CI = [−.48, −.31]) and positively related to job satisfaction ($\hat{\rho}$ = .25; 95% CI = [.04, .46]). For distal outcomes of motivation to learn, as

[3] We conducted a supplementary analysis to examine PPGO and APGO relationships with motivation to learn. PPGO was positively related to motivation to learn ($\hat{\rho}$ = .13, *k* = 10, *N* = 3,443, 95% CI = [.05, .21]). However, APGO was not significantly related to motivation to learn, with a CI containing zero ($\hat{\rho}$= −.02, *k* = 9, *N* = 3,187, 95% CI = [−.20, .17]).

we expected, motivation to learn was positively related to training transfer ($\hat{\bar{\rho}}$ = .44; 95% CI = [.34, .53]) and job performance ($\hat{\bar{\rho}}$ = .17; 95% CI = [.07, .27]).

Comparison results. We conducted supplemental analysis to compare effect sizes of the relationships between motivation to learn and other variables between subgroups separated by publication periods (i.e., comparison between studies included in Colquitt et al. (2000) and studies published since 1999). *Studies included in Colquitt et al. (2000)* refers to studies conducted before 1999 which were included in their meta-analysis. *Studies published since 1999* refers to studies published after Colquitt et al. (2000) meta-analysis. We conducted subgroup comparison analysis only for the relationships that were examined both in Colquitt et al. (2000) and in studies published since 1999 and reported the relationships with significant differences below. Table 1 summarizes the subgroup comparisons based on the results shown in Tables 3 and 4.

Insert Figure 1 about here

Fixed-effects MASEM Analytic Results. Table 5 presents the correlational matrix of the relationships among all study variables. In our proposed model (Figure 1), we considered proximal learning outcomes in four broad categories (e.g., affective-based, cognitive-based, skill-based, and work attitudes). We first tested the proposed theoretical model by inputting the correlation matrix (see Table 4) to LISREL 8.72 (Jöreskog, & Sörbom, 2005). [4] All proposed relationships between antecedents and motivation to learn were significant and consistent with our predictions except for the relationships between cognitive ability ($\beta = -.16$, $p < .05$), learning

[4] We included the covariance path between cognitive-based and skill-based outcomes because the two variables were theoretically related and highly correlated. This helped us avoid suppression effects in the model testing (see MacKinnon et al., 2000 for details).

goal orientation (β = .04, *n.s*), and support (β = .05, *n.s*) and motivation to learn (theoretical model in Figure 1: χ^2 [114] = 3395.57).

One of the best uses of meta-analytic data is comparing alternative models (Bergh et al., 2016; Combs et al., 2019). Thus, we tested several alternative models. The first alternative model (alternative model 1) we tested recognizes that better learning outcomes can be realized if trainees are more extrovert and open to other learning experience, regardless of their motivation to learn (e.g., Barrick & Mount, 1991; Schmidt et al., 2008). Therefore, we added direct paths from the personality variables (e.g., openness to experience and extraversion) and cognitive ability to both cognitive-based and skill-based outcomes (alternative model 1: χ^2 [108] = 3308.79, $\Delta\chi^2$ [6] = 86.78, $p < .05$). Next, we tested another alternative model (alternative model 2) based on research suggesting that cognitive ability influences task/job performance directly as well as indirectly through a learning outcome (e.g., knowledge acquisition) (Hunter & Hunter, 1984; Hunter & Schmidt, 1996). As a result, we added a direct path from cognitive ability to job/task performance, and an indirect path to task performance through the cognitive-based outcome. We found a significant improvement in alternative model 2, compared to alternative model 1 (χ^2 [106] = 2790.81, $\Delta\chi^2$ [2] = 517.98, $p < .05$). Finally, we tested alternative model 3 in which we added several direct paths between several antecedents of motivation to learn (e.g., conscientiousness, cognitive ability, support, and pretraining self-efficacy) and training transfer (Blume et al., 2010; Ford et al., 2018). The results showed a significant improvement in the fit of alternative model 3, our final model, compared to alternative model 2 (alternative model 3: χ^2 [102] = 2739.06, $\Delta\chi^2$ [4] = 51.75, $p <.05$). In the final model, we also calculated the squared multiple correlations (i.e., R^2s) for structural equations for motivation to learn (R^2 = .38), affective-based outcome (R^2 = .18), cognitive-based outcome (R^2 = .07), skill-based outcome (R^2

= .08), work attitudes (R^2 = .06), training transfer (R^2 = .37), and job/task performance (R^2= .47). Figure 3 presents the beta path coefficients and standard errors (in the parentheses) for each path in the indirect mediating model.

Insert Table 5 and Figure 3 about here

Random-Effects FIMASEM Analytic Results. To ensure the effect size heterogeneity around the mean path coefficient estimates, we additionally conducted random-effects FIMASEM (Yu et al., 2016). The FIMASEM approach considers the effect size heterogeneity identified in the bivariate meta-analysis (Cheung, 2018; Yu et al., 2016). This differs from the MASEM approach which is based on a correlation matrix of average effect sizes across different sub-populations. However, there was a statistical error (i.e., NPD: non-positive definitive) when we used the FIMASEM approach to test our final model with cognitive and skill based outcomes separated (see the discussion of Cheung [2018] and Yu et al. [2018] about the NPD issue). To address the NPD issue Cheung (2018) suggested replacing near positive definite matrices with non-positive definitive matrices in the two-stage FIMASEM (TS-FIMASEM) approach. A critical necessary condition to use this approach is to have at least one study that has complete correlations among all study variables. We could not adopt this approach because we do not meet this condition (Yu et al., 2016). Thus, we combined the cognitive-based and skill-based outcomes into one variable called “cognitive/skill-based outcome” to avoid the NPD error. The results of the FIMASEM analysis (see Table S1 in the online supplemental materials for more details) show the mean path coefficient across 1,000 iterations, mean path coefficient and its standard deviation of mean path coefficient, an average 80% credibility intervals (CR), and its 80% CR width. The FIMASEM does not focus on *p*-values or confidence intervals for path

estimates but instead provides 80% CR of path coefficients showing the range and distribution of the path coefficients. Although the model tested with FIMASEM was not identical to the MASEM model, we found that there is evidence for supporting each hypothesized relationship. For example, the results of the FIMASEM analysis show that the path coefficients for all antecedents and motivation to learn path estimates (for all 14 antecedents-motivation to learn paths overall) are directionally consistent with those from the fixed-effects MASEM approach. An important interpretational difference between the 80% CR and the 95% CI of the path coefficients is that if the former includes zero, it may suggest the existence of potential moderators depending on the width of the interval, while for the latter it indicates the lack of statistical significance of the coefficient.[5]

Exploratory Research Question Results

Relative importance analysis. Based on the RW and GD analyses, we examined the relative importance of the antecedents in predicting motivation to learn and outcomes (see Table S2 and Table S3 in the online supplemental materials). We found that pretraining self-efficacy (%RW = 24.3%; %GD = 23.7%), organizational commitment (%RW = 18.5%; %GD = 18.3%), and job involvement (%RW = 14.9%; %GD = 13.9%) were more important predictors of motivation to learn relative to other antecedents (total R^2 = .46). Regarding the relative importance of the antecedents in predicting different types of proximal learning outcomes, we found that for post-training self-efficacy (total R^2 = .39), neuroticism had the highest relative weight (%RW = 29.6%; %GD = 28.6%), followed by locus of control (%RW = 15.7%; %GD =

[5] Bosco et al., (2015) suggested that width of the 80% CR provides an indication of heterogeneity. Values less than .18 indicate small heterogeneity (i.e., consistency in relationship effect sizes and direction across all subpopulations), between .18 and .54 indicates moderate heterogeneity (i.e., moderate subpopulation differences), and greater than .54 indicates large heterogeneity (i.e., significant subpopulation differences). Bosco et al. (2015) derived these values by calculating the I^2 statistics that describes the percentage of variation across studies.

15.0%), extraversion (%RW = 13.2%; %GD = 12.7%), and motivation to learn (%RW=10.7%; %GD = 9.8%). Next, the results showed that motivation to learn (%RW = 44.5%; %GD = 43.7%) was the most important antecedent in predicting utility reaction (total R^2 = .27). For declarative knowledge (total R^2 = .50), situational characteristic (i.e., support, %RW = 53.0%; %GD = 55.0%) was substantially more important than any other antecedents. Similarly, we found that support (%RW = 27.5%; %GD = 27.8%) was the most important antecedent in predicting learning performance (total R^2 = .49), followed by pretraining self-efficacy (%RW = 21.1%; %GD = 20.8%). For work attitude (total R^2 = .95), individual motivation variables (i.e., learning goal orientation, %RW =32.5%; %GD = 38.3%, and pretraining self-efficacy, %RW =17.3%; %GD = 16.4%) had higher relative weights than other antecedents. Lastly, we also examined the relative importance of all antecedents in predicting distal outcomes. We found that support (%RW = 23.2%; %GD = 23.2%) and motivation to learn (%RW = 18.6%; %GD = 18.3%) were the two most important factors for training transfer (total R^2 = .37). In addition, cognitive ability (%RW = 27.8%; %GD = 27.0%) was the most important antecedent, followed by age (%RW = 16.3%; %GD = 16.4%), locus of control (%RW = 12.5%; %GD = 11.9%), motivation to learn (%RW = 11.8%; %GD = 10.7%), and pretraining self-efficacy (%RW = 10.3%; %GD = 11.3%) in predicting job and task performance (total R^2 = .16).

As shown in Tables S2 and S3 (see the online supplemental materials), even though the GD values were not exactly same as the RW values, the proportionate contribution values (e.g., %RW and %GD) were highly consistent. The average absolute difference between %RW and %GD was small across all the predictors (see Tables S2 and S3 for the difference value statistics). Also, both RW and GD results showed that support, motivation to learn, pretraining

self-efficacy, cognitive ability, and job involvement are the top five predictors of training transfer with identical ordering of importance. Therefore, considering the two methods together provided triangulation which validates the relative importance analysis results (Oh, 2020).

Meta-regression analysis for moderation test. Although there is no specific cut-off sample size for conducting meta-regression analyses, Schmidt (2017) has noted that meta-regression results may lack stability when the sample size is small. Therefore, we chose to explore moderators by focusing on relationships with no less than 30 effect sizes. Based on this criterion, we examined moderators of the training motivation relationship with pretraining self-efficacy, supportive climate, goal-orientation, and age. All the meta-regression results are reported in Tables S4 and S5 in the online supplemental materials. To code the study characteristics moderators, we examined whether the sample was from students or working adults, the study was unpublished or published in a journal, or used a field survey design or a lab design. For training characteristic moderators we coded whether the training was delivered as traditional classroom training or involved technology (e.g., computer-based) and whether motivation to learn was based on expectancy theory or self-determination theory (i.e., intrinsic or extrinsic; Ryan & Deci, 2000).

The complete results of the meta-regression moderator analysis are included in the online supplemental materials. We found that the relationship between motivation to learn and pretraining self-efficacy was more positive in field survey studies than in lab studies when controlling for all other moderators ($b = -.37$, $se = .11$, 95% CI = [−.59, −.16], $p < .05$). In addition, we found that this relationship was more positive for technology-based training methods than traditional classroom training ($b = -.15$, $se = .07$, 95% CI = [−.29, −.00], $p < .05$), suggesting that self-efficacy is more important to enhance motivation to learn in technology-

based training. In contrast, we found that the relationship between motivation to learn and climate was more positive in traditional classroom training than in technology-based training (b = .23, se = .09, 95% CI = [.05, .41], p < .05). Also, we found that the relationship between motivation to learn and goal-orientation was not moderated by sample characteristics or training characteristics. But this relationship was more positive for learning goal orientation than for performance goal orientation (b = .36, se = .06, 95% CI = [.24, .48], p < .05). For the relationship between motivation to learn and age none of the moderators were significant.

To examine the moderators of the relationship between motivation to learn and its outcomes (Research Question 2), we first combined all effect sizes together while controlling for four dummy variables indicating job performance, training transfer, affective-based outcomes, and cognitive/skill-based outcomes with attitudinal outcomes as the reference variable. We then tested the moderating effects for the relationships of motivation to learn with affective-based outcomes, cognitive/skill-based outcomes, and distal outcomes including both training transfer and job performance separately. We did not conduct a separate meta-regression for attitudinal outcomes due to the small number of effect sizes. We considered all moderators in our examination of Research Question 2. In addition, we added two study characteristics relevant to outcomes of training motivation. We considered whether measures of training motivation and the outcome variable were both provided by the same source (study participants) and were collected at a different point in time.

When we examined the overall model with all outcome variables, we found that regardless the types of outcome variables, the relationships between training motivation and outcome variables were more positive in student samples (b = .10, se = .04, 95% CI = [.02, .17], p < .05), and when both training motivation and outcomes were rated by the same source (b

= .27, *se* = .06, 95% CI = [.16, .39], $p < .05$). When we examined the moderating effects for each outcome separately, we found that the relationship between training motivation and affective-based outcomes was more positive in student samples than in working adult samples (*b* = .16, *se* = .06, 95% CI = [.04, .29], $p < .05$). Moreover, rating source (*b* = .33, *se* = .12, 95% CI = [.11, .57], $p < .05$) and traditional training type (*b* = .14, *se* = .06, 95% CI = [.01, .27], $p < .05$) were the significant moderators for the relationship between training motivation and learning performance. In addition, rating source also moderated the relationship between training motivation and distal outcomes such as training transfer and job performance (*b* = .36, *se* = .13, 95% CI = [.10, .62], $p < .05$). We did not find other significant moderators for the relationships between training motivation and its outcomes.

General Discussion

We proposed and tested a theory of training motivation based on Colquitt et al. (2000) and empirical studies conducted over the last 20 years. In this study we asked, "Is it time to update and expand training motivation theory?" Our results suggest that the answer to this question is yes. Specifically, the results of the meta-analysis summarized in Table 1 and model testing of our proposed theory of training motivation show that the nomological network of motivation to learn should be expanded to include additional antecedents and learning outcomes researchers have examined in the last 20 years. Below, we discuss the implications of our results for training motivation theory, managerial practices, and future research directions.

Theoretical Implications

Our study enhances our understanding of training motivation in several ways. First, we examined and updated our current understanding of motivation to learn, the focal variable of training motivation theory. The meta-analysis replicated and extended Colquitt et al.'s (2000)

findings by including 134 new studies conducted since their review. In general, replicating and extending meta-analytic results helps ensure previous findings remain applicable and relevant as the number of studies grows (e.g., Griffeth, 2000; Hedges & Schauer, 2019; Lakens et al., 2016). Specifically, our meta-analysis provides an opportunity to determine whether the individual differences and situational characteristics identified as important antecedents of motivation to learn and learning outcomes by Colquitt et al. (2000) remain influential and whether new variables should be included in training motivation theory. Overall, as shown in Table 1, we found that the strength and significance of the relationships reported in Colquitt et al. (2000) remain unchanged, which supports inclusion of those variables in a contemporary theory of training motivation. We also found several notable differences between our updated meta-analysis and Colquitt et al. (2000). Compared with Colquitt et al.'s findings (2000), job involvement had a stronger relationship with motivation to learn. Both cognitive ability and age had a weaker relationship with motivation to learn. Anxiety for learning had a null rather than a positive relationship with motivation to learn. Finally, we found a weak positive relationship between motivation to learn and job/task performance rather than a null relationship found by Colquitt et al. (2000).

More important, our meta-analytic results suggest adding several new antecedents and outcomes to training motivation theory. Training motivation theory should be expanded to include openness to experience and neuroticism from the FFM in addition to conscientiousness, which was included in Colquitt et al. (2000). Also, our results suggest LGO and PGO are two important individual motives that should also be included in the theory. Finally, we found that continuous learning culture, a macro type of support, is related to motivation to learn. As a result, continuous learning culture should be added to the support variables included in the theory of

training motivation. Additionally, we found that in the last 20 years training motivation researchers have continued to investigate traditional learning outcomes such as transfer of training and job/task performance. However, researchers have expanded their perspective on the consequences of motivation to learn by considering new affective outcomes and work attitudes. Specifically, our results show that learning satisfaction, job satisfaction, and turnover intentions should be added to the constellation of outcomes included in training motivation theory.

A second contribution of this study is that we were able to provide a complete test of the path model of training motivation theory. We first proposed and tested a fully mediated model of training motivation theory in which the antecedents influence the distal and proximal outcomes and transfer of training only through their relationship with motivation to learn. Building on the full mediation model, we also examined alternative models with partial mediation relationships. That is, we found that openness to experience, extraversion, and cognitive ability has a significant direct effect on the proximal and distal outcomes.[6] Conscientiousness, support, and pretraining self-efficacy directly affect transfer of training and indirectly affect the proximal and distal outcomes through motivation to learn. Self-efficacy, organizational commitment, and job involvement have the largest effect on motivation to learn. We found that motivation to learn has a significant influence on all learning outcomes but its strongest relationship is with affective-based outcomes (i.e., reactions and post-training self-efficacy). All of the proximal learning outcomes are significantly related to training transfer. Affective outcomes and skill-based outcomes have the strongest relationships with training transfer. We found that cognitive-based outcomes have a significant but small positive relationship with training transfer. Training transfer, in turn, has a strong relationship with job/task outcomes.

[6] The path estimates with cognitive ability are likely underestimated given the potential range restriction by including studies using college student samples.

Lastly, by examining the three exploratory questions, we further enrich our understanding of training motivation theory. The results of the relative importance analysis provide insight into the simultaneous effects of the antecedents on motivation to learn and learning outcomes. The results of the relative importance analysis show that considering all of the antecedents, three individual characteristics (pretraining self-efficacy, organizational commitment, and job involvement) had the largest influence on motivation to learn. These results highlight the important role of pretraining self-efficacy and job involvement in training motivation theory. Also, they support our contention that organizational commitment should be included in training motivation theory. Additionally, our results show that openness to experience has the largest relationship with motivation to learn of any of the five PPM traits. Further, the importance of the five PPM traits varies depending on the training outcome considered. For example, conscientiousness is a relatively more important predictor of declarative knowledge compared to agreeableness, but neuroticism and extraversion are relatively more important than conscientiousness for post-training self-efficacy. For training outcomes including knowledge, training transfer, and learning, job and task performance and cognitive ability are important predictors. However, support has the largest effect of all of the variables on most of the proximal learning outcomes and distal outcomes (with the exception of post-training self-efficacy). This contradicts previous research (e.g., Hunter & Schmidt, 1996) suggesting that cognitive ability should have the strongest influence on declarative knowledge and learning performance. Perhaps, trainees' "intellectual horsepower" alone is not sufficient to ensure they acquire knowledge in training programs. Rather, to maximize knowledge, acquisition trainees also need to understand their learning efforts are supported by managers, peers, and organizational cultures. Finally, we found that work attitudes, a new outcome we included in training

motivation theory, are most influenced by pretraining self-efficacy, learning goal orientation, and support.

One of the reasons to revisit Colquitt et al.'s (2000) training motivation theory was to investigate whether the increased use of technology-based training methods in the last 20 years would show that individual and situational characteristics have a greater influence on motivation to learn than previously believed. The moderation analyses results suggest that the relationships between some of the antecedents and motivation to learn likely depend on the training delivery methods. We found that learner's self-efficacy has a stronger relationship with motivation to learn when technology-based training-delivery methods are used rather than traditional face-to-face training methods. This suggests that to fully capitalize on the learner control inherent in most technology-based training methods as a means to enhance motivation to learn, trainees must feel they are capable of mastering the training content. We also found that a supportive climate has a more important influence on motivation to learn for trainees in traditional training than in technology-based training. This is not surprising given that learners using technology-based training are essentially learning on their own, often at home or in locations other than the office where an organizationally based climate is not relevant. Additionally, we found that the relationships between motivation to learn and learning outcomes are stronger when using student samples and a single source of data (measures of motivation to learn and outcomes both collected from study participants). These results are useful for researchers interested in more precisely interpreting and comparing effect sizes across studies. Lastly, the moderating effect of training method was significant for the relationship between motivation to learn and learning performance. The relationship is more positive for traditional training than for technology-based training methods.

Practical Implications for Managers

Our findings suggest several important implications for managing trainees' learning motivation. First, our results highlight the steps that managers can take to enhance employees' motivation to learn. Consistent with Colquitt et al. (2000), our findings reinforce the importance of employees' self-efficacy and a supportive learning environment. Managers should develop employees' self-efficacy prior to training, especially for technology-based training, by communicating not only the importance of the training but also their confidence in their ability to successfully master the content and accomplish training. Additionally, managers should consider developing formal organizational policies or providing incentives that facilitate a supportive workplace learning culture, especially for traditional training.

Our findings also highlight the dispositional traits that managers should pay attention to in the selection process to ensure employees are predisposed to have high levels of motivation to learn. Specifically, the contemporary model of training motivation suggests that in the selection process, hiring managers should weigh job applicants' dispositional traits such as conscientiousness, openness to experience, and emotional stability, as well as motives including learning goal orientation and performance goal orientation at least as equal to, if not more than, cognitive ability. This is especially important for organizations where there is a high demand or need for employee learning such as those that are growing quickly or rely on innovation and creativity to sustain their competitive advantage (Molloy & Noe, 2010).

Our results also suggest that to enhance employees' motivation to learn, managers need to ensure employees have high levels of organizational commitment and job involvement. Thus, managers should proactively show care and support for their subordinates and express appreciation for their work. Also, adjusting employees' schedules and workload so they can

attend training signals to employees that the organization values learning and their personal development. These actions can potentially boost employees' training motivation, which in turn increases their learning performance, learning satisfaction, and commitment.

Lastly, our findings provide additional insights into how managers can enhance employees' job/task performance and affective commitment in the post-training period. Managers should take a leading role in supporting employees' training transfer, given its positive relationship with their job/task performance. For example, managers can provide opportunities to encourage employees to apply what they acquired in training to work tasks and offer help when needed.

Study Limitations and Future Research Directions

There are several study limitations. First, meta-analysis cannot ensure the causality of the relationships among study variables. For example, most studies used a cross-sectional design to examine the relationships between the antecedents and consequences of motivation to learn. As a result, readers should not interpret our results as implying causality. Future research should investigate and replicate the relationships shown in the training motivation model using designs best suited for determining causation, such as controlled lab and field studies in which the antecedents and consequences of motivation to learn are collected over time.

Second, we based our theory of training motivation on research examining the antecedents and outcomes of one type of motivation (i.e., motivation to learn). Bauer et al.'s (2016) meta-analysis showed that how motivation was conceptualized and measured influenced the strength of its relationship with training outcomes. Our exploratory moderator analyses (see Tables S4 and S5) found no influence of motivation type on either the motivation to learn-training outcomes or the antecedent-motivation to learn relationship, the latter of which was not

examined by Bauer et al. (2016). The conclusions we can draw from our results and those of Bauer et al. (2016) are limited because of the lack of primary studies in which different measures of motivation types were examined. Studies investigating the relationships between motivation and its antecedents and outcomes that include multiple measures derived from different theoretical perspectives are needed to further advance training motivation theory.

We found several unexpected results in our meta-analysis and model testing. In our meta-analysis results we found a positive relationship between PGO and motivation to learn that was contrary to previous research that found a negative relationship (e.g., Payne et al., 2007). One possible explanation is that task requirements or demands of today's jobs have become increasingly unpredictable (Society for Human Resource Management, 2012). For high PGO employees to demonstrate their competence to impress others, they recognize that obtaining new knowledge or skills to successfully perform their tasks is necessary, which helps promotes their motivation to learn. Future research needs to examine whether the influence of PGO on motivation to learn varies by the degree to which training programs are focused on jobs with high levels of stable versus unpredictable task demands.

In our model, testing openness to experience had a negative relationship (rather than the expected positive relationship) with skill-based outcomes. It is plausible that individuals open to experience may be attracted by many learning opportunities but lack the specific focus of attention necessary to skills. Future research should examine whether learners' level of openness to experience is related to the extent to which they are distracted from focusing on training content, which in turn has a negative influence on their knowledge and skill acquisition. Another unexpected relationship involved LGO and motivation to learn. Unlike the positive relationship we found between LGO and motivation to learn in the meta-analysis, the relationship between

LGO and motivation to learn became insignificant when considered together with the other antecedents in our final model. This is likely due to the high correlation between LGO and pretraining self-efficacy ($\bar{r}$ = .56), but it deserves further attention.

We also found an unpredicted negative relationship between cognitive ability and motivation to learn, but cognitive ability did have a direct effect on cognitive and skill outcomes. Possibly this is because individuals with high cognitive ability are intelligent enough to acquire knowledge and skills in training without having to invest motivational resources related to energy or drive. In fact, they exhibit lower levels of motivation to learn because they may resent having to attend formal training programs. However, individuals with low levels of cognitive ability recognize they will have to invest their energy and effort to acquire knowledge and skills, so they exhibit higher levels of motivation to learn. Future research based in the conservation of resource theory (Hobfoll, 1989) is needed to more carefully examine whether individuals' motivational resource allocation in training varies depending on their cognitive ability.

Other potential antecedents and learning outcomes of training motivation deserve future research attention. For example, despite Colquitt et al.'s (2000) recommendation that future research should investigate the role of career variables, feedback variables, and adaptability behaviors on motivation to learn and training outcomes, few studies have examined them. Also, researchers have called for studies to examine the relationship between work design features and employees' motivation to learn (e.g., Parker, 2017). Considering our and Colquitt et al.'s results (2000) together, we see that for over 50 years our understanding of the influence of career-related variables such as career insight and career adaptability on training motivation and training outcomes remains nascent. Today, this is an especially important research area because more individuals have embraced the protean career concept. As a result, they may be less

motivated to learn in formal training programs not personalized to their needs and interests (Bedwell et al., 2011).

Our finding that motivation to learn is significantly related to learning satisfaction, job satisfaction, and turnover intentions highlights the need for future training motivation research to include learning outcomes from all three dimensions of Kraiger et al.'s (1993) taxonomy (affective, cognitive, and work attitudes). Also, we found that extant research has yet to investigate some potentially important learning outcomes such as trainees' well-being (e.g., Noe et al., 2014). Although employees' training motivation is generally viewed as resulting in positive outcomes, it may have a negative influence on employees' well-being. This phenomenon is aligned with the "too much of a good thing" effect (Grant & Schwartz, 2011). That is, when employees' training motivation becomes too high, they may invest too much time and effort in learning activities, which may drain their energies and reduce their well-being.

Lastly, in our exploratory analyses, we identified training delivery methods and study characteristics that likely moderate some of the relationship between the antecedents, motivation to learn, and learning outcomes. Future research from a theory-driven perspective is needed to better understand our moderation results and identify other moderators that may influence the relationships among variables included in training motivation theory. For example, one potential explanation for why we found that learner self-efficacy has a stronger relationship with motivation to learn when a technology-based training-delivery method is used rather than traditional face-to-face training methods is the cognitive burden placed on the trainee. That is, compared to traditional face-to-face training methods, technology-based training places a dual cognitive burden on trainees to know how to use the technology to learn and to understand the training content.

Conclusion

The last comprehensive analysis of the antecedents and consequences of training motivation was conducted over 20 years ago. Since then, many more primary studies focusing on motivation to learn as the central variable in training motivation theory and related meta-analyses have been conducted. In this study, we proposed and tested a more contemporary and comprehensive theory of training motivation based on this entire body of research. It is our hope that this paper provides a comprehensive and contemporary theory of training motivation, offers useful future research directions, and serves as the basis for effective practical recommendations.

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Notes. Studies included in the meta-analysis are marked with an asterisk (*)

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Table 1

Summary of Study Hypotheses & Meta-Analytic Results

Variables	Expected relationship	Result	New variable	Results from Colquitt et al. (2000)
Personality Traits				
Locus of control	+	No	No	−
Anxiety for learning	−	No*	No	−
Openness to experience	+	Yes	Yes	N/A
Conscientiousness	+	Yes	No	+
Extraversion	+	No	Yes	N/A
Agreeableness	+	No	Yes	N/A
Neuroticism	−	Yes	Yes	N/A
Knowledge and Skills				
Cognitive ability	Non-Directional	No*	No	−
Education	+	Yes	Yes	N/A
Individual Motivation				
Valence	+	Yes	No	+
Pretraining self-efficacy	+	Yes	No	+
Learning goal orientation	+	Yes	Yes	N/A
Performance goal orientation	+	Yes	Yes	N/A
Job/Career Variables				
Organizational commitment	+	Yes	No	+
Job involvement	+	Yes*	No	+
Climate Variables				
Manager support	+	Yes	No	+
Peer support	+	Yes	No	+
Organizational support	+	Yes	No	+
Learning culture	+	Yes	Yes	N/A
Demographic Variables				
Age	Exploratory	−*	No	−
Gender	Exploratory	−	Yes	N/A
Proximal Learning Outcomes				
Post-training self-efficacy	+	Yes	No	+
Training reactions	+	Yes	No	+
Learning satisfaction	+	Yes	Yes	N/A
Declarative knowledge	+	Yes	No	+
Learning performance	+	Yes	No	+
Turnover intention	−	Yes	Yes	N/A
Job satisfaction	+	Yes	Yes	N/A
Mediation Path Analysis				
Training transfer → Job/task performance	+	Yes	No	+
Distal Outcomes				
Training transfer	+	Yes	Yes	+
Job/task performance	+	Yes*	No	Null

Notes. * = a significant difference in the relationship between the results of Colquitt et al. (2000) and studies conducted since 1999; Expected relationship = hypothesized direction of the relationship between the variable listed and motivation to learn; Results = whether the hypothesis was supported (yes) or not supported (no); New variable = whether the variable was included in both Colquitt et al (2000) and this study (no) or just included in this study (yes); Results from Colquitt et al. (2000) = whether the relationship between the variable listed and motivation to learn was negative (-), positive (+), or null.

Table 2

Means and Standard Deviations of the Imputed Weighted Average Reliabilities for Primary Studies Used

Variables	*k*	Weighted Mean Reliability	Standard Deviation
Antecedents			
Locus of Control	11	.70	.15
Anxiety for learning	12	.88	.05
Openness to experience	4	.74	.05
Conscientiousness	11	.80	.06
Extraversion	3	.80	.09
Agreeableness	4	.78	.03
Neuroticism	6	.81	.06
Cognitive ability	8	.93	.11
Education	21	1.00	.00
Valence	9	.83	.19
Pretraining self-efficacy	53	.84	.09
Learning goal orientation	22	.85	.08
Performance goal orientation	18	.71	.06
Organizational commitment	9	.80	.09
Job involvement	8	.68	.13
Manager support	27	.86	.08
Peer support	10	.78	.07
Organizational support	9	.84	.07
Learning culture	5	.88	.10
Age	40	1.00	.00
Gender	27	1.00	.00
Motivation to Learn	142	.84	.09
Proximal Learning Outcomes			
Post-training self-efficacy	16	.88	.06
Training reactions	37	.86	.07
Learning satisfaction	14	.86	.13
Declarative knowledge	23	.77	.18
Learning performance	21	.91	.13
Turnover intention	5	.81	.07
Job Satisfaction	3	.86	.01
Distal Outcomes			
Training transfer	19	.88	.06
Job/task performance	10	.90	.11

Note. k = total number of effect sizes included in the analysis.

Table 3

Meta-analytic Correlations between Motivation to Learn and its Antecedents

	k	*N*	$\bar{r}$	sd_r	$\hat{\bar{\rho}}$	sd_ρ	95% CI	80% CR	%Var	*z*
Personality Traits										
Locus of control	11	1,984	.11	.46	.06	.60	[-.30, .42]	[-.71, .83]	2.48	
Colquitt et al., (2000)	3	352	.22	.20	.27	.29	[-.07, .62]	[-.10, .65]	15.54	1.57
Studies from 1999	8	1,632	.09	.49	.03	.63	[-.42, .47]	[-.79, .84]	1.94	
Anxiety for learning	14	2,406	-.05	.27	-.06	.30	[-.23, .10]	[-.44, .32]	8.09	
Colquitt et al., (2000)	4	346	-.44	.19	-.47	.19	[-.68, -.27]	[-.71, .24]	20.68	-3.98*
Studies from 1999	10	2,026	.02	.22	.02	.25	[-.14, .18]	[-.30, .33]	9.88	
Openness to experience	7	893	.26	.26	.34	.32	[.09, .59]	[-.08, .75]	9.86	
Conscientiousness	12	3,303	.25	.12	.31	.13	[.23, .39]	[.14, .48]	22.04	
Colquitt et al., (2000)	1	103	.44	-	.57	-	[.42, .73]	[.57, .57]	-	-
Studies from 1999	11	3,200	.25	.12	.30	.13	[.22, .39]	[.57, .57]	22.29	
Extraversion	4	566	.14	.16	.15	.18	[-.04, .35]	[-.07, .38]	24.71	
Agreeableness	5	760	.04	.14	.04	.15	[-.11, .18]	[-.15, .22]	32.35	
Neuroticism	8	2,139	-.07	.06	-.08	.00	[-.13, -.04]	[-.08, -.08]	100	
Knowledge and Skills										
Cognitive ability	18	5,726	-.05	.11	-.06	.10	[-.12, -.01]	[-.20, .07]	27.46	
Colquitt et al., (2000)	3	950	-.18	.12	-.20	.11	[-.34, -.06]	[-.34, -.06]	22.46	-2.11*
Studies from 1999	15	4,776	-.03	.09	-.03	.07	[-.08, .01]	[-.13, .06]	43.43	
Education	20	5,748	.14	.15	.15	.16	[.08, .23]	[-.05, .35]	14.57	
Individual Motivation										
Valence	9	3,014	.47	.17	.58	.20	[.45, .71]	[.33, .83]	6.44	
Colquitt et al., (2000)	3	395	.39	.18	.68	.33	[.29, 1.06]	[.25, 1.10]	13.33	.56
Studies from 1999	6	2,619	.49	.16	.57	.18	[.42, .72]	[.34, .81]	5.24	
Self-efficacy (pre)	56	13,023	.42	.19	.50	.22	[.44, .55]	[.22, .77]	7.89	
Colquitt et al., (2000)	8	2,379	.40	.18	.45	.21	[.30, .61]	[.18, .73]	6.62	-.76
Studies from 1999	48	10,644	.43	.20	.51	.22	[.44, .57]	[.23, .78]	8.21	
Learning goal orientation	29	9,671	.39	.19	.48	.21	[.40, .56]	[.21, .75]	6.68	
Performance goal orientation	23	7,106	.16	.15	.20	.18	[.12, .28]	[-.04, .43]	12.53	

Notes. *k* = total number of effect sizes included in the analysis; *N* = total sample size across studies; $\bar{r}$= sample-size-weighted mean observed correlations; sd_r = standard deviation of observed correlations across studies; $\hat{\bar{\rho}}$ = estimate of weighted mean correlation corrected for measurement error; sd_ρ = standard deviation of the corrected correlations; 95% CI = 95% confidence interval around $\bar{\rho}$; 80% CR = 80% credibility interval for ρ; %Var = the percentage of variance of observed correlations attributable to sampling error and measurement error.

[a] z scores indicate the effect sizes between subgroups separated by the studies before and after Colquitt et al. (2000)
* $p < .05$ *(two tailed)*.

Table 3 (continued)

	k	N	$\bar{r}$	sd_r	$\hat{\bar{\rho}}$	sd_ρ	95% CI	80% CR	%Var	z
Job/Career Variables										
Organizational commitment	9	3,820	.42	.16	.50	.18	[.38, .63]	[.27, .74]	6.57	
Job involvement	9	1,937	.34	.20	.43	.26	[.26, .61]	[.10, .76]	8.57	
Colquitt et al., (2000)	3	276	.15	.05	.18	.00	[.07, .30]	[.18, .18]	100	-2.82*
Studies from 1999	6	1,661	.37	.19	.48	.26	[.27, .69]	[.15, .81]	6.53	
Climate Variables										
Manager support	31	10,297	.29	.19	.35	.21	[.27, .42]	[.08, .62]	7.41	
Colquitt et al., (2000)	4	3,086	.21	.09	.26	.10	[.16, .36]	[.13, .39]	15.45	-1.65
Studies from 1999	27	7,211	.33	.21	.38	.23	[.29, .47]	[.09, .67]	7.04	
Peer support	14	5,929	.29	.13	.36	.15	[.27, .44]	[.16, .55]	12.03	
Colquitt et al., (2000)	3	3,010	.29	.06	.36	.06	[.28, .44]	[.28, .44]	25.16	.13
Studies from 1999	11	2,919	.28	.17	.35	.21	[.23, .48]	[.09, .62]	10.48	
Organizational support	18	6,377	.21	.15	.25	.16	[.17, .33]	[.04, .45]	12.40	
Colquitt et al., (2000)	2	1,043	.20	.02	.24	.00	[.19, .30]	[.24, .24]	100	-.20
Studies from 1999	16	5,334	.21	.16	.25	.17	[.16, .34]	[.03, .47]	11.09	
Continuous learning culture	9	2,906	.29	.18	.34	.19	[.21, .47]	[.10, .58]	7.79	
Demographic Variables										
Age	40	10,977	-.06	.15	-.06	.15	[-.11, -.01]	[-.25, .14]	15.95	
Colquitt et al., (2000)	7	2,852	-.20	.14	-.21	.15	[-.32, -.09]	[-.40, -.02]	10.90	-3.37*
Studies from 1999	33	8,125	-.01	.12	-.01	.11	[-.05, .04]	[-.15, .14]	27.96	
Gender	28	9,237	-.03	.12	-.03	.11	[-.08, .01]	[-.18, .11]	21.78	

Notes. k = total number of effect sizes included in the analysis; N = total sample size across studies; $\bar{r}$= sample-size-weighted mean observed correlations; sd_r = standard deviation of observed correlations across studies; $\hat{\bar{\rho}}$ = estimate of weighted mean correlation corrected for measurement error; sd_ρ = standard deviation of the corrected correlations; 95% CI = 95% confidence interval around $\bar{\rho}$; 80% CR = 80% credibility interval for ρ; %Var = the percentage of variance of observed correlations attributable to sampling error and measurement error.

[a] z scores indicate the effect sizes between subgroups separated by the studies before and after Colquitt et al. (2000)
* $p < .05$ *(two-tailed).*

Table 4

Meta-analytic Correlations between Motivation to Learn and Learning Outcomes

	k	*N*	$\bar{r}$	sd_r	$\hat{\rho}$	sd_ρ	95% CI	80% CR	%Var	*z*
Proximal Learning Outcomes										
Affective-based outcomes										
Post-training self-efficacy	16	2,332	.27	.16	.31	.17	[.22, .40]	[.09, .52]	21.44	-
Colquitt et al., (2000)	1	68	.35	-	.39	-	[.18, .60]	[.39, .39]	-	
Studies from 1999	15	2,254	.27	.16	.30	.17	[.21, .40]	[.08, .52]	20.28	
Training reactions	51	12,880	.40	.13	.48	.14	[.44, .52]	[.30, .65]	17.02	-1.36
Colquitt et al., (2000)	12	3,993	.37	.11	.43	.12	[.36, .51]	[.28, .59]	18.57	
Studies from 1999	39	8,887	.42	.13	.49	.14	[.45, .54]	[.31, .67]	17.10	
Learning Satisfaction	15	2,722	.47	.17	.53	.21	[.42, .64]	[.26, .80]	9.57	
Cognitive-based Outcome										
Declarative knowledge	45	9,323	.09	.15	.11	.16	[.06, .16]	[-.09, .32]	21.27	-1.54
Colquitt et al., (2000)	8	1,196	-.04	.24	-.06	.26	[-.25, .13]	[-.40, .27]	11.90	
Studies from 1999	37	8,127	.11	.12	.14	.12	[.10, .18]	[-.01, .29]	33.85	
Skill-based Outcome										
Learning performance	47	9,467	.19	.17	.22	.18	[.16, .27]	[-.01, .45]	15.80	.28
Colquitt et al., (2000)	9	1,145	.19	.15	.24	.15	[.12, .35]	[.05, .43]	33.06	
Studies from 1999	38	8,322	.19	.18	.22	.18	[.16, .28]	[-.02, .45]	14.07	
Work Attitudes										
Turnover intentions	7	2,106	-.33	.09	-.40	.10	[-.48, -.31]	[-.53, -.27]	27.78	
Job satisfaction	4	2,546	.21	.19	.25	.21	[.04, .46]	[-.02, .25]	4.32	
Distal Outcomes										
Training transfer	23	5,671	.38	.20	.44	.22	[.34, .53]	[.15, .72]	7.63	-2.86*
Job/task performance	15	8,598	.15	.18	.17	.19	[.07, .27]	[-.08, .42]	5.47	
Colquitt et al., (2000)	5	469	-.004	.00	-.003	.00	[-.09, .09]	[.00, .00]	100	
Studies from 1999	10	8,129	.16	.18	.18	.20	[.06, .30]	[-.07, .43]	3.86	

Notes. *k* = total number of effect sizes included in the analysis; *N* = total sample size across studies; $\bar{r}$= sample-size-weighted mean observed correlations; sd_r = standard deviation of observed correlations across studies; $\hat{\rho}$ = estimate of weighted mean correlation corrected for measurement error; sd_ρ = standard deviation of the corrected correlations; 95% CI = 95% confidence interval around $\bar{\rho}$; 80% CR = 80% credibility interval for ρ; %Var = the percentage of variance of observed correlations attributable to sampling error and measurement error.

[a] z scores indicate the effect sizes between subgroups separated by the studies before and after Colquitt et al. (2000)
* $p < .05$ *(two-tailed)*.

Table 5

Meta-analytic Inter-Correlations among Motivation to Learn and its Antecedents and Outcomes

Variables	1		2		3		4		5		6		7	
1. Openness to exp. ($\bar{r}$, $\hat{\rho}$)			-	-	-	-	-	-	-	-	-	-	-	-
(k, N)			-	-	-	-	-	-	-	-	-	-	-	-
2. Conscientiousness ($\bar{r}$, $\hat{\rho}$)	.16 [a]	.20			-	-	-	-	-	-	-.24	-.37	-.07	-.09
(k, N)	121	69,753			-	-	-	-	-	-	2	249	8	1,690
3. Extraversion ($\bar{r}$, $\hat{\rho}$)	.29 [a]	.38	.19 [a]	.24			-	-	-	-	-	-	-	-
(k, N)	114	68,152	129	96,442			-	-	-	-	-	-	-	-
4. Agreeableness ($\bar{r}$, $\hat{\rho}$)	.19 [a]	.28	.29 [a]	.40	.20[a]	.28			-	-	-	-	-	-
(k, N)	111	67,389	155	80,305	122	70,551			-	-	-	-	-	-
5. Neuroticism ($\bar{r}$, $\hat{\rho}$)	-.07 [a]	-.09	-.23 [a]	-.29	-.26 [a]	-.34	-.16 [a]	-.22			-	-	-	-
(k, N)	114	68,068	163	106,149	138	100,801	144	76,406			-	-	-	-
6. Locus of Control ($\bar{r}$, $\hat{\rho}$)	.139 [b]	-	.226 [b]	-	.073 [b]	-	.067 [b]	-	-.176 [b]	-			.07	.08
(k, N)	11	2,549	30	12,670	18	4,035	11	3,443	45	6210			1	330
7. Cognitive Ability ($\bar{r}$, $\hat{\rho}$)	.142 [b]	-	.021 [b]	-	.023 [b]	-	.005 [b]	-	-.035 [b]	-	-.01 [b]	-		
(k, N)	52	17,809	176	90,723	129	76,455	108	62,292	85	36,855	13	8,092		
8. Education ($\bar{r}$, $\hat{\rho}$)	.164 [b]	-	.045 [b]	-	.039 [b]	-	.036 [b]	-	-.051 [b]	-	.018 [b]	-	.424 [b]	-
(k, N)	68	63,636	87	55,257	71	56,723	59	41,718	42	21,045	39	20,041	16	95,654
9. Self-efficacy (pre) ($\bar{r}$, $\hat{\rho}$)	.238 [b]	-	.282 [b]	-	.29 [b]	-	.152 [b]	-	-.385 [b]	-	.345 [b]		.106 [b]	-
(k, N)	45	13,433	74	21,142	37	17,712	22	8,056	52	10,109	103	17,446	62	27,863
10.LGO ($\bar{r}$, $\hat{\rho}$)	.34 [c]	.44	.26 [c]	.32	.24 [c]	.29	.15 [c]	.19	-.14 [c]	-.18	.347 [b]	-	.111 [b]	-
(k, N)	16	4,359	12	3,066	12	3,215	9	2,448	11	3,042	10	1,039	13	3,324
11.Org. commitment ($\bar{r}$, $\hat{\rho}$)	.15 [d]	.18	.24 [d]	.29	.23 [d]	.28	.20 [d]	.24	-.16 [d]	-.19	.32 [e]	-	-.048 [b]	-
(k, N)	8	1,425	12	2,782	11	4,835	10	2,007	12	5,521	16	4,015	88	42,598
12.Job Involvement ($\bar{r}$, $\hat{\rho}$)	.11	.12	.144 [b]	-	.24	.3	.21	.25	-.017 [b]	-	.15 [f]	.02	.048 [b]	-
(k, N)	3	873	8	1,934	3	790	3	647	5	925	34	10,856	41	16,125
13.Support ($\bar{r}$, $\hat{\rho}$)	.106 [b]	-	.13 [b]	-	.049 [b]	-	.217 [b]	-	-.131 [b]	-	.45 [e]	-	-.002 [b]	-
(k, N)	8	1,262	11	3,335	12	1,947	8	1,334	19	2,995	4	1,706	81	44,999
14.Age ($\bar{r}$, $\hat{\rho}$)	-.009 [b]	-	-.016 [b]	-	-.011 [b]	-	.079 [b]	-	-.044 [b]	-	.05 [g]	.04	-.012 [b]	-
(k, N)	179	2,120,719	234	2,134,212	201	2,139,868	178	2,122,778	174	77,811	84	48,141	780	683,609
15.Motivation to Learn ($\bar{r}$, $\hat{\rho}$)	.26	.34	.25	.31	.14	.15	.04	.04	-.07	-.08	.11	.06	-.05	-.06
(k, N)	7	893	12	3,303	4	566	5	760	8	2,139	11	1,984	18	5,726

Variables	1		2		3		4		5		6		7	
16.Self-efficacy (post) ($\bar{r}$, $\hat{\rho}$)	.123 [b]	-	.239 [b]	-	.30 [b]	-	.102 [b]	-	-.421 [b]	-	.345 [b]		-.06	-.07
(*k*, *N*)	5	1,404	21	1,225	3	631	3	631	3	631	103	17,446	5	962
17.Training reaction ($\bar{r}$, $\hat{\rho}$)	.01	.00	.05	.06	.10	.12	.04	.04	-.01	-.02	.19	.23	.03	.04
(*k*, *N*)	5	1,500	4	737	6	1,641	6	1,641	3	848	5	589	9	3,353
18.Declar. knowledge ($\bar{r}$, $\hat{\rho}$)	.05	.07	.18	.22	.12	.15	.04	.02	.01	.02	.11	.15	.26	.30
(*k*, *N*)	3	350	6	1,278	3	721	3	483	3	920	5	478	21	4,211
19.Learning perf. ($\bar{r}$, $\hat{\rho}$)	-.02	-.02	.13	.16	.01 [b]	-	-.04 [b]	-	.07	.09	.07	.09	.24	.27
(*k*, *N*)	3	355	4	1,073	5	944	3	672	3	1,009	5	530	11	3,202
20.Turnover Intention ($\bar{r}$, $\hat{\rho}$)	-.03 [b]	-	-.05 [b]	-	-.05	-.06	-.11 [b]	-	.046 [b]	-	-.20 [e]	-	.025 [b]	-
(*k*, *N*)	12	2,747	13	4,962	8	2,624	7	1,692	10	2,583	19	3,664	98	33,320
21. Training Transfer ($\bar{r}$, $\hat{\rho}$)	.06 [h]	.08	.23 [h]	.28	.03 [h]	.04	-.02 [h]	-.03	-.16 [h]	-.19	.24	.31	.21	.26
(*k*, *N*)	4	303	5	433	3	218	3	218	5	653	4	593	3	700
22. Job/task perf. ($\bar{r}$, $\hat{\rho}$)	.04 [i]	.07	.14 [i]	.22	.06 [i]	.10	.07 [i]	.13	-.09 [i]	.14	.16 [e]	-	.201 [b]	-
(*k*, *N*)	35	5,525	45	8,083	39	6,453	40	6,447	37	5,671	9	3,744	37	7,741

Notes. Openness to exp. = Openness to experience; LGO = learning goal orientation; Org. commitment = organizational commitment; Declar. knowledge = Declarative knowledge; Learning perf. = Learning performance; Job/task perf. = Job and task performance; $\bar{r}$= sample average weighted correlations; $\hat{\rho}$ = estimate of weighted mean correlation corrected for measurement error; *k* = total number of effect sizes included in the analysis; *N* = total sample size across studies; The values above the diagonal line indicates the values reported from Colquitt et al. (2000).

Table 5 (Continued)

Meta-analytic Inter-Correlations among Motivation to Learn and its Antecedents and Outcomes

Variables	8		9		10		11		12		13		14	
1. Openness to exp. ($\bar{r}$, $\hat{\rho}$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(k, N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2. Conscientiousness ($\bar{r}$, $\hat{\rho}$)	-	-	.23	.28	-	-	-	-	.29	.38	-	-	.04	.04
(k, N)	-	-	5	563	-	-	-	-	2	417	-	-	1	483
3. Extraversion ($\bar{r}$, $\hat{\rho}$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(k, N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4. Agreeableness ($\bar{r}$, $\hat{\rho}$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(k, N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5. Neuroticism ($\bar{r}$, $\hat{\rho}$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(k, N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6. Locus of Control ($\bar{r}$, $\hat{\rho}$)	-	-	-.02	-.03	-	-	-	-	-.09	-.13	-	-	-.11	-.12
(k, N)	-	-	6	899	-	-	-	-	1	58	-	-	1	392
7. Cognitive Ability ($\bar{r}$, $\hat{\rho}$)	-	-	22	.26	-	-	-.16	-.20	.21	.28	.04	.05	-.07	-.08
(k, N)	-	-	8	987	-	-	1	666	4	2,062	1	180	2	658
8. Education ($\bar{r}$, $\hat{\rho}$)			-	-	-	-	-	-	-	-	-	-	-	-
(k, N)			-	-	-	-	-	-	-	-	-	-	-	-
9. Self-efficacy (pre) ($\bar{r}$, $\hat{\rho}$)	.04	.05			-	-	.12	.15	.15	.25	.10	.12	-.19	-.21
(k, N)	7	1,137			-	-	3	2,035	2	1,418	4	3,307	7	1,792
10.LGO ($\bar{r}$, $\hat{\rho}$)	.132 [b]		.56 [c]	.71			-	-	-	-	-	-	-	-
(k, N)	5	1,911	9	2,366			-	-	-	-	-	-	-	-
11.Org. commitment ($\bar{r}$, $\hat{\rho}$)	-.04 [j]	-.092	.30	.36	.376 [b]				-	-	.38	.44	.11	.12
(k, N)	22	4,914	5	1,877	3	2,305			-	-	5	3,302	3	2,303
12.Job Involvement ($\bar{r}$, $\hat{\rho}$)	.01 [k]	.013	.039 [b]		.32 [b]	.37	.418 [k]	.496			.13	.19	-	-
(k, N)	29	13,992	11	5,714	3	851	71	26,331			2	1,815	-	-
13.Support ($\bar{r}$, $\hat{\rho}$)	-.01 [b]		.26	.32	.36	.47	.44	.56	.04	.55			.25	.29
(k, N)	22	26,438	10	2,075	3	687	5	2,173	5	1,272			1	1,245
14.Age ($\bar{r}$, $\hat{\rho}$)	-.15	-.15	.06	.06	.06	.06	.20 [j]	.201	.134 [k]	.164	.006 [b]	-		
(k, N)	15	5,208	19	3,575	5	1,263	41	10,335	50	17,110	250	139,568		
15.Motivation to Learn ($\bar{r}$, $\hat{\rho}$)	.14	.15	.42	.50	.39	.48	.42	.50	.34	.43	.29	.35	-.06	-.06
(k, N)	20	5,748	56	13,023	29	9,671	9	3,820	9	1,937	31	10,297	40	10,977
16.Self-efficacy (post) ($\bar{r}$, $\hat{\rho}$)	-.04	-.04	.33	.37	.31 [c]	.37	.19	.23	.044 [b]	-	.25	.29	-.13	-.14
(k, N)	3	145	8	683	49	10,649	3	784	7	2,952	3	351	5	330
17.Training reaction ($\bar{r}$, $\hat{\rho}$)	.05	.05	.18	.22	.27	.33	.21	.26	.17	.21	.32	.39	-.04	-.05
(k, N)	8	2,683	19	5,015	7	1,867	4	1,652	6	1,303	13	4,708	17	5,523

Variables	8		9		10		11		12		13		14	
18.Declar. knowledge ($\bar{r}$, $\hat{\bar{\rho}}$)	.17	.02	.17	-.21	.09	.12	.03	.03	-.03	-.04	.47	.57	.02	.03
(k, N)	9	666	15	3,224	5	1,457	3	1,271	4	759	3	417	14	2,113
19.Learning perf. ($\bar{r}$, $\hat{\bar{\rho}}$)	.25	.27	.31	.34	.12 [c]	.16	.202	-	.17	.19	.40	.48	-.13	-.14
(k, N)	3	140	15	2,529	43	8,676	3	1,927	3	558	3	417	8	1,200
20.Turnover Intention ($\bar{r}$, $\hat{\bar{\rho}}$)	.032 [b]	-	-.079 [b]	-	-.24 [b]	-	-.41 [j]	-.46	-.24 [k]	-.31	-.46 [b]	-	-.194 [b]	-
(k, N)	86	48,169	15	7,721	3	2,045	36	14,080	23	9,230	126	52,091	58	45,794
21. Training Transfer ($\bar{r}$, $\hat{\bar{\rho}}$)	.14	.15	.34	.38	.29	.35	.197 [b]	-	.27 [b]	-	.40	.48	-.02	-.02
(k, N)	3	482	7	1,803	4	1,041	3	751	3	512	9	1,965	3	241
22. Job/task perf. ($\bar{r}$, $\hat{\bar{\rho}}$)	.025 [b]	-	.19 [l]	.23	.04 [c]	.05	.13 [j]	.135	.069 [k]	.088	.33	.41	.17 [b]	.20
(k, N)	90	40,400	10	1,122	25	4,400	10	2,215	25	8,888	3	620	5	853

Notes. LGO = learning goal orientation; Org. commitment = organizational commitment; Declar. knowledge = Declarative knowledge; Learning perf. = Learning performance; Job/task perf. = Job and task performance; $\bar{r}$= sample average weighted correlations; $\hat{\bar{\rho}}$ = estimate of weighted mean correlation corrected for measurement error; k = total number of effect sizes included in the analysis; N = total sample size across studies; The values above the diagonal line indicates the values reported from Colquitt et al. (2000).

Table 5 (Continued)

Meta-analytic Inter-Correlations among Motivation to Learn and its Antecedents and Outcomes

Variables	15		16		17		18		19		20		21		22	
1. Openness to exp. ($\bar{r}$, $\bar{\rho}$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(k, N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2. Conscientiousness ($\bar{r}$, $\bar{\rho}$)	.31	.38	.16	.19	-.05	-.06	-.01	-.01	-.04	-.05	-	-	.27	.29	-	-
(k, N)	3	388	1	80	1	139	3	725	6	839	-	-	1	80	-	-
3. Extraversion ($\bar{r}$, $\bar{\rho}$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(k, N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4. Agreeableness ($\bar{r}$, $\bar{\rho}$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(k, N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5. Neuroticism ($\bar{r}$, $\bar{\rho}$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(k, N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6. Locus of Control ($\bar{r}$, $\bar{\rho}$)	-.33	-.46	.00	.00	.15	.18	.16	.21	.03	.04	-	-	.19	.27	.25	.35
(k, N)	3	309	5	309	2	125	7	924	7	386	-	-	2	125	1	44
7. Cognitive Ability ($\bar{r}$, $\bar{\rho}$)	-.13	-.15	.18	.22	.48	.58	.58	.69	.32	.38	-	-	.32	.43	-	-
(k, N)	3	926	3	928	3	944	12	6,737	17	6,713	-	-	3	310	-	-
8. Education ($\bar{r}$, $\bar{\rho}$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(k, N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9.Self-efficacy (pre) ($\bar{r}$, $\bar{\rho}$)	.36	.42	.52	.59	.14	.17	.25	.30	.26	.32	-	-	.33	.47	.19	.22
(k, N)	14	4,143	8	1,437	14	2,783	16	2,806	20	2,745	-	-	1	68	2	182
10.LGO ($\bar{r}$, $\bar{\rho}$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(k, N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11.Org. commitment ($\bar{r}$, $\bar{\rho}$)	.41	.47	.17	.20	-.08	-.10	-.10	-.12	.01	.01	-	-	.34	.35	.22	.26
(k, N)	3	2,878	2	790	4	1,149	1	666	1	666	-	-	2	1,206	2	586
12.Job Involvement ($\bar{r}$, $\bar{\rho}$)	.16	.20	-	-	.04	.05	-.16	-.18	-.11	-.13	-	-	.25	.39	.06	.07
(k, N)	3	305	-	-	4	514	2	247	3	291	-	-	1	44	2	246
13.Support ($\bar{r}$, $\bar{\rho}$)	.31	.36	.45	.53	.11	.15	.20	.25	.24	.29	-	-	.33	.43	-.07	-.08
(k, N)	5	2,933	1	180	4	181	4	181	1	43	-	-	2	1,206	1	62
14.Age ($\bar{r}$, $\bar{\rho}$)	-.18	-.18	-.30	-.32	.02	.02	-.17	-.19	-.03	-.03	-	-	.01	.01	-.04	-.04
(k, N)	5	2,153	2	144	5	1,167	8	1,774	6	1,047	-	-	1	68	1	106
15.Motivation to Learn ($\bar{r}$, $\bar{\rho}$)			.17	.18	.38	.45	.23	.27	.13	.16	-	-	.44	.58	.06	.07
(k, N)			2	734	12	2,517	11	1,509	9	1,615	-	-	2	1,011	3	291
16.Self-efficacy (post) ($\bar{r}$, $\bar{\rho}$)	.27	.31			.09	.10	.26	.31	.33	.40	-	-	.38	.50	.13	.14
(k, N)	16	2,332			5	1,008	9	1,120	13	1,484	-	-	3	172	1	76
17.Training reaction ($\bar{r}$, $\bar{\rho}$)	.40	.48	.55	.68			.08	.10	.07	.09	-	-	.08	.11	.27	.29
(k, N)	51	12,880	5	683			26	4,520	15	2,261	-	-	9	951	3	291
18.Declar. knowledge ($\bar{r}$, $\bar{\rho}$)	.09	.11	.17	.22	.03	.03			.44	.55	-	-	.28	.38	-.03	-.04
(k, N)	45	9,323	7	1,386	18	3,778			16	5,309	-	-	14	1,369	2	243

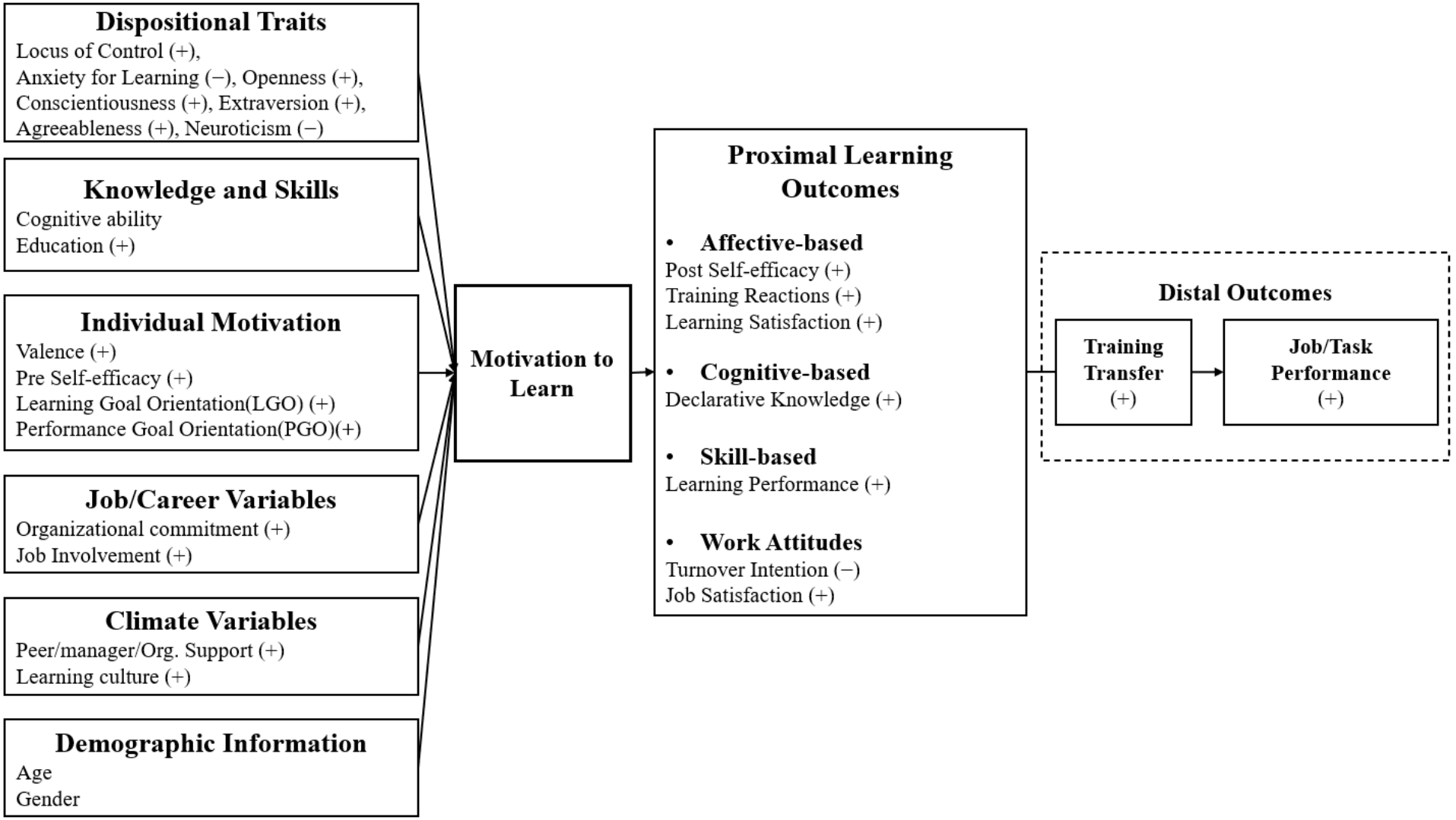
Variables	15		16		17		18		19		20		21		22	
19.Learning perf. ($\bar{r}$, $\bar{\rho}$)	.19	.22	.23	.25	.15	.18	.36	.41			-	-	.50	.69	.36	.44
(*k*, *N*)	47	9,467	5	1,004	17	2,937	12	2,420			-	-	8	604	3	291
20.Turnover Intention ($\bar{r}$, $\bar{\rho}$)	-.33	-.40	-.079 [b]	-	-.007 [b]	-	-.22 [b]	-	-.23 [b]	-			-	-	-	-
(*k*, *N*)	7	2,106	15	7,721	9	2,106	6	2,106	3	755			-	-	-	-
21. Training Transfer ($\bar{r}$, $\bar{\rho}$)	.38	.44	.33	.38	.48	.58	.19	.23	.44	.49	-.02 [b]	-			.45	.59
(*k*, *N*)	23	5,671	3	708	3	944	6	1,154	4	901	3	565			2	146
22. Job/task perf. ($\bar{r}$, $\bar{\rho}$)	.15	.17	.272 [b]	-	.22	.24	.50	.59	.02	.03	-.122 [b]	-	.60 [b]	-		
(*k*, *N*)	15	8,598	10	564	3	360	3	287	3	360	50	16,098	9	702		

Notes. Declar. knowledge = Declarative knowledge; Learning perf. = Learning performance; Job/task perf. = Job and task performance; $\bar{r}$= sample average weighted correlations; $\hat{\rho}$ = estimate of weighted mean correlation corrected for measurement error; *k* = total number of effect sizes included in the analysis; *N* = total sample size across studies; The values above the diagonal line indicates the values reported from Colquitt et al. (2000).

[a] from Park et al. (2020); [b] the value was adapted from *MetaBus* dataset; [c] from Payne et al. (2007); [d] from Choi et al. (2015); [e] from Wang et al. (2010); [f] from Ng et al. (2006); [g] from Kooij et al. (2011); [h] from Blume et al. (2010); [i] from Hurtz & Donovan (2000); [j] from Mathieu & Zajac (1990); [k] from Brown (1996); [l] from Judge & Bono (2001)

Figure 1

Theoretical Model of Suggested Effects of Motivation to Learn and its Antecedents and Outcomes



Notes. Signs next to the variables indicate the hypothesized relationship with the *'motivation to learn'* variable.

Figure 2

Depiction of a Flowchart for the Search Process including Reasons for Inclusion and Exclusion

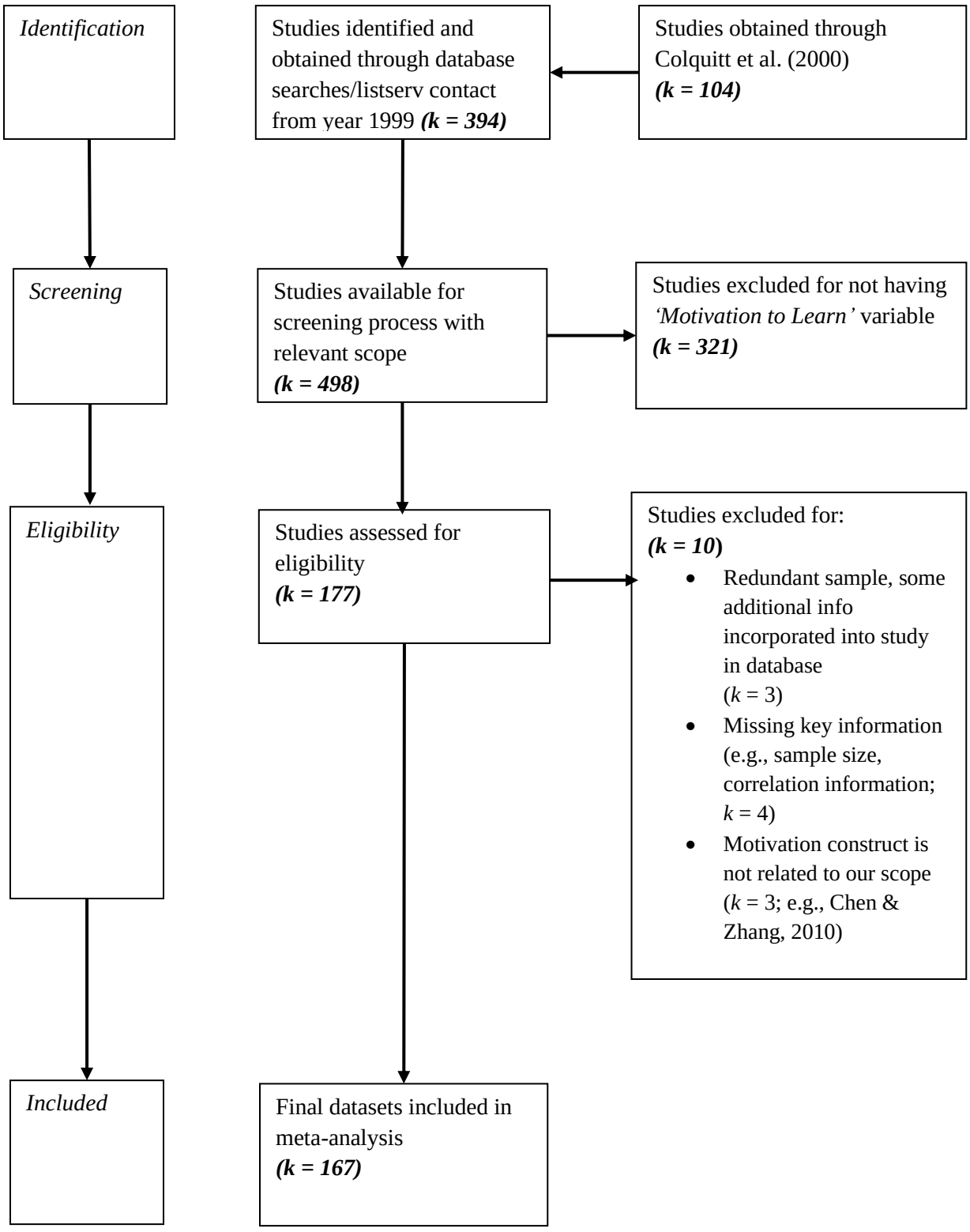
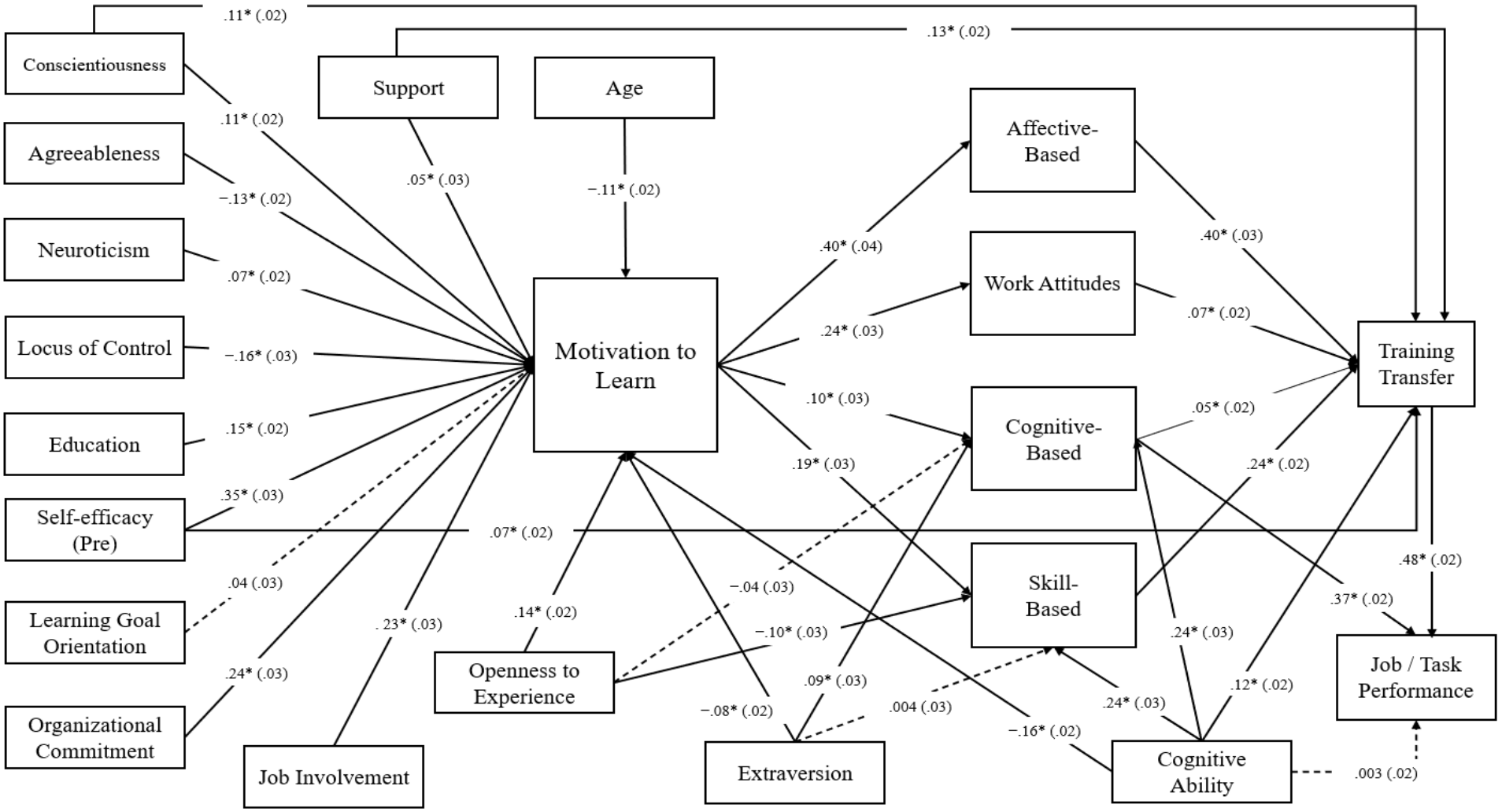


Figure 3

Final Model of Motivation to Learn and its Antecedents and Outcomes



Notes. The coefficients and standard errors (in the parentheses) were based on MASEM results; Dotted line refers to a non-significant relationship; Harmonic N = 1,362.

* $p < .05$ *(two tailed).*