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A Meta-Analytic Integration of What Matters in Training Transfer

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A META-ANALYTIC INTEGRATION OF WHAT MATTERS IN TRAINING TRANSFER

by

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ABSTRACT

Estimates demonstrate that 52- 92% of acquired learning is lost within a year following training (Arthur, Bennett, Stanush, & McNelly, 1997; Saks, 2002), wasting billions in organizational spending on training each year (Miller, 2012, 2013, 2014). As such, research on training transfer has garnered attention from theoretical and empirical research alike (e.g., Baldwin & Ford, 1988; Blume, Ford, Baldwin, & Huang, 2010; Ford & Weissbein, 1997; Tracey, Tannenbaum, & Kavanagh, 1995) to better understand the factors which enhance the process of training transfer. Among the various factors that have been identified as important, factors of the work environment have received much attention in the recent research. In fact, empirical work has shed light to the roles of organizational support and motivation to transfer in predicting training transfer. Beyond this basic understanding, research is needed to explore the nature of transfer in different evaluation contexts and the differential effects of various levels of support. Thus, the current dissertation uses meta-analytic techniques to examine the extent to which four factors of work environment support predict training transfer as it differs in context. First, motivation to transfer, organizational support, supervisor support, peer support and opportunities to perform all correlate moderately and positively with training transfer (ρ=0.15-0.38); interestingly, the nature of the relationships between work environment characteristics, motivation to transfer, and training transfer does not appear to differ significantly even when transfer is evaluated a year following training (ρ=0.25-0.57), yet are based on low *k*. Second, motivation to transfer was found to fully mediate two relationships- organizational support and peer support- to training transfer. Interestingly, although not explained by motivation to transfer, supervisor support

explains the most variance (i.e., 31% of R) of work environment support factors in explaining transfer. Moderator analyses attempted to explore the impact of transfer task, industry type, and timing of the predictor assessment in relation to training; however, insufficient *k* was reported for fair comparisons to be made across groups. Ultimately, this study aims to inform theory and impact the state of the science such that practitioners can feel confident that the time and effort spent in ensuring training transfer is well-spent.

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CHAPTER ONE: INTRODUCTION

Training has been defined as a set of instructional activities designed for trainees to acquire targeted knowledge, skills, and attitudes (KSAs) relevant to the job context (Cannon-Bowers, Tannenbaum, Salas, & Converse, 1991). Evidence illustrates training's ability to effectively foster positive responses from trainees (i.e., reactions), enhance learning (i.e., learning), improve behaviors on the job (i.e., behaviors [sometimes referred to as transfer]), and improve targeted organizational results (i.e., results; Alliger, Tannenbaum, Bennett, Traver, & Shotland, 1997; Arthur, Bennett, Edens, & Bell, 2003). However, ensuring key behaviors are used or transferred to the job context is essential for training to ultimately be effective (E. F. Holton, 1996); that is, training must first be applied within another environment (e.g., in the job context) to enhance performance and desired organizational goals (Alliger et al., 1997; R. O. Brinkerhoff & Montesino, 1995; Kirkpatrick, 1996; Kozlowski, Brown, Weissbein, Cannon-Bowers, & Salas, 2000; Tharenou, Saks, & Moore, 2007).

Defining the Transfer Problem

Failure to transfer training is all too common in organizational settings. Each year, organizations are estimated to spend upwards of billions of dollars on training and educational initiatives on employees (Miller, 2012, 2013, 2014); yet, despite current efforts to improve training initiatives in organizational settings (e.g., Society of Industrial and Organizational Psychology 2013 Meeting's theme of sustainability of practice), estimates demonstrates that as few as 10% of trained knowledge, skills, and attitudes (KSAs) are being used on the job a year following training (Arthur et al., 1997). Further estimates reveal that approximately 52% of these KSAs are lost months following training (Saks, 2002), showing a decrement in use of the trained KSAs over time. Failure to transfer and retain use of the KSAs on-the-job has been coined as the

training-firm performance paradox (Saks & Burke, 2014) as funding for training initiatives fail to yield transfer and thus provide return on investment (ROI).

Clearly, failure to provide ROI is an issue for many organizations; however, Kirkpatrick (1996) argues that training should be evaluated for improvements in Human Resource-related outcomes such as job performance and organizational goals rather than fiscal outcomes alone. Thereby, it is critical to consider how failure to transfer impacts safety for individuals and teams working in high risk, fast-paced, and dynamic industries. One critical illustration of the transfer problem comes from the healthcare industry. In 1999, the Institute of Medicine (IOM) published a sentinel report revealing that 100,000 lives are lost each year due to medical error alone. Unfortunately, recent evidence estimates that these numbers have not since improved (James, 2013) and in some cases, the number of lives lost due to medical error are grossly underestimated three times higher than that of the national average (e.g., St. Mary's Medical Center in West Palm Beach, FL, closed due to a mortality rate three times higher than the national average; Cohen, 2015). Emerging evidence on team training (i.e., training targeted at improving teamwork KSAs) within healthcare settings unveils its potential for mitigating medical error (Global Diffusion of Healthcare Innovation Working Group, 2015) and reducing negative patient outcomes, such as mortality (Neily et al., 2010), when use of teamwork on-the-job is enhanced. However, some investigations of team training have revealed a failure to transfer communication strategies (a core competency of team training in healthcare settings; see Weaver et al., 2010) due to a dominant and conflicting organizational culture (i.e., teamwork training conflicted with healthcare organizational norms; Heaven, Clegg, & Maguire, 2006). Thereby, understanding the mechanisms by which training is used on the job context can ultimately save lives (Global Diffusion of Healthcare Innovation Working Group, 2015).

Effectively, safety cannot be overlooked when examining the failure to transfer and the need to investigate the mechanisms by which training transfer is achieved and maintained is highlighted.

Despite various estimates of the transfer problem (i.e., failure to transfer training to the job context), transfer of training is possible and can effectively improve targeted outcomes. For instance, Saks and Burke (2014) found that optimal training transfer results in increased firm performance and enhanced organizational performance (e.g., fiscal outcomes). Meanwhile, a meta-analysis by Tharenou et al. (2007) suggests that training induces organizational improvement when key behaviors from training are used on-the-job (i.e., transfer occurs in the work environment). While some argue that training should not be evaluated for its financial return (Kirkpatrick, 1996), transfer of training has an extensive literature base (Lionetti, 2012), which may lead one to presume that the underlying characteristics for optimizing transfer are well understood. Yet, data remains to highlight the transfer problem (J. Brinkerhoff, 2006; Fitzpatrick, 2001; Mooney & Brinkerhoff, 2008) despite KSA acquisition during training (Arthur et al., 2003; Blume et al., 2010) as research continues to strive to understand what factors or antecedents of transfer are of the utmost importance (Grohmann, Beller, & Kauffeld, 2014; Huang, Blume, Ford, & Baldwin, 2015).

Significance of the Current Study

Taking into account that training transfer can be optimized (M. J. Burke et al., 2011; Tharenou et al., 2007), this study seeks to make the following contributions: (a) advance a practitioner-oriented framework guided by sentinel frameworks of training transfer (Baldwin & Ford, 1988; Chiaburu & Lindsay, 2008; E. F. Holton, 1996; Machin & Fogarty, 2004), (b) clarify the strength of four aspects of work environment characteristics and motivation to transfer on training transfer, (c) determine the role of transfer motivation as a mediator between

characteristics of the work environment and training transfer, (d) clarify the role of time in training transfer evaluations in relation to training administration, (e) examine differences in training transfer across industries, and (f) clarify the relative contribution of four work environment characteristics and transfer motivation as a predictor of training transfer. Results of this meta-analysis will provide evidence-based guidance on the selection of strategies that lie within the organization's sphere of control (Lewis, 1997) to enhance transfer across industries.

CHAPTER TWO: LITERATURE REVIEW

"The technology for [training] transfer now exists." (Broad & Newstrom, 1992, p. 50)

This quote from Broad and Newstrom (1992) implies that the solution to the training transfer problem is now or will soon be available; yet, much work has been done in theory and research since Broad and Newstrom's (1992) framework on training transfer.

Historically, training transfer has had many conceptualizations (see Adams, 1987) and several potential antecedents (e.g., Baldwin & Ford, 1988) which influence the quality and quantity of the transfer outcome. Despite its many conceptualizations, transfer of training is considered to be the hallmark of many key training effectiveness models (Beier & Kanfer, 2009; E. F. Holton, 1996; Kirkpatrick, 1996) and thereby has garnered attention from theory and empirical research alike (e.g., Baldwin & Ford, 1988; Ford & Weissbein, 1997; Machin & Fogarty, 2003). Various models and definitions have played a key role in determinants and antecedents to transfer which serve to inform the development of a practitioner-oriented model used in the current meta-analysis.

Models of Training Transfer

Baldwin and Ford (1988) offer the first integration of the training transfer literature. This model plays a key role even in current transfer research endeavors, having received both qualitative updates (Ford & Weissbein, 1997) and quantitative validation (Blume et al., 2010). Baldwin and Ford (1988)'s model identifies antecedents to training transfer by organizing them into three major categories which are: trainee characteristics, training design features, or work environment characteristics. Several models use and build upon Baldwin and Ford's work;

thereby, definitions for each training input are mentioned and explained below. It is important to note Baldwin and Ford's definition of transfer as the model is widely cited (Google Scholar notes its citation count at 2,500 and Web of science has the paper cited as 500 times). Specifically, they define training transfer as the generalization and maintenance of trained skills to the work environment.

Training design. The first set of training inputs is training design. Training design is further specified as the set of instructional strategies, learning principles, content, and facilitation of learning that informs the design and implementation of learning activities during training. Training design features have arguably received the most attention in training transfer research and have received much attention in their role in facilitating learning and subsequent transfer (Arthur et al., 2003; Blume et al., 2010; Cannon-Bowers et al., 1991).The initial examinations of training transfer centered on understanding the components of training design driving training transfer (Arthur et al., 2003; Blume et al., 2010; Grossman, Oglesby, & Salas, 2015; Huang et al., 2015). In fact, previous work on training design reveals how the similarity of the training environment and many features of practice contribute to training transfer. For instance, R. E. Clark and Voogel (1985) stipulate that the more specifically that the training program reflects key features of the work place, the more successful the occurrence of near transfer, in conjunction with identical elements theory (Thorndike & Woodworth, 1901). Moreover, features of practice, such as practicing the trained KSAs in several environments or scenarios several times can facilitate training transfer (Noe, 1986; Yamnill & McLean, 2001). Training design highlights the importance of conducting a thorough training needs analysis to ensure valid content and match employee expectations for training (Cannon-Bowers et al., 1991; Vroom, 1964), and to ensure that training design leverages key learning principles to ensure the

formation of accurate shared mental models during training (Cannon-Bowers et al., 1991). These features include massed versus distributed practice opportunities, strategic incorporation of technology in training (e.g., selecting a simulator), using advanced organizers, and method of instruction, to name a few (Lionetti, 2012).

Work environment. Second, features of the work environment were identified as necessary for training transfer. Previous theoretical work contributing to Thayer and Teachout (1995)'s model included research by Broad and Newstrom (1992) which emphasized the three transfer stages: before, during, and after training. While studies (e.g., E. F. I. I. I. Holton, R. A. Bates, D. L. Seyler, & M. B. Carvalho, 1997; Rouiller & Goldstein, 1993) have sought to measure and understand the role of climate in training transfer, (Thayer & Teachout, 1995) introduced a new focus on the aspects of transfer climate as a critical contributing factor to training transfer. Specifically, Thayer and Teachout (1995) conceptualized transfer climate as existing via cognitive cues such as "goal cues, social cues, task and structural cues…positive reinforcement, negative reinforcement, punishment and extinction" (p. 3). In subsequent research, E. F. Holton (1996) further reinforces the notion that transfer climate enhances the training outcomes in a new model focused on training motivation and work conditions. Taken all together, Machin (2002) synthesized the most recent transfer research and as a result, identified key training strategies that help boost transfer effects before, during, and after training. Of particular importance, Machin believed that training success was a by-product of a variety of different internal and external factors. In other words, Machin's model provides great insight about how to increase the probability of transfer success utilizing a variety of evidence-based approaches and interventions across different stages in the training process. While there are several models and frameworks which seek to identify the components necessary to effectively

transfer training, the original Baldwin and Ford (1988) model of training transfer is continually leveraged to inform new reviews and perspectives on the training transfer literature (e.g., L.A. Burke & Hutchins, 2007; L.A. Burke & Hutchins, 2008; Grossman & Salas, 2011; Lionetti, 2012; E. Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2012).

Trainee characteristics. Third, several trainee characteristics play a role in transferring training. Trainee characteristics encompass the factors of the trainee which matter for training transfer such as personality, affect, ability, goal orientation, and locus of control, among other individual differences. More specifically, trainee characteristics embody the experiences, abilities, and unstable antecedents (e.g., affect) of trainees before, during and after they enter training (Beier & Kanfer, 2009; Colquitt, LePine, & Noe, 2000). The list of stable and unstable trainee characteristics abounds (Ford & Weissbein, 1997), as subsequent research has sought to further identify which trainee characteristics matter in transfer of training and how. Variables known to play a key role in transfer include trainee motivation (Colquitt et al., 2000; Machin & Fogarty, 2004), self-efficacy (Grossman et al., 2015; Grossman & Salas, 2011; Machin & Fogarty, 2003; Thayer & Teachout, 1995), affect (Machin & Fogarty, 2003), and personality (Broad, 2005a; Grossman & Salas, 2011). Huang and colleagues expand upon the Baldwin and ford model by taking a deeper dive into characteristics of the trainee and support mechanisms the work environment can offer to support the continued use of training on the job. This model of transfer of training offers insight into stable predictors for optimal and typical transfer by leveraging the optimal and typical performance criteria specified by (P.R. Sackett, Zedeck, & Fogli, 1988). Specifically, the differentiations in maximal and typical performance are such that maximal performance occurs under conditions in which the participants are 1. Aware of the fact that they are being evaluated, 2. Are asked to perform to their maximum capability and 3.

Performance periods occur for relatively short periods of time. Typical performance does not have to meet specific criteria rather than that the participant is unaware that s/he is being evaluated and that this must be obvious. In leveraging previously supported stable predictors within individuals for both maximal ad typical performance (Beus & Whitman, 2012), Huang et al. (2015) specified a model to predict both optimal and typical transfer of training. Their primary findings of their meta-analytic tests of the training transfer model include a distinction between maximum and typical transfer through non-significant meta-analytic correlation and distinguishing of stable antecedents which predict different outcomes. Further, they also provide for support for learning as a necessary precursor to training transfer via successful partial mediation of different learning types to transfer outcomes.

Time as a factor in training transfer. Subsequent transfer frameworks have highlighted the impact of interventions in relation to when training takes place (Broad, 2005a; Broad & Newstrom, 1992; E. Salas et al., 2012). Specifically, effective training requires effort before, during, and after the training takes place to ensure proper training design, delivery, and reinforcement. Transfer of training is no different in that factors of the training transfer process may be more effective before, during, or after training (Broad, 2005a; Broad & Newstrom, 1992; Wexley & Latham, 1991). For instance, Broad and Newstrom (1992) identify what matters for before, during and after training and segregate the distinct behaviors (e.g., supervisory support, peer to peer support) and actions (e.g., training needs analysis) into each of these timeframes. Yet, further examination of these timeframes show that experts at the American Society of Training and Development (ASTD; which is currently known as the Association of Talent Development [ATD]) conceptualize several behaviors as non-temporal specific (Burke & Hutchins, 2008). In other words, behaviors necessary to stimulate use of trained KSAs on the

job are not specific to a "before", "during", or "after" training period but rather should be done throughout the training lifecycle in order to support employee use of trained KSAs on the job and promote its continued use. In fact, many of the constructs identified as necessary for training transfer may differ in the way that they impact training transfer based on the time point in which they are assessed in relation to training.

Broad and Newstrom (1992) provide evidence that the importance of various training inputs and outputs differs based on whether it is before, during or after the training intervention has been implemented. Specifically, they found that perceptions of important information emphasize the importance of supervisory support to be most critical after training has occurred. Subsequently, training design features are most important before and during training such that training is designed in accordance with training needs and the context for which training is implemented. Further, trainee characteristics, such as motivation, may matter most during the training process itself such that critical KSAs are acquired and subsequently transferred to the work environment.

Training Transfer Conceptualizations

The domain of training transfer is broad and multidisciplinary, extending beyond the science of organizations into education, learning, management, business, and psychological areas of research and application (e.g., Human Factors). However, the conceptualizations and definitions by which we've come to know and understand transfer have differed over the last several decades of research. Definitions reviewed stipulate that training transfer differs as a function of the environment, the task, evaluation features, and as a function of time.

Near and far transfer. One conceptualization of transfer differentiates between near and far transfer (R. E. Clark & Voogel, 1985; Laker, 1990; Perkins & Salomon, 1989; Royer, Cisero, & Carlo, 1993). Near transfer refers to the application of learning acquired during training to similar tasks within a similar transfer environment; meanwhile, transfer of learning from the training environment to the work environment in which the context and task are inherently different from those used in training exhibits far transfer (R. E. Clark & Voogel, 1985; Johnson, 1995). As near transfer relies on similar KSAs to be applied in similar contexts, far transfer has been deemed as requiring higher cognitive ability and a more deliberate mindful abstraction of skill or knowledge (Perkins & Salomon, 1989) thereby making it more difficult to achieve (Johnson, 1995). Haskell (2000) created a taxonomy to better understand the proximity and levels of transfer; through this, Haskell identified nonspecific transfer, application transfer (i.e., putting knowledge into action), context transfer (i.e., transfer involving generalization of KSAs), near transfer (i.e., using previously learned concepts and their application in similar situations), far transfer (i.e., applying previously learned concepts in dissimilar situation to that in which they were learned), and creative transfer (i.e., examining previously held knowledge in a new way which may lead to unique knowledge). Predictors of near and far transfer have distinctions based on training design strategies, including phrasing and creation of learning objectives, whether they should incorporate procedural knowledge for near transfer objectives or declarative knowledge as necessary for far transfer (Rumelhart & Norman, 1981). For instance, providing content relevant training and contextualized examples have been linked to enactment of far transfer (Paas & Van Merriënboer, 1994) whereas part-task methods of practice facilitates near transfer (Van Merriënboer, Kirschner, & Kester, 2003) by simplifying complex tasks in smaller and easier to practice tasks (Albrecht, 2008). Cognitive methods of instruction are typically

needed to promote far transfer (R. E. Clark & Voogel, 1985) and work best when instruction minimizes inclusion of content which may facilitate negative transfer (i.e., learning of irrelevant information that interferes with learning the intended KSAs).

Analogical and adaptive transfer. Similar to near and far transfer, analogical transfer and adaptive transfer provide an alternative means by which transfer can be understood based on similarity of the transfer task. Ivancic IV and Hesketh (2000) refer to analogical transfer as application of the KSAs to the transfer tasks that are familiar or structurally similar to those of the tasks covered in training. Adaptive transfer involves "using one's existing knowledge base to change a learned procedure, or to generate a solution to a completely new problem" (Ivancic IV & Hesketh, 2000, p. 1968); in fact, adaptive transfer involves trainees engaging in a task that is structurally dissimilar from the tasks covered in training. Application of trained skills to a procedure that was covered explicitly in training may not be sufficient to assess training transfer. In fact, Keith and Frese (2008) provide meta-analytic evidence that training strategy and approach to training (i.e., error management training) promotes a different type of training transfer referred to as analogical or adaptive transfer. previous work on analogical transfer demonstrates its success when training leverages a problem solving approach (Thompson, Gentner, & Loewenstein, 2000) or provides tools to structure the learning process (Casale, Roeder, & Ashby, 2012). Taken together, near and far transfer illustrate the impact of task and environment in changing the way that training is transferred.

Horizontal and vertical transfer. While near and far transfer focus on the environment and/or task by which training transfer differs, other conceptualizations have focused on the level within the organization at which transfer occurs. Specifically, Kozlowski and Salas (1997) differentiates between horizontal and vertical transfer to identify mechanisms by which use of

KSAs impacts the acquisition of a more complex skill to ultimately impact organizational level transfer. Specifically, horizontal transfer refers to use of the trained skills that occurs in contexts that are at the same organizational level (Kozlowski et al., 2000; Kozlowski & Salas, 1997). To illustrate, a unit within a hospital receives training on a new protocol for suturing wounds. If this training is generalized and maintained within the unit, the training is horizontally transferred. In contrast, vertical transfer illustrates how a lower order skill can impact the acquisition of a higher order skill. For instance, a surgeon who gains skills and knowledge pertaining to completing a robotic hysterectomy via laparoscopic procedures when robotic options fail may then have to learn the his/her role within the team to lead surgical team members to successful surgery completion. This stems from Gagne's (1963) original conception of transfer of learning in that it can transfer to similar environments or multiple levels for novel application. Specifically, Kozlowski and Salas (1997) maintain that vertical transfer is possible when there is a clear and training-oriented vision, a supportive organizational culture and climate, adequate team coordination, teamwork and leadership, and application of human process skills and knowledge. Thereby, Kozlowski and Salas (1997)'s framework highlights the critical role of team and organizational level features in transferring KSAs to organizational learning.

Maximal and typical transfer. Maximal and typical transfer highlights how training transfer differs based on assessment conditions. This conceptualization stems from the maximal and typical performance literature which specifies that performance will differ based on the parameters by which it is assessed (P.R. Sackett, 2007; P.R. Sackett et al., 1988). Specifically, typical transfer refers to trainees' performance under conditions of assessment in which the participant was not aware of his/her evaluation. Subsequently, maximal performance occurs when trainees are aware that they are being evaluated and that performance using the trained

skills is for a short duration of time. These conceptualizations of performance have been shown to be distinct constructs in meta-analysis (Beus & Whitman, 2012). In leveraging this distinction in performance, (Huang et al., 2015) distinguish typical transfer from maximal transfer. Specifically, they provide evidence that typical and maximal transfer are predicted by different trainee characteristics and work place support antecedents. With few exceptions (e.g.,Smith-Jentsch, Salas, & Brannick, 2001), typical and maximal transfer have yet to be defined and examined explicitly in the empirical literature base; yet Huang et al (2015) establish the importance of workplace support in gaining typical use of trained KSAs on the job.

Training sustainment. Over the past 100 years, transfer of training has been assessed as much more than simply a one-time application of trained skills from one context to another and to be attributed to more than simply the features embedded within the learning environment (Thorndike & Woodworth, 1901). Sitzmann and Weinhardt (2015) agree that effective training requires input from all levels of the organization over time; thereby, training effectiveness outcomes and variables (such as training transfer) requires examination over time. In fact, the role of time in training effectiveness and training transfer highlights the role of time in a decline in the use of trained skills starting in as few as two months (Saks, 2002; Saks & Belcourt, 2006), to a year (Arthur et al., 1997) to seven years (Siassakos et al., 2011). Use of the trained skills declines with time in that transfer of training does not occur naturally. In fact, previous meta-analyses have also shown training transfer to differ as a function of time, yet they did not specify specific increments at which decrements occur (Blume et al., 2010; Huang et al., 2015). Sustainment of training refers to prolonged use of the trained skills (Alonso et al., 2006). While this term is referenced throughout the training literature (Alonso et al., 2006; Antiles, Couris, Schweitzer, Rosenthal, & Da Silva, 2000; Weaver et al., 2010), it is more typically referred to as

an evaluation of training transfer above and beyond skill maintenance that Baldwin and Ford (1988) use in their model. While predictors of training sustainment are yet to be specified or quantified in their effectiveness, King and Harden (2013) emphasize the necessity of fostering a supportive organizational culture and climate in maintaining behaviors on-the-job for long-term retention and use such that use of the trained skills becomes an organizational norm.

The Current Study

The training transfer literature has transitioned from early notions that the skills used on the job were a direct result of the training program including program aims and initiatives (Thorndike & Woodworth, 1901), and as such, there are now various explanations as to how transfer occurs (L.A. Burke & Hutchins, 2008; Huang et al., 2015; Machin & Fogarty, 2003, 2004; Thayer & Teachout, 1995; Tracey et al., 1995). Several qualitative reviews (Baldwin & Ford, 1988; Blume et al., 2010; L.A. Burke & Hutchins, 2007; L.A. Burke & Hutchins, 2008; L.A. Burke, Hutchins, & Saks, 2013; Ford & Weissbein, 1997; Grossman & Salas, 2011; E. Salas, Bowers, & Rhodenizer, 1998; Wickens, Hutchins, Carolan, & Cumming, 2012) have highlighted what matters in training transfer, including an emphasis on key features of the work environment to encourage use of trained KSAs. Specifically, L.A. Burke et al. (2013) call for a better understanding on factors of the work environment that predict or ensure long-term use of skills. Similarly, Lionetti (2012) encouraged empirical research on the antecedents to transfer that lie within the organization's "sphere of control"; yet, little has been done to quantify where organizations should focus their efforts in terms of fostering a receptive work environment. Thereby, evidence-based guidance is necessary for selecting work environment interventions and strategies for training transfer that lie within their sphere of control.

A Framework for Work Environment that Matters in Practice

The framework for this dissertation builds upon previous frameworks and transfer conceptualizations to ultimately provide guidance on what strategies matter most in practice, but also to enrich the understanding of long-term transfer (i.e., sustainment). More specifically, the proposed framework provides an integration of Baldwin and Ford (1988)'s original model, E. F. Holton (1996)'s proposed four level training evaluation framework, Chiaburu and Marinova (2005)'s testable framework of training antecedents and Huang et al. (2015)'s optimal versus typical transfer model. Variables of intended focus were identified from salient reviews, supplanted with theory (e.g., L.A. Burke & Hutchins, 2008; L.A. Burke et al., 2013; Grossman & Salas, 2011; Lionetti, 2012).

Specifically, several qualitative reviews have scoured the literature with the intent to report on actionable interventions and effective means by which to enhance transfer. For instance, Grossman and Salas (2011) identified the most frequently salient predictors of training transfer and provide guidance on advancing the field. Consequently, the review found that self-efficacy, cognitive ability, motivation of the trainee, perceived utility of training, training design features, and key characteristics of the work environment such as mechanisms of support, a receptive transfer climate and opportunities to perform the trained skill. Further a review by Lionetti (2012) reviewed and ranked interventions integral to training transfer. Emergent from this review, training design strategies, opportunities to perform, supervisory support, content relevance, trainee motivation, and instructor training were identified as most capable interventions at optimizing training transfer. Further, interviews with practicing human resource professionals reveals a further need to understand support from the organization, support from peers and engagement of trainees in the transfer process

(L.A. Burke & Hutchins, 2007). Additionally, further review of the empirical work on transfer was conducted by L.A. Burke et al. (2013) in the attempt to identify the best practices of training transfer. Evidenced in their review, motivation to transfer, accountability, and specific forms of work environment support (such as framing training to trainees, follow-up with trainee supervisors and providing the opportunities to practice skills on-the-job) emerged as the most important factors in the transfer process. This study leveraging a framework which combines the need to focus transfer efforts on practitioner needs, evaluate emergent themes of the qualitative literature, and combine various transfer frameworks. This practitioner-oriented model is designed quantify predictors of training transfer (see figure 1) which will be further delineated in sections.

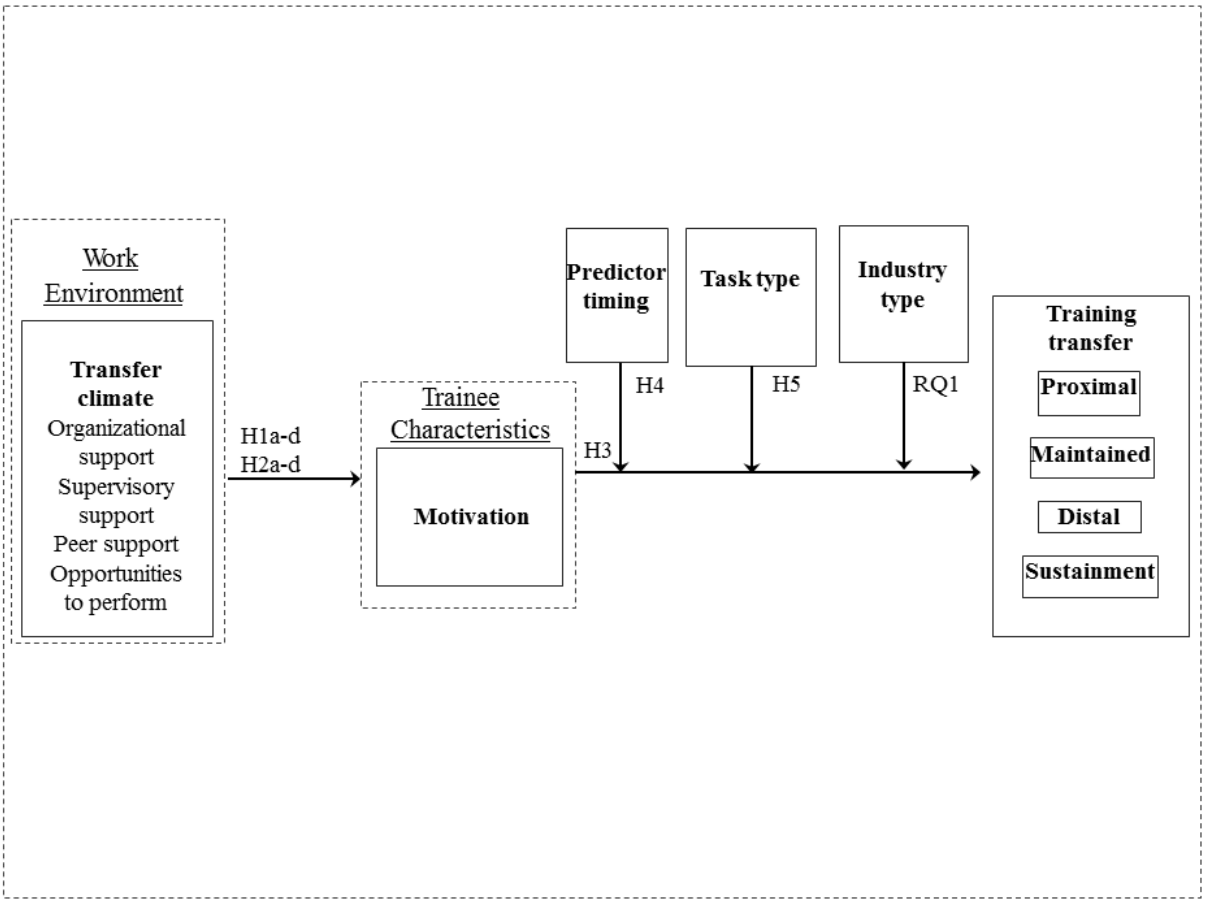

Figure 1. A practitioner-oriented model of training transfer

The training transfer continuum. Training transfer is most typically defined as the use of skills from training in application to the job context (L.A. Burke et al., 2013) and involves the "generalization and maintenance" of skills from training (Baldwin & Ford, 1988, p. 65). However, training transfer can be viewed as a continuum in which several features such as task characteristics (Barnett & Ceci, 2002), evaluation contexts (Huang et al., 2015), and nature of the skills applied (Blume et al., 2010) change the nature of this dynamic construct.

One such illustration of transfer as a continuum is the impact of time on the use of the trained skills. Previous studies have demonstrated a decline in the use of the trained

skills over time (Blume et al., 2010; Huang et al., 2015; Tziner & Falbe, 1993), yet there has been no formalized index of training transfer to illustrate how the construct changes as a function of time. Training sustainment (i.e., prolonged maintenance of the skills over time) is one conceptualization of training transfer in which transfer differs as a function of time. In a meta-analysis done by Arthur et al. (1997), various retention intervals to examine how long training was retained. Retention of learning, particularly of learning that is skill-based (Kraiger, Ford, & Salas, 1993), has been shown to strongly predict training transfer in empirical (Huang et al., 2015) and theoretical work. In their examination, Arthur et al. (1997) found that skill decays significantly over intervals of less than one day to greater than one year; specifically, they examined the decay in less than one day, greater than one day and less than a week, greater than seven days and less than or equal to fourteen days, greater than fourteen days and less than or equal to twenty eight days, greater than twenty eight days and less than or equal to ninety days, greater than ninety days and less than or equal to 180 days, greater than 180 days and less than or equal to one year, and greater than one year. Results show the sharpest declines in skill retention between zero and ninety days (i.e., 3 months) after training, between 90 days and 180 days and a year and beyond. Sustainment has been referred to as the long-term retention of key skills above and beyond the maintenance of skills defined by Baldwin and Ford (1988). While nascent work has been done to refer to training sustainment and mention some mechanisms by which it can be attained, there has yet to be an index of time intervals showing how training transfer becomes sustained training. Thereby, leveraging critical time points in skill retention (Arthur et al, 1997), an index of training transfer is created for the purposes of this study as factors of support for transfer efforts may play critical roles at different time points as

transfer progresses. Specifically, the proposed gamut of training transfer sustainment is: proximal, maintained, distal, and sustained transfer.

Work environment factors. Lewin (1951) defined work characteristics as the pre-training behaviors which influence training transfer; however, work characteristics as identified by Baldwin and Ford (1988), also mentioned earlier, include factors of the work climate that play an integral role in the process of transferring training, both pre and post-training, including sending important messages regarding training and providing support for use of the skills following training. Baldwin & Ford (1988), later echoed by Cromwell and Kolb (2004), include two primary dimensions of a work environment which are favorable to transfer of training. These dimensions include elements of a transfer climate both reinforcement of learning and support for use of the trained KSAs.

Organizational culture is the "pattern of basic assumptions" that is "invented, discovered or developed" on how employees are to think, feel, and act (Schein, 2003, p. 3) while climate from organizations describes employee perceptions of culture including perceptions of what the organization deems as acceptable or unacceptable day-to-day interactions and quality of work. Similarly, transfer climate is the perceptions of an individual's work environment which can influence an individuals' use learned skills on-the-job (E. F. I. I. I. Holton et al., 1997) and plays a critical role in optimizing training's use on the job (Rouiller & Goldstein, 1993). Organizational climate has been said to shape behaviors of employees on the job such that positive or negative work-related behaviors are reinforced (E. Salas, Shuffler, Thayer, Bedwell, & Lazzara, 2014), further highlighting its importance to transfer. Research on transfer climate has been disjointed at best, originally conceptualized as psychological cues embedded in the workspace (Thayer & Teachout, 1995) which later expanded to include facets of work

environment support. For instance, supervisor support and peer support (E. F. Holton, R. A. Bates, D. L. Seyler, & M. B. Carvalho, 1997; Rouiller & Goldstein, 1993) also are noted to facilitate use of the skills on-the-job. Of these various support mechanisms found to enhance training transfer, Cromwell and Kolb (2004) identified that peers, supervisors, and organizational levels of support were most inherent to a transfer climate through positive relationships to training transfer.

Support. As Cromwell and Kolb (2004) found, support for training can stem from three sources: the organization (e.g., top management), supervisors and peers. These environmental and situational variables have been found to explain a significant portion of trainee's motivation to use the trained skills (D.L. Seyler, Holton, Bates, Burnett, & Carvalho, 1998), thus enhancing potential for transfer to occur. While prior work sheds light into how support variables may enhance transfer, their effectiveness for promoting training transfer is relatively unknown. Workplace support has demonstrated strong predictive relationships from previous meta-analyses on training transfer by Huang et al. (2015) and Blume et al. (2010), yet more work is necessary to determine the types of support that matter most in transferring learning to the work environment (Putter, 2014). For instance, supervisory support has been noted to play a critical role in the training transfer process (R. O. Brinkerhoff & Montesino, 1995; Broad & Newstrom, 1992; L.A. Burke & Baldwin, 1999; Clarke, 2002; E. Salas, Almeida, et al., 2009; E. Salas et al., 2012), yet its effectiveness is mixed in the literature. In fact some studies demonstrate strong positive effects of supervisory support (J. Brinkerhoff, 2006; R. O. Brinkerhoff & Montesino, 1995; Broad & Newstrom, 1992; Cromwell & Kolb, 2004; Tracey et al., 1995), meanwhile others find weak or negative relationships among variables of support and training transfer (e.g.,

Axtell, Maitlis, & Yearta, 1997; Facteau, Dobbins, Russell, Ladd, & Kudisch, 1995; Nijman, Nijhof, Wognum, & Veldkamp, 2006; Van der Klink, Gielen, & Nauta, 2001).

Social identity theory could aid in explaining how transfer climate variables, particularly forms of social support including organizational, peer and supervisory support, may facilitate enhanced transfer of training. Social identification occurs when individuals gain meaning and personal definition through identification with a particular group (Tolman, 1943). When individuals form a social identity with a work group, they personally experience the failure, success (Foote, 1951), or anticipation of failure and success (Gammons, 1986) of the collective group. Social identification can occur within organizations and manifest in organizational identification and subsequent organizational commitment (Ashforth & Mael, 1989; Wiener, 1982). Thereby, when trainees perceive organizational, supervisory and peer support for use of the trained skills as present in the work environment, they are more likely to transfer KSAs acquired during training.

Opportunities to perform. Trainee's perceptions about the likelihood of feedback from peers and supervisors has been shown to play an important mediating role (R. O. Brinkerhoff & Montesino, 1995; I.L. Goldstein, 1993; Lim & Johnson, 2002; Rouiller & Goldstein, 1993; Tracey et al., 1995) in using training on-the-job. Opportunities to perform, or practice use of the trained skills has been defined as "the extent to which a trainee is provided with or actively obtains work experiences relevant to the tasks for which he or she was trained" (Ford, Quiñones, & Sego, 1992, p. 512). Broad and Newstrom (1992) identified what trainees perceived to be most important in the transfer of training process. Among these, supportive interventions, actions and a supportive culture were the most critical factors for consideration. Specifically, they identified deficient reinforcement of use of KSAs on the job, barriers arising in the immediate

work environment (e.g., supervisor sanctions) to use the trained KSAs, a non-supportive organizational culture to be among the top contributors to failing to transfer training to the work environment. Additionally, a review by Berk (2008) found that 52% of trainees reported not having relevant opportunities to apply and use training on the job leading to a decline in use of the trained skills. Minimizing time spent from training to the application of skills on the job, modifying employees' workload to provide time to practice and use the trained skills.

Provision of opportunity to perform skills may be critical to skill retention and setting the expectation for using training (Lim & Johnson, 2002). Lim and Johnson (2002) further conclude that the trainees' opportunity to apply what they have learned to their jobs is a key factor for transferring learning - a sentiment that has been shared among trainees (Broad & Newstrom, 1992; Gilpin-Jackson & Bushe, 2007). The opportunity to practice the trained KSAs within the job context creates an action-based approach that action control theory suggests would be critical to learning and retaining learning (Cannon-Bowers et al., 1991; Kuhl, 1992; Nijman et al., 2006; Revans, 1982). Based on key features identified in overlearning, continued opportunities to practice trained content are likely to lead to greater training transfer (Driskell, Willis, & Copper, 1992).

Thereby, I hypothesize the following:

Hypothesis 1: Characteristics of the work environment, (a) organizational support, (b) supervisory support, (c) peer support, and (d) opportunities to perform, will positively relate to training transfer (i.e., proximal, maintained, distal, and sustained use of skills).

Support for training sustainment. Best practices of training indicate that training initiatives should align with the organization's priorities and goals (I.L. Goldstein, 1991; I.L.

Goldstein, 1993; I.L. Goldstein & Ford, 2002). However, early literature on sustainment of teamwork indicates that prolonged maintenance of trained behaviors (i.e., sustainment of training) boils down to ensuring that training is incorporated within the organizational culture. A framework and transfer conceptualization by Kozlowski and Salas (1997) provides a means of understanding how sustainment may occur. Specifically, this framework highlights multi-level processes and mechanisms by which training can be transferred vertically from an individual level to an organizational level such that training is embedded within organizational norms and organizations learn. Fostering a supportive culture for training initiatives to be maintained may prolong use of training (Rouiller & Goldstein, 1993; Tracey et al., 1995); thereby, if training is critical to organization's goals, it is logical that organizational culture change may be necessary. In this same vein, Kotter (1995) recommends guidelines on how to initiate and ultimately maintain organizational change initiatives. Specifically, Kotter (1995) advocates that organizations which seek to initiate and maintain change have to think long-term by: "(1) establishing a sense of urgency, (2) forming a guiding coalition, (3) creating a vision, (4) communicating the vision, (5) empowering others to act on the vision, (6) planning for and creating short-term wins, (7) consolidating improvements and producing still more change, and (8) institutionalizing new approaches" (p.61). These actions have been utilized to focus on managerial actions to guide organizational change strategies (Fernandez & Rainey, 2006) or have been mimicked throughout the literature through similar strategies for organizational change (Conner, 2000; Galpin, 1996).

As these guidelines are targeted toward actions which should be taken at an organizational/top management level directive, I hypothesize the following in regards to specific work environment predictor and the type of transfer it will incur:

Hypothesis 2: Organizational support relates more positively to sustained training transfer (i.e., sustainment) than (a) motivation to transfer, (b) supervisory support, (c) peer support, and (d) opportunities to perform.

Trainee characteristics. Trainee characteristics encompass the traits, attributes, affects, and individual differences possessed by the trainee which influence their ability to transfer trained KSAs o the work environment (Baldwin & Ford, 1988). While few instances of individual differences exist within the original Baldwin and Ford (1988) transfer of training framework, updates to the sentinel review have expanded understanding of trainee characteristics and their role in training transfer. For instance, Ford and Weissbein (1997) identify several other individual trainee factors to consider for transfer of training as reported in the literature and as such, the literature identifying various trainee characteristics has proliferated (e.g., Machin, 2002; Machin & Fogarty, 2004). As such, Grossman and Salas (2011) identified trainee characteristics which demonstrate significant and consistent relationships with training transfer including cognitive ability, perceived utility of training and self-efficacy. Huang and colleagues (2015) quantify the role of stable trainee characteristics, including cognitive ability and conscientiousness, in their role in training transfer.

Various trainee characteristics exhibit relationships with training transfer. Despite trainee characteristics' roles in the transfer of training process, oftentimes, organizations implement training that is relevant to the entire organization or may not have time or resources to select trainees based on cognitive ability or personality characteristics (Lionetti, 2012). Training motivation, however, has been shown to be directly influenced by interventions implemented by the organization such as pre-training experiences (Cannon-Bowers & Salas, 1998; Smith-Jentsch,

Cannon-Bowers, Tannenbaum, & Salas, 2008; Vroom, 1964), characteristics of the work environment (Grohmann et al., 2014) and training design factors (Grohmann et al., 2014; Dian L. Seyler, Holton Iii, Bates, Burnett, & Carvalho, 1998). Motivation is noted for being involved in multiple phases of the training transfer process (Scaduto, Lindsay, & Chiaburu, 2008), including motivation's explaining a significant portion of the variance of learning that occurs during training (Colquitt et al., 2000) as well as subsequent, or post-training motivation, to enhance transfer (Grohmann et al., 2014; Huang et al., 2015).

Motivation to transfer (i.e., the "trainee 's desire to use the knowledge and skills" learned in training on the job; Noe, 1986, p. 503), however, has exhibited stronger predictive value than motivation to learn (Chiaburu & Lindsay, 2008). Previous work on motivation to transfer highlights its potential for enhancing transfer, as well as several mechanisms by which trainees can be motivated to use the trained skills (E. F. Holton, 1996; Huang et al., 2015). Fortunately, support mechanisms for transfer provide reinforcement for training; if and when reinforcement is applied regularly, trainees may be more likely to be motivated (Skinner, 1953). Thereby, factors of work environment support may predict motivation to transfer. Further, when training is believed to relate to greater performance and payoff in the career setting, trainees are also more likely to experience motivation to apply the trained skills (C. S. Clark, Dobbins, & Ladd, 1993; Dobbins, DeCorby, & Twiddy, 2004). Taken together, incentives and reinforcement, particularly when scheduled and targeting trainee needs, are likely to enhance training transfer by first motivating trainees to transfer their skills. For example, trainees who perceive that training will aid them advance in their jobs through a reward system which supports training may be more motivated than trainees returning to a transfer environment with no comparable reward system.

Thereby, I hypothesize the following:

Hypothesis 3: Motivation to transfer partially mediates the relationship between four characteristics of the work environment (i.e., organizational support, supervisor support, peer support, and opportunities to perform) and training transfer (i.e., proximal, maintained, distal and sustained use of skills).

Timing of training transfer input. Organizations receive the behaviors that they measure and reinforce (Rouiller & Goldstein, 1993). This fact highlights the need to clarify characteristics of evaluation which enable robust examination of training transfer. Specifically, ensuring effective evaluation ensures accuracy of transfer findings and promote continued use of training on the job (Baldwin & Ford, 1988; Blume et al., 2010). Timing of evaluation is more typically conceptualized as timing of the transfer evaluation such that transfer of training occurs over time. More specifically, evaluation investigations examine transfer over time as time between training and evaluation of transfer or the source of measurement (Blume et al., 2010; Huang et al., 2015).

Broad and Newstrom (1992) developed a framework for practitioners to transfer training. Their framework identifies the timing of interventions in relation to training to specify which interventions are most important to implement and when they should be implemented. Specifically, they conceptualize interventions as pre-training, during training, or after training has been delivered to trainees and focus on the roles of the trainee, trainer, and supervisor. In the transfer of training matrix proposed by Broad and Newstrom (1992), supervisor support is critical both before and after training; however, their matrix of training transfer stipulates that supervisory support is most salient to improving transfer after training has occurred. The role of trainees and their characteristics are presented as most important during the training process. As training design variables are limited in the context in which they can be evaluated (i.e., before or

during training), features of training and practice in training are not examined in subsequent hypotheses.

Therefore, I hypothesize:

Hypothesis 4. Characteristics of the work environment and motivation to transfer relate most positively to training transfer (i.e., proximal, maintained, distal and sustained use of skills) when provided or assessed after training occurs.

Transfer task type. Research in human performance illustrates the various effects that task types can have on performance. For instance, McCormick (1976) listed other types of tasks that, based on their features, show a sharp decrement in performance. One of these characteristics is tasks that are conducted in the midst of noise. The types of these task span complex mental tasks, speed tasks, tasks that demand complex use of psychomotor skills, and tasks that impose high demand on perception. Further, a study by Hawel (1975) supports that the distinction between complex/simple tasks is meaningful such performance on a complex task deteriorated while that on a simple task remained the same.

One index of tasks that has received attention in the training transfer literature is the similarity of tasks in the transfer environment to the learning environment. Near and far transfer refer to the transfer of learning to similar or different contexts, including the similarity of the features of the work environment and the type of task on which learned skills are applied. These conceptualizations of transfer stem from the idea that learning is easier to apply in similar circumstances, such as location (Craik & Lockhart, 1972; Craik & Tulving, 1975) or appearance of the environments (Hays & Singer, 1989; Thorndike & Woodworth, 1901). Near transfer refers to application of skills from training applied within similar context including similar

environment and similar task whereas far transfer extends the application of training to contexts which differ from the training task and environment. Extending these principles of similarity to transfer tasks, analogical and adaptive transfer distinguish whether the transfer task was analogical (i.e., situations where the type of tasks in which trainees engage is similar structurally to the tasks covered in training) or adaptive (i.e., application of trained skills to a novel task that is structurally dissimilar from those covered in training). Keith and Frese (2008) found that training transfer differed whether the task was analogical versus adaptive in that the transfer types stem from different antecedents in training design features (i.e., training features that promoted deeper critical thinking of skills to be acquired produced better adaptive transfer). Through a series of studies (Brown, 1989; Brown & Kane, 1988; Brown, Kane, & Echols, 1986) analogical and adaptive transfer have been distinguished, showing that it requires deeper levels of processing to achieve adaptive learning transfer thereby making adaptive transfer more difficult to achieve.

Antecedents of near and far transfer stipulate that high cognitive ability is necessary to obtain far transfer (i.e., to apply skills to tasks that are outside of the scope that was covered during training; Barnett & Ceci, 2002). Similarly, the literature on adaptive transfer is clear; concepts regarding how to apply the trained skills such that learning needs to be deeper and targeted toward concepts rather than route use of skills. To apply the trained skills in a dissimilar or adaptive task, trainees need to be familiar and have a deep level understanding of the skills which were disseminate during training (Brown, 1989; Keith & Frese, 2008).

Peer support that is provided within a positive transfer climate supports the use of training in various ways. For instance, peer support has been conceptualized as expression of beliefs, use of training and discussion of how to best apply training (Bates, Holton, & Hatala,

2012; E. F. Holton et al., 1997). Discussion of how to best apply training can be done via informal discussions as well as through more formalized feedback (Bates et al., 2012). Discussion of how to best apply the trained skills including through use of feedback which effectively develop accurate mental models (Kluger & DeNisi, 1996; Kluger & DeNisi, 1998) to promote subsequent enhanced performance and use (Goodman & Wood, 2004; Tannenbaum & Cerasoli, 2013). Supervisors may also support training through provision of feedback on trained behaviors (Cromwell & Kolb, 2004). However, when power distance is present through formal positions (e.g., supervisor), feedback and discussion may not be as effective. Specifically, peer support may provide a more psychologically safe and less anxiety provoking means by which discussion of skills can promote deeper learning.

Taken together, I hypothesize:

Hypothesis 5: Peer support relates more positively to training transfer (i.e., proximal, maintained, distal and sustained use of skills) when the task type is adaptive than (a) motivation to transfer, (b) organizational support, (c) supervisory support, and (d) opportunities to perform.

Industry type. Features of the organizational context may impact training's use on-the-job. To illustrate this point, Birdi, Patterson, and Wood (2007) stipulate that non-profit organizations and organizations with highly engaged employees may have more engagement within training initiatives. Best practices of training transfer demonstrate transfer is different based on organizational characteristics, such as organization or firm size (Broad, 2005b). Moreover, research on training transfer conducted within healthcare settings reveals that many typically effective transfer strategies, such as feedback and coaching on-the-job, are not effective due to the prevailing influence of the industry's culture (Schwellnus & Carnahan, 2014). Furthermore,

while Baldwin and Ford (1988) encourage inclusion of various industries and disciplines in examining training transfer, little is known as to how transfer may differ across industries.

Further, criticisms of meta-analysis argue that effect sizes may not reflect the same type of sample, potentially confounding results (Becker, 2015). In fact, several meta-analyses have explored differences in practice and effects across industry by examining industry as a moderator of meta-analytic estimates (e.g., Seibert, Wang, & Courtright, 2011; Van Iddekinge, Roth, Putka, & Lanivich, 2011). Therefore, given the cross-disciplinary nature of training and training transfer and potential theoretical and practical constraints, it is important to explore how training transfer practices may differ across industries, culminating in the following research question:

Research question 1. Does training transfer vary by industry?

Relative importance of training transfer inputs. While this study highlights the importance of both trainee characteristics as well as several features of the work environment, organizations need guidance on where to invest to maximize training transfer (Lionetti, 2012). Examinations of training transfer within a multiple regression analysis have revealed that a positive transfer climate contributes above and beyond the impact of training variables on training transfer (Nijman et al., 2006), which is further supported by empirical work which has sought to understand the role of transfer climate (E. Holton, Baldwin, & Holton, 2003; D.L. Seyler et al., 1998; Tracey et al., 1995). Fostering a climate supportive of use of the trained skills to adopt training may be of critical importance. In fact, work done by Kotter (1995) on organizational change initiatives highlights the importance of the role of supervisors in reinforcing and managing organizational change initiatives being implemented; otherwise, change initiatives will fail. In fact, studies which examine both peer and supervisory support

show differing effects between the two types of support such that supervisory support shows higher effect sizes than that of organizational (Blume et al., 2010) and peer support (Nijman et al., 2006).

The importance of supervisory support may stem from the science of teamwork and functions of leadership. Marks, Mathieu, and Zaccaro (2001) advanced a temporal framework to understand the role of teams and team process in various phases of team's functioning. Specifically, their framework focuses on team processes relevant to action (i.e., when the team is enacting a plan or actively working toward achieving shared goals) and transition phases (i.e., when teams formulate a mission, strategy and contingency plan to accomplish a shared goal) of a team and interpersonal processes. Morgeson, DeRue, and Karam (2009) identified critical leadership behaviors salient to each phase of team functioning. Specifically, they found that establishing social climate (e.g., psychological safety) is an essential leadership function which enables the team to act effectively. The importance of action and transition phases to team performance has been further clarified in subsequent meta-analysis. Findings reveal that team processes within the action phases of teamwork (e.g., establishing social climate) demonstrate the highest loadings to team performance (LePine, Piccolo, Jackson, Mathieu, & Saul, 2008). As organizations increasingly rely upon teams in work settings to accomplish shared goals (E. Salas, Rosen, Burke, & Goodwin, 2009), leaders may play a critical role in establishing transfer climate within teams of subordinates, which may optimize transfer of trained skills.

Hypothesis 6: Supervisory support exhibits increment validity over predictors of organizational support, peer support, and opportunities to use training in predicting training transfer (i.e., proximal, maintained, distal and sustained use of skills).

CHAPTER THREE: METHODOLOGY

In order to test hypotheses and answer the proposed questions on what matters for training transfer, a meta-analysis was conducted to further examine the relationships between four characteristics of work environment support, motivation to transfer, and types of training transfer as they differ by time (i.e., proximal, maintained, distal, sustained). Specifically, this meta-analysis investigates support variables identified in previous qualitative reviews to quantify the impact of organizational, supervisory, and peer support along with opportunities to use the training and motivation to transfer the acquired skills.

Literature Search

To identify salient literature on training transfer, this study leveraged a multi-pronged search. First, I identified relevant literature based on extant reviews of the empirical literature (e.g., Baldwin & Ford, 1988; Blume, Ford, Baldwin & Huang, 2010; Burke & Hutchins, 2007; 2008; Burke, Hutchins & Saks, 2013; Grossman & Salas, 2011). Next, databases and journals were searched to specifically replicate the search method reported in Blume et al. (2010) and Huang et al. (2015). More specifically, this search entails searching for the following terms in PsycINFO, ERIC and ProQuest dissertations and theses global databases for the following terms: transfer of training, training transfer, training effectiveness, and learning transfer from 1988 until now. Baldwin and Ford (1988) call for more holistic integrations of the training transfer literature (i.e., examining transfer in diverse disciplines and industries). Therefore, further attempts were made to locate and include inter and cross-disciplinary work on training transfer. Specifically, efforts to include more diverse publication outlets involved performing a manual search in several salient journals including: Academy of Management, Human Factors and

Ergonomics Journals and Proceedings papers, International Journal of Training and Development, and Human Resource Development. Additionally, authors of primary studies were contacted in the event that their published or unpublished materials lack the necessary statistical information necessary to compute a between person Pearson's *r* and to request unpublished manuscripts. Although it is typically sufficient to include studies which repot an outcome of interest, it is also acceptable to conduct additional searches for intercorrelations necessary to test a model-based meta-analysis (Huang et al., 2015; Hughes et al., under review). Thus, additional searches were conducted in Google Scholar and Wiley Web of Science using the terms "training transfer", "training effectiveness" and "support and training transfer" and "support and motivation", respectively. This added 1,231 articles in the search. In sum, the approach to gathering primary studies is presented below in Table 1.

Table 1

Journals and other databases nested within the search engines

Database	Journal name(s)	Search terms	# hits
PsycINFO		Training transfer	3,885
		Transfer of training	3,877
		Training effectiveness	11,500
		Learning transfer	5,342
ERIC		Training transfer	1,730
		Transfer of training	1,730
		Training effectiveness	4,910
		Learning transfer	4,713
ProQuest dissertations and theses global		Training transfer	3,015
		Transfer of training	3,014
		Training effectiveness	9,055
		Learning transfer	3,992
HFES databases	Human Factors Ergonomics in Design Journal of Cognitive Engineering & Decision Making HFES Proceedings	Training transfer	10
		Transfer of training	44
		Training effectiveness	40
		Learning transfer	1
	Academy of Management	Training transfer	33
		Transfer of training	33
		Training effectiveness	147
		Learning transfer	137
	International Journal of Training and Development	Training transfer	222
		Transfer of training	222
		Training effectiveness	227
		Learning transfer	215
	Human Resource Management	Training transfer	252
		Transfer of training	252
		Training effectiveness	352
		Learning transfer	226

Inclusion Criteria

The initial search yielded 55,496 unique articles. 54,313 articles were removed from the pool of potentially relevant articles because they did not empirically examine training transfer.

Further, abstracts were screened for inclusion of a predictor variable and use of empirical quantitative methods, resulting in 487 articles remained to be reviewed for the following inclusion criteria. To be included in the study, articles must meet the following criteria: (a) written in English, (b) report an examination of organizational support, supervisory support, peer support, opportunities to apply or use training to motivation to transfer or an examination of organizational support, peer support, opportunities to apply or use training, motivation to transfer training to transfer of training, (c) contain a healthy human adult sample, and (d) contain statistics amenable to calculating a Pearson's R between one or more predictor variables to training transfer or motivation to transfer and sample size[1].

Coding Procedure

Two authors independently coded 33 of the 63 primary studies included in the meta-analysis. The author of this dissertation coded 100% of codeable articles, while 50% of articles were divided and coded by one of two double coders, each of whom is enrolled in an Industrial-Organizational Psychology doctoral program and trained in meta-analysis. Interrater agreement on the subset of articles was high at 89% and discrepancies were resolved via discussion. Studies were coded for sample size, effect size, work environment factor, training transfer type, motivation to transfer, reliability of the predictor and criterion variables, timing of the predictor variable assessment, type of transfer task, and industry type.

Predictor coding. In coding, organizational support for training was characterized by assistance which the organization provides resources, both tangible and intangible, to support

[1] Studies were not excluded for using a post-only design which risks inflation in effect sizes of post-only studies. Results of a subgroup moderator analysis revealed no significant differences in the relationships between predictors and transfer with the exception of motivation to transfer (see Appendix A).

training initiatives (e.g., policy and procedural changes, sending messages of relevance regarding training; Tracey & Tews, 2005). Supervisory support was conceptualized as the extent to which trainee's managers and supervisors encourage application of learning on-the-job (e.g., expressed beliefs in the training, feedback provided to trainees regarding training, goal setting for use of the trained skills). Meanwhile, peer support was defined by the reinforcement provided by trainee's peers for trainee application of learning to the job which stems from peers or fellow employees within a similar position in the organization (e.g., trainees discuss use of training on the job, trainees reinforce one another to use the skills, trainees use the skills). Further, opportunities to perform were identified when they matched Ford et al. (1992)'s definition which is "the extent to which a trainee is provided the opportunity or actively obtains work experiences that are relevant to tasks for which s/he was trained" (p. 512). And finally, motivation to transfer was coded as both a predictor of training transfer as well as an outcome of levels of support for transfer. Motivation to transfer was defined to be consistent with Noe's (1986) definition in that it reflects the "trainee's desire to use the knowledge and skills" learned in training on-the-job (p. 503) through the strength, valence (i.e., positive or negative), and persistence of the desire.

Transfer types. The outcome of training transfer was coded more specifically to capture training transfer as it differs over time. The role of time in training effectiveness and training transfer highlights the role of time in a decline in the use of trained skills starting in as few as two months (Saks, 2002; Saks & Belcourt, 2006) to a year (Arthur et al., 1997) to seven years (Siassakos et al., 2011). Use of the trained skills declines with time in that transfer of training does not occur naturally. Outcomes were coded in accordance to time points outlined by Arthur et al. (1997) in accordance to when results show the sharpest changes. Specifically, proximal transfer was coded if transfer was evaluated between zero and ninety days (i.e., 3 months) after

training, maintained transfer was coded when transfer was evaluated between 90 days and transfer was considered distal when it was evaluated between180 days and a year and beyond. Sustained transfer is referred to as the long-term retention of key skills above and beyond the maintenance of skills defined by Baldwin and Ford (1988); the coding for the index of transfer is as follows:

- **Proximal transfer**- The criterion tasks (i.e., tasks performed in the transfer environment) were assessed between 1 and 89 (i.e., <90) days after training.
- **Maintained transfer**- The criterion tasks (i.e., tasks performed in the transfer environment) were assessed between 90 and 179 (i.e., <180) days after training.
- **Distal transfer**- The criterion tasks (i.e., tasks performed in the transfer environment) were evaluated between180 days and 365 days (i.e., 1 year) after training.
- **Sustainment**- The criterion tasks (i.e., tasks performed in the transfer environment) were evaluated more than 365 days (i.e., 1 year) after training.

Studies were coded for the effect sizes effect size between each predictor and outcome (i.e., transfer of training), correlations between each predictor (e.g., motivation to transfer and organizational support) and correlations between outcomes (i.e., transfer of training). Moreover, the timing of the predictor evaluation in relation to training (i.e., before, during, or after) and industry type (e.g., healthcare, financial services) will be coded to test their moderating effects on the training input antecedents and learning and training transfer relationships (see table 2 and Appendix B for codebook materials). More specifically, studies will be coded for a between persons Pearson *r* and converted from usable statistics when r is unavailable using an effect size converter (DeFife, 2009). Codesheet information recorded number and identification of independent samples, year of publication, publication type, sample type, study characteristics (industry in which the study was conducted [healthcare, military, students, financial/business, or

other] and study design [independent groups, pre-post, repeated measures not pre-post, post-only]). Appendix C contains coding for primary studies and references for primary studies are listed in the reference section denoted with an asterisk.

Table 2

Coding scheme for transfer of training meta-analysis

Factor in model	Construct name	Operational definition	Citations
Trainee Characteristics	Motivation to transfer	Training motivation that encompasses the "trainee's desire to use the knowledge and skills" on the job. Specifically, motivation to transfer taps into commitment to apply training and can sometimes be evaluated as an item in trainee reactions to training.	Colquitt et al. (2000); Noe (1986, p. 503)
Work characteristics	Transfer climate	Transfer climate is defined as "the practices and procedures (e.g., rewards, policies, managerial behaviors) used in an organization that signal to people that transferring KSAs from training is important to develop a shared pattern of meaning; specifically, situations and consequences that either inhibit or help to facilitate the transfer of what has been learned in training into the job situation"	E. F. I. I. I. Holton et al. (1997); Rouiller and Goldstein (1993, p. 379); Tracey et al. (1995); Tracey and Tews (2005)
	Organizational support	This form of support represents changes that are made or introduced to policies, procedures, or practices that reinforce the use of training. This level of support can include development of a reward system or provision of resources to help support use of training. Organizational support or perceived organizational support is characterized by help from the organization used to support training initiatives. Some examples of organizational support include provision of resources (e.g., money, physical resources, space for teaching or practice of skills, transportation to/from training),	Axtell et al., 1997; Gergenfurtner, Veermans, Festner, and Gruber (2009)

Factor in model	Construct name	Operational definition	Citations
		support from top management for training initiatives, changes in policies and procedures, and sending positive messages regarding training attendance or use.	
	Supervisory support	The degree to which managers and supervisors encourage innovative application of skills, and skill acquisition on-the-job and/or recognize employees for using training well which supports continued use of learning. Supervisory support can come in many forms and includes: feedback on the trained skills, support or perceived support for training, belief that the training is helpful, and goal setting.	Bates, Holton, and Seyler (1997); Cromwell and Kolb (2004)
	Peer support	Peers reinforce use of the learning on-the-job (Holton, Bates, Seyler & Carvalho, 1997). Peer reinforcement or support of training include beliefs that training is useful, verbalized support for use of training, discussing how to best use the trained skills, and provide encouragement for using training.	Cromwell and Kolb (2004); E. F. Holton et al. (1997)
	Opportunities to perform	Trainees were provided with the opportunity to use the trained skills on the job; "The extent to which a trainee is provided with or actively obtains work experiences relevant to the tasks for which he or she was trained"	Ford et al. (1992, p. 512); Quiñones, Ford, Sego, and Smith (1995)
Timing of predictor evaluation	Before, during or after training	Predictors of training transfer, that is training inputs, can be implemented prior to the training intervention, during the training intervention, or after the training intervention.	Baldwin (1992); Broad and Newstrom (1992)
Transfer task type	Analogical	The criterion tasks (i.e., tasks performed in the transfer environment) were similar to or the same as the tasks that trainees had completed in the training environment.	Ivancic IV and Hesketh (2000); Keith and Frese (2008)
	Adaptive	The criterion tasks (i.e., tasks performed in the transfer environment) were structurally different to the tasks that trainees had completed in the training environment.	Ivancic IV and Hesketh (2000); Keith and Frese (2008)

Factor in model	Construct name	Operational definition	Citations
Industry Type	Healthcare, military, student, financial or other	Type of industry is characterized as healthcare, military, student, financial, or other.	Becker (2015)
Training transfer		Applying the skills within a transfer environment can include the work environment, a simulator, or a separate task issued post-training that requires use of skills. For the purposes of this study, transfer starts as early as one day post-training and can continue to be evaluated at any point post-training.	Baldwin and Ford (1988); Blume et al. (2010, p. 1067); L.A. Burke and Hutchins (2007); Huang et al. (2015)
	Proximal	The criterion tasks (i.e., tasks performed in the transfer environment) were assessed between 1 and 89 (i.e., <90) days after training.	Arthur et al. (1997)
	Maintained	The criterion tasks (i.e., tasks performed in the transfer environment) were assessed between 90 and 179 (i.e., <180) days after training.	Arthur et al. (1997)
	Distal	The criterion tasks (i.e., tasks performed in the transfer environment) were evaluated between180 days and 365 days (i.e., 1 year) after training.	Arthur et al. (1997)
	Sustained	The criterion tasks (i.e., tasks performed in the transfer environment) were evaluated more than 365 days (i.e., 1 year) after training.	Arthur et al. (1997)

Statistical Analysis

Analysis of primary studies. To analyze the relationship between predictors and outcomes in primary studies, a random-effects Hunter and Schmidt (2004) approach to meta-analysis was used. Data is analyzed using a random effects approach as it assumes that a normal distribution underlies each dataset but that the true effect size may vary from study to study (Hedges & Olkin, 1985; Schulze, 2004), an approach which is consistent with previous meta-

analyses on training transfer (Blume et al., 2010; Huang et al., 2015). Further, random effects meta- analysis allows for standard deviations (SD) of the "true" effect size to be greater than zero, thereby providing more accurate description of across study variance. Similarly, effect sizes weights are calculated by the inverse of the sampling variance. When multiple effect sizes appeared within a single independent sample, linear composites were created to reduce bias (Geysenks, 2009). When intercorrelations among predictors or dependent variables were not reported for a given study, an average was taken to create a single effect size representative of that study (Nunnally, 1978). When a composite or average was calculated, the new reliability of the combined measures was estimated by inputting the number of items and reliabilities into the Spearman-Brown prophecy formula. When reliabilities of a given measure were not provided, the mean reliability was imputed as the artifact distribution. Mean reliabilities were calculated for each outcome so as to provide more accurate estimates of corrected reliabilities and are as follows: supervisory support (α= 0.92), peer support (α= 0.90), opportunities to perform (α=0.87), and training transfer (α=0.92).

Publication bias was assessed using random effects trim and fill procedure (Duvall & Tweedie, 2000) via Comprehensive Meta-Analysis (version 3). This was done to ensure that the file drawer effect did not inflate meta-analysis results. In conducting publication bias assessment inputting published studies, slight bias was found, showing three studies that positively deviated from the mean. Fortunately, approximately half of the studies (n= 23) included within this meta-analysis are unpublished studies and critical fail safe N estimates indicate that 38 unpublished studies with differing results would need to be added to transform significant results into nonsignificant results, indicating no significant file drawer effect (z= 29.01, p<.01). To examine

any differences between published and unpublished studies, publication status was examined using moderator analysis and is presented in Table 3

Table 3

Publication status and predictors of transfer

Predictor	*k*	N	$\bar{r}$	P	SD_ρ	% Variance	95 % CI		80% CV		*Q*
							Lower CI	Upper CI	Lower CI	Upper CI	
Trainee Characteristics											
Motivation											
Published	17	3,077	0.43	0.50	0.21	10.50	0.34	0.52	0.24	0.76	144.67**
Unpublished	14	3,042	0.35	0.48	0.21	12.31	0.31	0.56	0.29	0.83	192.84**
Work Environment											
Organizational support											
Published	8	1,619	0.35	0.42	0.20	13.35	0.27	0.27	0.04	0.55	62.40**
Unpublished	3	291	0.35	0.48	0.49	5.47	-0.08	0.79	-0.16	1.11	48.91**
Supervisory support											
Published	20	2,663	0.34	0.42	0.19	17.91	0.12	0.37	0.04	0.55	78.64**
Unpublished	9	1,419	0.44	0.56	0.21	12.31	0.31	0.56	0.30	0.83	39.39**
Peer support											
Published	9	1,543	0.34	0.40	0.15	22.63	0.25	0.43	0.21	0.60	81.01**
Unpublished	7	863	0.28	0.37	0.18	25.41	0.16	0.40	0.14	0.61	23.52**
Opportunities to perform											
Published	1	68	0.03	0.04	0	-	0.03	0.03	0.04	0.04	0
Unpublished	4	281	0.18	0.23	0	100	0.08	0.28	0.23	0.23	2.86

Note. *p<.05, **p<.01

Both 95% confidence intervals and 80% credibility intervals are calculated to inform significance of results. Significance of meta-analytic estimates are determined to be significant (i.e., p>.05) if the 95% confidence interval does not include zero (Whitener, 1990); however, 80% credibility intervals can inform whether a result is different from the population. Results are further tested for homogeneity of variance using Q-tests which are evaluated using *k*-1 degrees of

freedom on a chi-square distribution. While proportion of the variance is provided in subsequent tables of results, it is an indicator of meta-analysis results that is less accurate and reliable than an effect size estimate; namely, it is a statistic that is affected when power for a meta-analysis is low. (Schmidt & Hunter, 2014). Readers are urged to interpret the percent or proportion of variance accounted for (PVA) with caution, particularly when derived from few primary studies as this can inflate PVA.

Regression. The secondary and tertiary goals of this dissertation are to test transfer motivation as a mediator and to identify the relative significance of each predictor in the practitioner-oriented model for training transfer. In order to perform these hypothesis tests, we used the harmonic mean of N and meta-matrix of correlations (see table 4) to run meta-regression (Viswesvaran & Ones, 1995). Meta-regression tests the model (i.e., interrelated set of postulated relationships; Becker & Schram, 1994) and accounts for the relationship of each predictor to the outcome as well as the relationships between predictors (that is, their intercorrelations); thereby, this technique reduces the potential type II error through identifying partial effects (Goldhaber & Brewer, 1999). Once regression weights are obtained for each study's predictor, mediation tests and relative importance indices are calculated. Significance of a mediating effect is signified when a 95% Monte Carlo confidence interval (Preacher & Selig, 2012) calculated for the mediating effect does not cross zero. Dissimilarly, relative importance analysis approaches indicate the extent to which each predictor contributes to R^2 (Tonindandel & LeBreton, 2011). Relative importance analyses are important both for better understanding the model as well as furthering an understanding the practical importance of each predictor, even in the presence of multicollinearity (see Tonindandel & LeBreton, 2011 for a full review).

Table 4

Intercorrelations among predictors and outcomes

	Motivation	Organizational support	Supervisory support	Peer support	Opportunities to perform	Transfer
Motivation	1.00					
k/N	-					
Organizational support	.52	1.00				
k/N	6/898	-				
Supervisory support	.34	.74	1.00			
k/N	16/2,803	6/1,936	-			
Peer support	.51	.64	.55	1.00		
k/N	10/1,925	5/1,679	16/3,749	-		
Opportunities to perform	.29	.21	.08	.46	1.00	
k/N	3/340	1/121	4/664	2/268	-	
Transfer	.45	.36	.46	.48	.19	1.00
k/N	31/6,119	12/2,877	30/5,049	17/3,373	5/349	-

For a summary of analyses proposed for hypothesis testing, see table 5.

Table 5

Analysis approach for hypothesis testing

Hypothesis	Hypothesis wording	Analysis strategy	Citations
Hypothesis 1	Characteristics of the work environment, (a) organizational support, (b) supervisory support, (c) peer support, and (d) opportunities to perform, positively relate to training transfer (i.e., proximal, maintained, distal, and sustained use of skills).	Correlational meta-analysis	Hunter & Schmidt (2004); Schmidt & Hunter (2014)

Hypothesis	Hypothesis wording	Analysis strategy	Citations
Hypothesis 2	Organizational support relates more positively to sustained training transfer (i.e., sustainment) than (a) motivation to transfer, (b) supervisory support, (c) peer support, and (d) opportunities to perform.	Correlational meta-analysis	Hunter & Schmidt (2004); Schmidt & Hunter (2014)
Hypothesis 3	Motivation to transfer partially mediates the relationship between characteristics of the work environment and training transfer (i.e., proximal, maintained, distal, and sustained use of skills).	Meta-regression; mediation analysis	Becker (2015); Preacher and Selig (2012)
Hypothesis 4	Characteristics of the work environment and motivation to transfer relate most positively to training transfer (i.e., proximal, maintained, distal, and sustained use of skills) when provided or assessed after training occurs.	Subgroup analysis	Hunter & Schmidt (2004); Schmidt & Hunter (2014)
Hypothesis 5	Peer support relates more positively to training transfer (i.e., proximal, maintained, distal, and sustained use of skills) when the task type is adaptive than (a) motivation to transfer, (b) organizational support, (c) supervisory support, and (d) opportunities to perform.	Subgroup analysis	Hunter & Schmidt (2004); Schmidt & Hunter (2014)
Research Question 1	Does training transfer vary by industry?	Subgroup analysis	Hunter & Schmidt (2004); Schmidt & Hunter (2014)
Hypothesis 6	Supervisory support exhibits increment validity over organizational support, peer support, motivation to transfer and opportunities to	Meta-regression; Relative weights	Tonidandel and LeBreton (2011)

Hypothesis	Hypothesis wording	Analysis strategy	Citations
	use training in predicting training transfer (i.e., proximal, maintained, distal, and sustained use of skills)		

CHAPTER FOUR: RESULTS

To answer relevant research questions and hypotheses, meta-analysis, moderator analysis (i.e., subgroup analysis), and regression were performed. All results report the sample weighted mean correlation ($\bar{r}$) as well as corrected values (ρ; corrected for unreliability) to represent the relationship between each predictor and outcome of training transfer. Results of the correlational meta-analysis of primary studies are first presented, followed by the resulting regression(s).

Meta-Analysis of Correlations

The first objective of this meta-analysis was to identify the extent to which support and motivational variables correlated with training transfer.

Hypothesis 1 stated that various components of a supportive work environment relate positively to training transfer. Results of these correlational tests show support for this hypothesis as organizational support (*k*= 11, ρ= 0.32, 95%CI[0.13, 0.40]), supervisory support (*k*= 29, ρ= 0.47, 95%CI[0.031, 0.45]), peer support (*k*= 17, ρ= 0.48, 95%CI[0.31, 0.47]), and opportunities to perform (*k*= 5, ρ= 0.19, 95%CI[0.06, 0.24]) all demonstrate correlations with training transfer which are significantly different from zero (i.e., confidence intervals do not contain zero). Further, while not formally hypothesized, motivation to transfer similarly exhibits a positive correlation to training transfer (*k*= 31, ρ= 0.45, 95%CI [0.30, 0.46]). It is important to note, however, that while supervisory support exhibits a stronger correlation with training transfer than other mechanisms of support hypothesized to predictor training transfer, 95% confidence intervals overlap with other predictors meaning that supervisory support is not significantly superior to other forms of support in determining training transfer (also, see table 6).

Table 6

Relationships between predictor variables and transfer

Predictor	*k*	N	$\bar{r}$	ρ	SD_ρ	% Variance	95 % CI		80% CV		*Q*
							Lower CI	Upper CI	Lower CI	Upper CI	
Trainee Characteristics											
Motivation	31	6,119	0.38	0.45	0.25	7.54	0.30	0.46	0.12	0.77	358.40**
Work Environment											
Organizational support	11	1,910	0.26	0.32	0.26	9.75	0.13	0.40	-0.19	0.66	104.03**
Supervisory support	29	4,082	0.38	0.47	0.20	15.07	0.31	0.45	0.21	0.31	124.44**
Peer support	17	3,373	0.39	0.48	0.19	22.92	0.31	0.47	0.24	0.72	97.53**
Opportunities to perform	5	349	0.15	0.17	0	1.22	0.06	0.24	0.10	0.24	4.08

Note. *p<.05, *p<.01

Similarly, Hypothesis 2 predicted that organizational support will most positively relate to sustained training transfer (i.e., sustainment). Findings illustrate that organizational support relates positively to the long-term sustainment of training transfer (*k*=5, ρ=0.39, 95%CI [0.10, 0.50]). Contrary to the hypothesis, supervisor support exhibits a stronger relationship with sustained training transfer (*k*=4, ρ=0.57, 95% CI [0.19, 0.69]) suggesting that support at the supervisory level could have a more direct impact on the long-term use of trained skills. However, it is important to note that confidence intervals overlap, suggesting that more than one form of support is similarly important to the transfer process. Support from peers and opportunities to perform also demonstrate modest correlation to training transfer. However, based on low *k,* the relationship between peer support and opportunities to perform with training transfer respectively should be interpreted with caution and warrant further research and to avoid direct interpretation of low *k* findings, results have been added in Appendix D. Results for sustained transfer are based on low *k* and should be interpreted with caution.

Regression

The next steps for hypothesis tests use multiple regression. Multiple regression analyses were performed using the matrix of meta-analytic estimates (see table 6; Cheung & Chan, 2005; Viswesvaran & Ones, 1995) and the harmonic mean of sample sizes (Viswesvaran & Ones, 1995). Results for beta weights and standardized residuals were used to estimate a 95% confidence interval for mediation analysis (Preacher & Selig, 2012) and to calculate relative importance indices. The meta-matrix used to produce regression is in table 4. Relative importance weights were calculated to obtain the percentage of R^2 accounted for in a single predictor. This adds clarification to the regression model in the presence of multicollinearity and

clarifies incremental validity findings for hypothesis 6 and is presented in table 8. Standardized estimates are used in mediation analyses as described below.

Table 7

Regression results and relative importance analyses

Predictor	Motivation to transfer		Transfer of training	
	Raw relative weights	% of R^2	Raw relative weights	% of R^2
Motivation to transfer	-		0.11	30.65%
Work Environment				
Organizational support	0.14	42.94%	0.04	9.79%
Supervisory support	0.04	12.16%	0.11	30.92%
Peer support	0.14	42.28%	0.11	29.96%

The third hypothesis stated that motivation to transfer will partially mediate the relationship between four factors of the work environment and training transfer. To test this hypothesis, the mediational models presented in Figure 2 were estimated using multiple regression and the indirect effect of motivation to transfer was tested using a 95% Monte Carlo simulation interval (Preacher & Selig, 2012). Motivation to transfer mediates two important relationships- organizational support (95%CI[0.10, 0.19]) and peer support (95%CI[0.06, 0.13]). Specifically, organizational support and peer supports' prediction of transfer is enhanced when trainees are motivated. Interestingly, the relationship between organizational support and training transfer is completely mediated by motivation to transfer as 95% confidence interval excluded zero. Similarly, peer support's relationship with training transfer is fully mediated by motivation to transfer as indicated by 95% confidence intervals which excluded zero. Interestingly,

motivation to transfer appears to detract from the relationship between supervisory support and training transfer as 95% confidence intervals excluded zero and span negative values in the upper and lower limits (95%CI[-0.08, -0.03]). Taken together, the third hypothesis received partial support; however, relationships differ based on predictor.

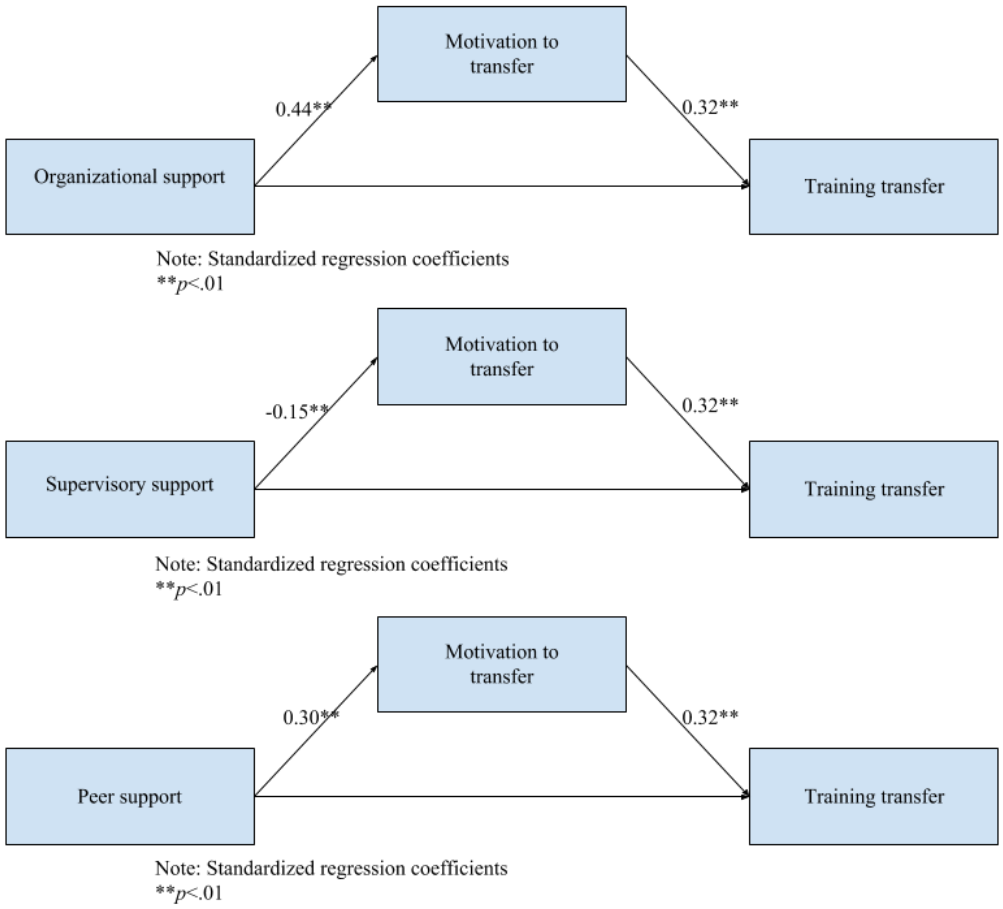

Figure 2. Mediation analyses

Hypothesis 4 predicted that antecedents of transfer assessed after completion of the training program would most strongly relate to training transfer scores. More specifically, four factors of the work environment and trainee's motivation to transfer that are assessed following training will demonstrate stronger and more positive relationships to training transfer than their counterparts assessed prior to or during the training session. While the majority of studies

evaluated predictors of training transfer after the training program had been administered, assessment of training transfer predictors at other time points (e.g., before or during training) were lacking (i.e., $k<5$), making any comparisons to the "after" training assessment groups unfair and insufficient for subgroup analysis within meta-regression. While this hypothesis was originally planned for testing using regression equations, insufficient *k* within the resulting meta-matrices were insufficient for analyses using meta-regression (i.e., $k<5$ in many relationships in the model); therefore, data is insufficient to test Hypothesis 4 and attempts to meta-analyze are presented in Appendix E.

Hypothesis 5 anticipated that peer support would relate more positively to training transfer when transfer tasks and assessments are adaptive than other predictors of training transfer. Unfortunately, due to the nature of the evaluation method and information reported within primary studies, no instances of adaptive transfer were reported in this meta-analysis. Thereby, hypothesis testing is limited due to unfair comparisons (i.e., $k<5$) in analogous transfer tasks. Further, results are reported purely to demonstrate that insufficient *k* is available to evaluate this hypothesis and insufficient to evaluate work environment's role in analogous transfer (i.e., $k<5$). Attempts that were made to test this hypothesis are included in Appendix F.

Research question 1 concerns the extent to which training transfer practices differ due to the industry of the sample used in primary studies. While training transfer studies occur within healthcare, military, student, and financial industries, the only category with sufficient *k* to meta-analyze and obtain interpretable findings is the "other" group. While the "other" group may show whether training transfer occurs across a variety of settings, primary articles that obtained this code include a mix of industries, including insurance agencies (10.5%), agriculture (5%), law enforcement (2.6%), hospitality (3.2%), and samples that used a variety of industries

(10.5%), to name a few. As such, there is insufficient *k* to compare these findings fairly to any other industry types and this research question cannot be tested. Attempts are included in Appendix G to document this thought process and attempt; the reader is strongly cautioned against interpretation of these analysis attempts.

Table 8

Relative importance indices of work support

Predictor	Motivation to transfer		Transfer of training	
	Raw relative weights	% of R^2	Raw relative weights	% of R^2
Work Environment				
Organizational support	0.14	42.94%	0.04	14.85%
Supervisory support	0.04	12.16%	0.11	39.50%
Peer support	0.14	42.28%	0.14	46.76%

Hypothesis 6 predicted that supervisory support will exhibit incremental validity in predicting training transfer over other work environment variables (i.e., organizational support, peer support, opportunities to practice). It appears that supervisor support accounts for a slightly higher percentage of training transfer than peer or organizational support (31% versus 30% versus 9%, respectively); relative importance indices of work environment variables are presented in table 8. Results of the relative importance weights are presented in table 6, showing the relative contribution of each predictor in the multiple regression model to explain R^2. Regression showing the incremental validity of supervisor support are presented in table 9. Supervisor support adds 6% of the variance to the model; results of an F-test show a significant change in R^2, $F(455, 3{,}555) = 2.36$. This change is significant to a $p<.05$ one-tailed hypothesis

test, adding incremental value to the model enables more transfer (i.e., transferring 6 more percent of the skills to the job is practically relevant to the point of adding practical value to the model).

Table 9

Incremental validity of supervisory support

Predictor	Training transfer				
	Model 1		Model 2		
	β	R^2	β	R^2	ΔR^2
Organizational support	0.09		-0.15		
Supervisor support	-		0.38		
Peer support	0.43	0.29*	0.36	0.36*	0.06*

Note. Standardized regression coefficients.

*p<.05; Harmonic mean N for model without supervisory support = 3,105; Harmonic mean N for model with supervisory support = 3,562

CHAPTER FIVE: DISCUSSION

Results of this meta-analysis provide insight and clarification to the extent and nature of relationships between antecedents of training transfer. Specifically, findings of this study contribute to research and practice necessary to further our understanding of training transfer.

Summary of results

Results of this dissertation aimed to fill the following gaps: (a) advance a practitioner-oriented framework (that ultimately resulted in explaining 36% of training transfer), (b) clarify the strength of aspects of work environment and transfer motivation on training transfer, (c) clarify the role of work environment predictors in predicting transfer over time, and (d) quantify the relative contribution of each work environment characteristic and motivation as an antecedent of training transfer.

In sum, the results of this meta-analysis show that several levels of work environment support and motivation to transfer show positive relationships with training transfer and that results suggest a similar relationship of antecedents to transfer as it changes over time (proximal, maintained, distal, and sustained). Similarly, moderator analyses highlight a need for more robust research in the assessment of training transfer and illustrate a diverse set of industries in which training transfer research occurs. Regression analyses reveal that the mechanisms of support for transfer matter. Specifically, organizational and peer support mechanisms are effective when they enhance the motivation to transfer the skills to the point that they are fully mediated by motivated to transfer. Interestingly, while supervisor support and organizational support are highly correlated, motivation to transfer appears to detract from the relationship between supervisor support and training transfer. In fact, when examined directly and with relative

importance indices, supervisory support accounts for 31% of R^2 and incremental validity adding 6% of the variance to R^2 when added to other support factors and motivation to transfer (which, as stated earlier, is a mediating mechanism between peer support and organizational support and training transfer).

Contributions

Given the findings of this research, there are several theoretical and practical contributions of these findings.

Theoretical. The current study's finding highlight many contributions to existing theory. Namely, theories of transfer for social identity, accountability, and organizational learning warrant reexamination in light of this study's findings.

First, findings indicate that organizational and peer support strongly predict transfer when trainees are motivated to use the skills. This may be due to trainees' deriving a sense of identification with the organization by deriving motivation through mutual relation on support and positive attitude fostered for training transfer in that all parties involved find the training to be useful. Similarly, findings are consistent with previous theory in the training transfer research that support from organizations may motivate trainees by promoting a sense of equality and fairness (Yamnill & McLean, 2001). This sense of equality could stem from organizational level reinforcement systems that reward employees for use of training which most likely creates a sense of equity when criteria for rewards or consequences is objective. Contrary to the hypothesis, motivation to transfer does not exhibit a positive mediation effect between supervisory support and training transfer; yet, supervisor support explains the majority of R^2 in predicting training transfer not explained by motivation. This evidence suggests that the effect of supervisory support lies outside of motivation to transfer. One potential explanation for this

strong predictive relationship may be indicative of a sense of accountability. Theories on team climate indicate the leader's key role in modeling behavior and fostering a climate indicative of expected team actions (Morgeson et al., 2009). Similarly, Schlenker's Model of Responsibility emphasizes the key roles of answerability, arising through a sense of personal responsibility and social roles (Schlenker, Britt, Pennington, Murphy, & Doherty, 1994). Findings of this dissertation may aid in incorporating Schlenker's triangle of responsibility in that accountability may arise as a direct effect of social roles, particularly when the social role is that of a team leader or supervisor. This may be particularly true in organizational settings where the culture is hierarchical and leader power distance is high (such as that in healthcare environments); yet, future empirical work should seek to evaluate the extent to which this is true. Alternative explanations for this particular mediating and incremental variance effect may stem from the referent in data collection procedures as well as classical psychology theory by Skinner (1953). In particular, data is largely collected from individual trainee perceptions regarding supervisors and organizations; taken together with the strong positive association between organizational and supervisor support, it could be that trainees are unable to distinguish between organizations and supervisors except that supervisors more directly represent the organization's support for training. By executing all changed policies and procedures regarding training, supervisors' support for organization's initiatives may be perceived as negatively and positively reinforcing trainees (particularly when trainees are reminded that there are both rewards and consequences for use/disuse of training). Skinner (1953) advocates that participants behave in mannerisms based on the schedules and type of reinforcement provided to condition a behavior or set of behaviors. While Skinner's work explains that both positive and negative reinforcement increase motivation, a sense of punishment decreases motivation to exhibit a behavior. Given findings of

the importance of supervisor support and peer support's contributions to R^2 (over 50% when taken together), findings bear implications to integration of teams and multilevel theory in transfer research. Kozlowski and Salas (1997) propose a multi-level model through which transfer can be understood; specifically, they stipulate that training transfer is inherently multi-level and highlights the role of teamwork processes in facilitating vertical transfer, enabling organizations to learn and develop new norms. Given this framework, findings of this research highlighting the need for a teams perspective, social roles, particularly emergent or shared leadership, may explain the importance of formal and potentially informal leaders supporting training at the peer level.

Practical. The model for this dissertation was developed with the practitioner in mind and accounts for a significant portion of the variance in explaining training transfer (R^2= 0.36, p<.05). As such, findings aim to inform practice. The first salient finding is that all four identified work environment support factors correlate with motivation to transfer and training transfer. Subsequent analyses, however, reveal that when accounting for intercorrelational and mediational relationships, the role of support factors, such as organizational support, changes. Specifically, beta coefficients for organizational support show a negative relationship to training transfer when the motivation to transfer is already accounted for in the model. Thereby, organizations seeking to enhance transfer should carefully select strategies by which to demonstrate support for training such that employees are motivated to use the skills in the transfer environment following training to avoid negative ramifications from transfer efforts. To support this endeavor, have advocated use of focus groups and employee interviews prior to changing policies, procedures, and creating of reward and reinforcement systems to ensure alignment with employee motivational needs. (Kotter, 1995). Similarly, motivation to transfer

completely mediates the relationship between peer support and training transfer. While relative importance indices signify that peer support does not play as large of a role as organizational support in motivating employees to transfer skills, (Broad & Newstrom, 1992)as supervisory support accounts for 31% of the R^2 in the model and is not explained by motivation to transfer, transfer interventions can specifically target supervisor involvement in the transfer process (i.e., before, during, after and continued after training). More specifically, interventions for enhancing supervisory support may not have to place as much focus on its ability to motivate trainees to apply the skills. It is, however, it is important to note that complete disregard for supervisor's impact on transfer motivation is not suggested.

Limitations and Future Research

While this study informs theory and practice with how and why support mechanisms may aid in training transfer, several limitations must be noted. Of primary concern are the design and evaluation of primary studies included in this meta-analysis. Secondly, limitations based on selected methodologies are noted.

Due to the nature of inclusion criteria and nature of empirical work done in this area, there are several limitations worth noting regarding the nature of primary studies. First, the nature of adaptive transfer could not be examined within this study as originally proposed. This may be due to the fact that certain proposed moderators, such as transfer task, are typically reported in experimental, lab-based evaluations of learning transfer (Keith & Frese, 2008) where manipulation of the evaluation context may be more feasible to implement. Similarly, while the effectiveness of training transfer practices may vary based on industry, a good portion of transfer studies report collecting data from diverse industry types. While this practice enables a generalization of effective transfer practices, this limits the understanding of what is most

effective within specific industries to enable practical guidance. Additionally, results are based on correlational designs; while findings indicate that relationships exist between work environment, training transfer, and motivation to transfer, readers are cautioned against interpreting results as work environments causing motivation or causing transfer. Similarly, as this meta-analysis relies upon reporting of effect sizes amenable to conversion to a correlation, quality of study design was not a factor in including relevant studies. Fortunately, in exploratory moderator analyses (see Appendix A), study design type did not significantly inflate effect size values. However, results of prediction should be interpreted with caution as true prediction would leverage a model including only studies in which predictors and criterion were assessed at different time points. Thereby, future research should seek to incorporate more robust methods of evaluating transfer, including more objective assessment tools and a study design in which predictors and criterion are evaluate at more than one time point and preferably in a longitudinal design.

Further, meta-analysis requires studies to report statistics amenable to conversion to a specific effect size of interest (in this studies' case, a Pearson's *r*). In this way, other limitations are noted based on the methodology selected for the current study. First, several studies representative of the practices of training transfer may not be reflected in effect sizes reported simply in that they did not include statistics that could be converted to a Pearson's *r* (e.g., qualitative). Secondly, while this study corrected for unreliability in both the predictor and criterion to avoid bias in regression (Becker, 2015; Becker & Schram, 1994), three intercorrelations among predictors relied on *k*s of 5, 6, and 6, respectively. While this is sufficient *k* to determine significance, the reader should interpret results with caution as intercorrelations values may change with future research.

Additionally, study populations may differ between links in the model (i.e., correlations between organizational support and motivation to transfer may differ from motivation to transfer to transfer). While subgroup analyses of industry type sought to test for the existence of this potential limitation and the variation which may exist among practices within specific industries, there was insufficient *k* to test for differences between industry types. Fortunately, much of the reasons underlying low *k* for unfair comparisons arose from transfer of training being evaluated in a diverse sample across industries. Thereby, this limitation may exist, but is less likely to negatively impact findings. In a similar vein, significant heterogeneity was found in each predictor of training transfer; thereby future research should seek to understand the role of additional moderators in enhancing or detracting from the relationship of motivation and factors of work environment support with training transfer.

Another potential limitation of this meta-analysis is the level of analysis at which predictors are examined. Specifically, level of support rather than specific mechanisms by which training transfer could be enhanced (i.e., examined the support of supervisors rather than the specific behaviors by which supervisors can be effective at promoting training use) provided sufficient *k* to meta-analyze and interpret results as very few studies examined specific mechanisms by which organizations, peers, and supervisors provide support to trainees. Thereby, additional research is warranted to better inform the specific actions needed at each level to both motivate trainees and hold them accountable for using training (L.A. Burke & Saks, 2009). Further, it should be noted that more instances of manipulation as a measure appeared for supervisor support than for any other work environment support factor. This could explain that supervisory support's relationship to training transfer could be attributed to a more objective and perhaps impactful measurement. However, as these instances were very few for supervisory

support, few for organizational support, and none at all for peer support, it is unlikely that these slight differences explain the entire relationship between supervisor support and transfer. Effectiveness of interventions targeted at improving training transfer at each level of support is an area of exploration for future research.

Conclusions

The current meta-analysis demonstrates the effectiveness of four work environment support factors and motivation to transfer in the transfer of training process. In particular, results suggest that there is an association between organizational support, supervisory support, peer support, opportunities to perform, motivation to transfer, and training transfer, suggesting that work environment support factors and motivation to transfer exhibit similar relationships to transfer as it is more distally evaluated from the time of training. Furthermore, results suggest a complete mediation effect of motivation on organizational support and peer support; specifically, that motivation plays a key role in explaining organizational and peer support's ability to predict training transfer. The current meta-analysis also provides encouraging evidence that supervisor support is critical to the transfer process and its effectiveness is explained by mechanisms other than motivation, suggesting future work should examine other mediating variables between support and training transfer. Results aim to inform both theory and practice to encourage practitioners to enhance training transfer and improve safety.

APPENDIX A: RESULTS OF STUDY DESIGN TYPE

Predictor	*k*	N	$\bar{r}$	ρ	SD_ρ	% Variance	95% CI		80% CV	
							Lower CI	Upper CI	Lower CV	Upper CV
Trainee Characteristics	-	-	-	-	-	-	-	-		
Motivation to transfer	-	-	-	-	-	-	-	-		
Pre-post	12	1461	.21	.25	.13	36.46	.13	.29	.08	.42
Independent groups	-	-	-	-	-	-	-	-	-	-
Repeated Measures	4	299	.27	.32	.12	52.14	.13	.42	.17	.48
Post-only	15	4359	.44	.52	.25	4.73	.33	.55	.20	.86
Work Environment	-	-	-	-	-	-	-	-	-	-
Organizational support	-	-	-	-	-	-	-	-	-	-
Pre-post	2	232	.10	.12	.16	34.6	-.12	.31	-.08	.32
Independent groups	-	-	-	-	-	-	-	-	-	-

Predictor	*K*	N	$\bar{r}$	P	SDρ	% Variance	95% CI		80% CV	
Repeated Measures	1	268	.33	.00	.00	-	.33	.33	.37	.37
Post-only	9	2377	.31	.38	.22	8.48	.18	.43	.09	.67
Supervisor support	-	-	-	-	-	-	-	-	-	-
Pre-post	8	1004	.30	.36	.00	85.98	.24	.36	.36	.36
Independent groups	1	35	.30	.51	.00	-	.30	.30	.51	.51
Repeated Measures	4	289	.27	.34	.00	100.00	.21	.33	.34	.34
Post-only	17	3721	.40	.49	.20	9.86	.32	.49	.23	.75
Peer support	-	-	-	-	-	-	-	-	-	-
Pre-post	5	700	.28	.35	.14	31.63	.16	.4	.18	.53
Independent groups	-	-	-	-	-	-	-	-	-	-
Repeated Measures	2	187	.23	.28	.00	100	.22	.25	.28	.28
Post-only	10	2486	.43	.53	.19	10.09	.33	.53	.29	.77

Predictor	*k*	N	$\bar{r}$	ρ	SD ρ	% Variance	95% CI		80% CV	
Opportunities to perform	-	-	-	-	-	-	-	-	-	-
Pre-post	2	140	.14	.18	.00	100	.07	.21	.18	.18
Independent groups	-	-	-	-	-	-	-	-	-	-
Repeated Measures	1	68	.03	.04	.00	-	.03	.03	.04	.04
Post-only	2	141	.22	.28	.01	99.08	.06	.38	.26	.29

Note. *p<.05, **p<.01

APPENDIX B: CODEBOOK

INSTITUTE FOR SIMULATION & TRAINING

TRAINING TRANSFER

A guidebook for coding the training transfer meta-analysis

Ashley

8/15/2015

This document is designed with the intent to provide instructions for using the codesheet to code articles for the transfer of training meta-analysis.

Coding Categories and Resource Materials for Training Transfer Review

Contents

Codebook Overview

This codebook explains the coding process for the Transfer of Training (ToT) meta-analysis using the corresponding Excel workbook (i.e., "Codesheet-9.14").

- This is a working document.
- Coding will be completed using the Excel workbook entitled "MTT Meta Codesheet 6.13v2". You can save your work as an individual file, and we will then merge them at a later date.
- Each column in the Excel coding sheet has a note at the top which provides a brief explanation and any relevant codes.

General Coding Rules and Information

Follow the instructions for coding the variables outlined in this document. Some variables will be coded using specific numeric labels while others will be free-response.

- Every column in the Excel workbook has a brief description of that variable and how to code it
- Each column also indicates whether the variable is free response or, if numeric, lists the numeric labels
    - While the columns are intended to remind you of numeric codes and what should go into them, always refer to the codebook for guidance on how to code information.

There may be multiple excel rows for a single manuscript. Each row will contain only 1 IV-DV relationship, and studies may look at multiple relationships between variables.

Rule of thumb with meta-analyses;

- **CAUTION**: Some information may remain the same across rows (i.e., different DVs); however, it is likely some information may change with regards to the different DVs (e.g., sample size, training type). You will want to verify that each IV-DV relationship on each row aligns with the proper sample ID number which is also placed on different rows.

Please use the "Add comment" option in excel under the review tab to keep track of your decisions, particularly when you have concerns regarding your coding. If you need a visual cue to bring attention to your coding, please use red font to make a distinction.

Consensus coding
Consensus coding is when two coders code the same article, mark discrepancies in their coding and use the article to come to agreement on which codes and relationships exist within the article. The reason for this is to ensure reliability in coding for more trustworthy results.

Missing Information
On occasion, an article may not report the information that you need to complete a cell in the codesheet. When this is the case, please leave that cell BLANK. Make comments on cells using tracked change comments as needed.

Quoting the Article Authors

There are certain items in the codebook and codesheet that will ask for you to copy and paste information directly from the article you are coding. Whenever you are directly inputting information from the article, please indicate that you are quoting the article by adding quotation marks around the excerpt.

- NOTE: Be sure to include any citations if the excerpt is not directly from the writing of the authors. For instance, when listing measures and measure items mentioned in the article, be sure to include the citation of the original article containing this information.

Effect Size Coding
Each effect size belongs on its own row, indicating the relationship between a predictor of training transfer and the evaluation of transfer. When we begin creating composites, we will take an average of the same outcome types in which there are no intercorrelations between variables. When there are instances of intercorrelations between variables (predictor or outcome), these need to be coded as a separate line in the excel codesheet such that we can create linear composites (Geyskens, 2009) to prepare the data to be analyzed according to the best practices in meta-analysis.

Composites will be created during the consensus process.

Google Document
We also have a google doc set up to keep track of agreed upon coding rules as we continue with coding. If you have questions or issues with any of the coding, please make notes!! [there is a special column called "comments" in which to do so; I've found it helpful to use "review→ tracked change comment" to add a note directly onto a cell of interest]

- Use the google spreadsheet "Training transfer coding questions and decisions" to add questions you may have about the coding process.
- If you aren't sure which category a variable falls under, select the best one then discuss
- Use the Google Doc shared with everyone to list any general questions/comments that come up between you and your partner that you'd like to share with the entire team. We will review this at each team meeting to make sure things are being answered, but let team leadership know if you have an urgent question or issue.

Excel Sheet 1: Inclusion/Exclusion

The following information is coded in the spreadsheet labeled "inclusion/exclusion" within the Meta Codesheet excel file "Codesheet-9.14". The inclusion/exclusion section of the codesheet includes a complete list of all of the articles pulled during the literature search conducted. The purpose of this section is to identify articles for inclusion in the meta-analysis and qualitative review and screen out irrelevant articles from further coding efforts.

A. ID

This is the number that corresponds with the articles pulled during the literature review. These ID numbers are found in the column to the left of the AMA citation of the article with which they correspond.

B. Article (APA Style)

APA style citation of the article pulled during the literature review.

C. Coder Initials

Please provide your initials in this column (e.g., AMH, SZ). Feel free to use your middle initial, if desired. However, use of a middle initial is not required. Please be consistent.

D. Quantitative?

Quantitative data are those which can be utilized for meta-analysis.

- 0 = No, not quantitative
- 1 = Yes, quantitative

The article must report one of the following statistics to be considered quantitatively codeable:

- Statistics for effect size inclusion are as follows:
  - Cohen's f^2
  - Pearson's r
  - Eta Squared η^2
  - Omega-squared ω^2
  - Cohen's d
  - Glass's Δ
  - Hedge's g
  - Cohen's d
- Statistics which can be converted to effect sizes include
  - One way ANOVAs

- T-tests
- Means and standard deviations
- Chi Square with One df
- Tau

- Other statistics that can be included are as follows:
  - Percentages
  - Percentage of change
  - NOTE: If percentages are used, please note in the inclusion/exclusion comment section.

When in doubt, if you think a relationship might be relevant, code it! It's easier to exclude than to go back and recode articles.

E. If Not Quantitatively Codeable, why?

Please indicate why this cannot be quantitatively coded and included in the meta analysis. Please specify by using free response to indicate the reason.

1. The article is theoretical or a review piece (i.e., no empirical)
2. No training intervention in paper
3. Specialized population is used as the sample (i.e., children, non-healthy adults, non-human population)
4. Empirical but appropriate statistics are not reported
   a. Statistics for effect size inclusion are as follows:
      i. Cohen's f^2
      ii. Pearson's r
      iii. Eta Squared η^2
      iv. Omega-squared ω^2
      v. Cohen's d
      vi. Glass's Δ
      vii. Hedge's g
   b. Statistics which can be converted to effect sizes include
      i. One way ANOVAs
      ii. T-tests
      iii. Means and standard deviations
      iv. Chi Square with One df
5. No training transfer score (see section v of codesheet 2 for definition)
6. No predictor variable is included. (see section v of codesheet 2 for definitions). Predictor variables are as follows;
   i. Training design
      1. Content validity
      2. Opportunities to practice
      3. Fidelity of training environment

4. Feedback

ii. Trainee characteristics
    1. Motivation to transfer

iii. Work environment/transfer climate
    1. Organizational support
    2. Supervisory support
    3. Peer support
    4. Opportunities to use

7. Other - if other indicate in words the exclusion reason

F. Comments

Leverage this section to make any notes about articles as you go through. These may be helpful during exclusion/inclusion consensus meetings or merely notes for your general reference. For example:

- Contains correlation matrix
- Contains multiple samples
- Come back to this later, etc.

- I like to leave the page number and type of statistics reported for each article. It helps in going back to code the article along with any special considerations (e.g. repeated measures design but they used an independent samples t-test because they couldn't pair samples).

Excel Sheet 2: Codesheet

The following information is coded in the spreadsheet labeled "codesheet" within the Meta Codesheet excel file "Codesheet-9.14" The codesheet is the section of the excel file where information from primary studies and independent samples should be recorded. The purpose of this section is to record statistical and qualitative information necessary for statistical analysis of ToT effectiveness and best practices.

BACKGROUND

A. Initials of coder

Please put your initials as a coder into this column (e.g. LB, SS, AH).

A. Date

Please indicate the date on which you began coding this article (e.g., 4/22/15).

B. Article Sample ID

Assign a sample ID to each independent sample reported in the study by using the Article ID number plus the number of the sample separated by a decimal.

- Article ID number: 3 has two independent samples. This would be input as:
  - 3.1
  - 3.2

➢ Each sample will be listed on a different row in the article. As you have already read, each IV:DV relationship will also be its own row in excel. You will need to make sure that each IV:DV relationship aligns with the correct sample ID number. This is applicable when there is more than one sample in the article in which different outcomes are measured.

C. APA Citation

Please record the article information in an abbreviated APA format. This will be used to help identify duplicates. The format to use is:

- Author, I.I., Author, I.I., Author, I.I., Author, I.I., Author, I.I., Author, I.I.,…. Author, I.I. (YEAR). Title of article.
  - Essentially, please keep the format to APA style with the exception of the journal/publication information.

D. Publication Status

Please indicate whether this a published or unpublished study

1= Published (includes peer-reviewed journal articles, book chapters, published conference *proceedings*)

2= Unpublished (includes unpublished manuscripts, dissertations, unpublished conference presentations, and conference abstracts)

E. Abstract

Please copy and paste the abstract of the paper in this area

F. Description of sample

Copy and paste a description of the sample including location, industry, and type of sample from the article.

G. Industry Type

Indicate the type of participants recruited to participate in training/the study. Further details about the composition in the sample will be asked later in the coding. Use the following labels:

- **1=Healthcare.** These are employed clinicians or students who work and/or study at a college of medicine, college of nursing, hospital, clinic, private practice or military-based setting.
- **2= Military.** This industry includes those who are enlisted in a branch of the army, navy, or airforce and excludes those working in the private sector
- **3= Students.** This sample type includes students enrolled in an undergraduate medical, MBA, or pre-med program as well as students enrolled in an MBA, masters or PhD program.
  - **Note:** As stated above, residents are NOT considered students. Rather, code them as "non-military clinicians."
- **4= Finance.** This refers to industries in banking and financial services (e.g., stock market brokering) that receive training.
- **5= Other .**Sometimes, organizations that administer training are comprised of a mixture of various industry types in the attempt to generalize findings across industries. This category for industry type encompasses any sample type that is not considered a clinician or student, but that still was included in the sample.
  - **E.g.,** healthcare, finance, customer service, etc.

TRAINING DESIGN

H. Needs Analysis

This is a systematic exploration of the state of how things are in a group or organization. Please list all that apply, separated by a comma:

- **0= No needs analysis** was conducted [stated explicitly in the article]
- **1= Needs analysis was conducted**; however the type of needs analysis conducted is not specified.

I. Training Strategy

What type of training strategy was used to disseminate information? Please indicate all that apply.

- **1= Information Based (e.g., lecture).** Information based strategies rely on a platform such as powerpoint to deliver the background and information alone on a knowledge, skill, or ability.
- **2=Demonstration Based Training (e.g. video).** Demonstration based strategies leverage contextualized examples and videos to model the proper or improper use of a knowledge, skill or ability to foster learning.
- **3= Practice (e.g., role play, SJTs, Simulation Based Training).** Practice only strategies provide the opportunity for trainees to enact or mentally rehearse the knowledge, skills and abilities.
- **4= Information and Demonstration.** Training strategies which leverage information and demonstration techniques provide a description of the training content in addition to contextualized examples and/or videos of use of the trained skills.
- **5= Information and Practice.** Training strategies which leverage information and demonstration techniques provide a description of the training content in addition to opportunities to use the trained skills.
- **6= Information, demonstration, and practice.** Training strategies which leverage information and demonstration techniques provide a description of the training content with contextualized examples and/or videos showing how to use the trained skills in addition to opportunities for trainees to use the trained skills.

J. Training content- percent of non-technical skills

Indicate whether training content is focused on non-technical competencies (e.g., situation monitoring, leadership, mutual support, communication, team structure) only or combines instruction on both technical and non-technical competencies (e.g., clinical skills, performing a toracentesis). Indicate the percent of training content that focuses on non-technical skills training. Please do this by dividing the number of modules for teamwork over the total number of modules in the training program. For example, if the training focuses on communication and suturing modules, the percent of nontechnical skills content would be ½, or 50%.

Training Content	Example Interventions	Description

Non-technical skills (teamwork examples) **<u>Example competencies</u>:** · Team adaptation · Team situational awareness · Performance monitoring · Interpersonal skills · Coordination skills · Communication skills · Decision making · Mutual support · Leadership · Shared Decision Making · Situation Monitoring	- Crew Resource Management -Crisis Resource Management - Assertiveness Training - GTSCT - Team Coordination Training (TACT) -TeamSTEPPS -Other	- Focus on activities that strengthen quality of functional interactions of team members. - Targets behaviors as well as the attitudes required for effective team performance. - These focus most clearly on teamwork skills, such as communication, coordination and problem solving. - <u>NOTE</u>: These interventions often *also* incorporate task simulations, but the focus is usually more heavily upon team processes.
Taskwork **<u>Example competencies</u>:** ·Proper respiratory intubation ·Running a central line ·Ordering medication ·Correctly diagnosing	- Cross-Training - On-the-job training -HIV training -C-section training - Other	- Involves the operations-related activities to be performed by the team members. - Directly related to the task at hand and the execution of the task. - Might include a focus on the individual behavior required by the individual to perform his or her specific roles.

Both Teamwork & Taskwork

K. Training Competencies

List the names of competencies trained in the program, separating each competency by a comma. Training competencies are developed and provided with the intention of improving the knowledge, skills, and attitudes, such as teamwork or taskwork (Baker, Day, & Salas, 2006). Training competencies should be recorded for both technical and non-technical skills training. Please list all training competencies, separated by a comma.

Practice Features and Components

L. Number of Practice Sessions

Please indicate the total number of practice sessions used in the study.

M. Feedback provided?

Is feedback provided to trainees?

- **0= No**, no feedback is provided to trainees
- **1= Yes**, feedback is provided to trainees

TRAINING TRANSFER EVALUATION

N. When is the Training Transfer Predictor Assessed? (categorical)

Please indicate, in relation to training, when the training transfer predictor was assessed. Please leverage one of the three time points provided to apply this code

- **1= Before training**. Use this code when the predictor variable was assessed before the training was administered (e.g., trainee motivation was assessed prior to trainees entering the training environment).
- **2= During training.** Use this code when the predictor variable was assessed during training (e.g., opportunities to practice were available to trainees during training).
- **3=After training**. Use this code when the predictor variable was assessed after training has occurred (e.g., supervisory support was assessed to determine supervisor's role in reinforcing use of the trained KSAs).

- **4= Before and During.** Use this code when the predictor variable was assessed before trainees enter the training environment and during training (e.g., trainees rated validity of training content before training commenced and during the training).
- **5= Before and After.** Use this code when the predictor variable was assessed before trainees enter the training environment and after training has commenced (e.g., motivation to transfer was assessed before and after training)
- **6= During and After.** Use this code when the predictor variable was assessed while trainees are in the training environment and once training is completed (e.g., peer support is provided and measured during and after training)
- **7= Before, During, and After.** Use this code when the predictor variable was assessed before trainees enter the training environment, while trainees are in the training environment and once training is completed (e.g., peer support is provided and measured before, during, and after training)

O. Training transfer task type

This code is intended to reflect the type of task on which trainees were evaluated for transfer based on its similarity to the task trained or performed in the training environment. Please indicate task similarity using one of the following codes. Keep in mind that codes are applied based on task distinctiveness rather than task difficulty.

- **1= Analogous transfer**. The criterion tasks (i.e., tasks performed in the transfer environment) were similar to or the same as the tasks that trainees had completed in the training environment.
- **2= Adaptive transfer**. The criterion tasks (i.e., tasks performed in the transfer environment) were structurally different to the tasks that trainees had completed in the training environment.

P. When is the Training Evaluation Data Collected? (continuous)

When is the training evaluation data collected? Is there some kind of evaluation immediately following the training, 3 months down the line, 6 months down the line? Please indicate the timing indicated in the article. This should be specific to each specific DV (e.g., perhaps reactions were measured immediately, but patient mortality was measured 6 months later).

- Please indicate the time from training to transfer evaluation by reporting the number of days.
  - If time points of training evaluation are provided using a range (e.g., 1-3 months post-training), please take an average (i.e., 2 months in applying the previous example).
  - If the article reports the number of months at which training was evaluated for transfer (e.g., we conducted on-site observations for use of the trained skills 2 months post training), please convert to days by assuming a 30-day month unless otherwise specified (i.e., for the previous example, we would code for 60 days post-training transfer evaluation unless otherwise specified)
  - If months are provided, please use the number of days within that actual month (e.g., December and January = 62 days); if the month of February is included within the training transfer evaluation period, please default to using a 27 day calendar month unless otherwise specified.

Q. Predictor Variable (DV1) Type 1

Please indicate which code best applies to the relationship you are coding. These include Kirkpatrick levels of training evaluation including affective/reactional criterion, learning outcomes, performance outcomes, and organizational outcomes.

- **1= Trainee characteristics (not an umbrella code; simply used to denote that this is the section for trainee characteristic[s])**
  - **1.1 Motivation to transfer**. Motivation to transfer refers the "trainee's desire to use the knowledge and skills" learned in training on-the-job (Noe, 1986, p. 503). Specifically, motivation to transfer taps into commitment to apply training and can sometimes be evaluated as an item in trainee reactions to training and can be conceptualized by the intensity, direction and persistence of the desire.
  - **Example,** "I am committed to using training on the job"
- **2= Work Environment/transfer climate**. Characteristics of the work environment, including transfer climate, includes facets of support and opportunities to use the training.
  - **2.1= Organizational support.** This form of support represents changes that are made or introduced to policies, procedures, or practices that reinforce the use of training. This can include development of a reward system or provision of resources to help support use of training. Organizational support or perceived organizational support is characterized by help from the organization used to support training initiatives. Some examples of organizational support include provision of resources (e.g., money, physical resources, space for teaching or practice of skills, transportation to/from training), support from top management for training initiatives, changes in policies and procedures, and sending positive messages regarding training attendance or use. (Tracey & Tews, 2005). Organizational support or perceived organizational support is characterized by help from the organization used to support training initiatives. Some examples of organizational support include provision of resources (e.g., money, physical resources, space for teaching or practice of skills, transportation to/from training), support from top management for training initiatives, changes in policies and procedures, and sending positive messages regarding training attendance or use.
    - **Example,** "My organization provides resources to necessary to use the trained skills".
  - **2.2= Supervisory support.** The degree to which managers and supervisors encourage innovative application of skills, and skill acquisition on-the-job and/or provide recognition of employees which support continued use of learning.

    Supervisory support can come in many forms and includes: feedback on the trained skills, support or perceived support for training, belief that the training is helpful, and goal setting.
    - **Example,** "My supervisor encourages me to use the training".
  - **2.3= Peer support.** Peers reinforce trainees' use of the learning on the job (Holton, Bates, Seyler & Carvalho, 1997). Peer reinforcement or support of training include beliefs that training is useful, verbalized support for use of training, discussing how to best use the trained skills, and provide encouragement for using training.

- **Example,** "My co-workers discuss how to best apply the trained skills".

- **2.4= Opportunities to use. "**The extent to which a trainee is provided with or actively obtains work experiences relevant to the tasks for which he or she was trained" (Ford et al., 1992, p. 512).

- **3**= **Training transfer**. Is the training intervention that is being discussed or studied targeting behavioral criteria? For example, is the training targeting the improvement of the team's performance by increasing their use of teamwork on the job? Specifically, behavioral criteria includes use of skills back to the another (i.e., transfer) environment. Applying the skills within a transfer environment can include the work environment, a simulator, or a separate task issued post-training that requires use of skills. For the purposes of this study, transfer starts as early as one day post-training and can continue to be evaluated at any point post-training. If training transfer is evaluated one of the following two ways, please use the following codes; otherwise, please apply '3' to indicate transfer.
  - **3.0= Training transfer**. The degree to which trainees use learning in the transfer environment [use this code if DV timing and/or description does not meet the criteria to apply more specific subcodes; includes quantity and quality of skill use].
  - **3.1= Proximal transfer**. The criterion tasks (i.e., tasks performed in the transfer environment) were assessed between 1 and 89 (i.e., <90) days after training.
  - **3.2= Maintained transfer**. The criterion tasks (i.e., tasks performed in the transfer environment) were assessed between 90 and 179 (i.e., <180) days after training.
  - **3.3= Distal transfer**. The criterion tasks (i.e., tasks performed in the transfer environment) were evaluated between180 days and 365 days (i.e., 1 year) after training.
  - **3.4= Sustainment**. The criterion tasks (i.e., tasks performed in the transfer environment) were evaluated more than 365 days (i.e., 1 year) after training.

R. DV1 Construct name

Provide the name of the construct you have coded as labeled in the article. For example, relevance of training content could be labeled as "perceived content validity" in the article".

S. DV1 Measure Detail

Provide a description of the measure and citation of the source for the measure. Information of interest for coding includes:

- Items listed in the appendix/article
- Citation if the measure was pulled from another article/pre-existing measure
- Indicate if it was developed in-house

This can be copied and pasted straight from the article.

T. Predictor Variable (DV1) Criterion Measurement Method

Indicate how the DV was measured. Use one of the following labels:

- **1=Self-Report** (e.g., I report my perceptions of how well I performed on a task)

- **2=Coworker/peer report** (e.g., my peers and/or coworkers report my performance)
- **3= Leader or supervisor report** (e.g., my supervisor assesses my performance)
- **4=Observer Report** (e.g., an outside observer assesses my performance)
- **5=Automated Report/Objective metric** (e.g., the technology automatically records my performance)
- **6=Other**
- **Other, explain (use write-in tracked change comment for this response)**

U. Number of items (DV1)

Please record the number of items used to measure the particular construct recorded in DV1. For instance, if you were coding an article reporting a 50-item scale with a 4-item dimension of organizational support and organizational support was the construct recorded in DV1, then the number of items would be 4 and not 50. Conversely, if a scale is reported to measure various forms of organizational support using 50 and reported results as dimensions of organizational support being assessed via 10 items (i.e., you were coding each construct on a separate row in excel for its correlations and intercorrelations), you would record 10 in this column.

V. Reliability of Predictor (DV1) Variable

Provide the specific Cronbach's alpha for the reliability of the measure. If not listed or other reliability metric is provided, leave blank. If the measure is completely objective, add a "1" to assume perfect reliability. If a range of reliabilities is provided and never specified for each scale, take the lowest number in the range as the most conservative estimate of reliability for the scale(s) you are coding.

W. Dependent Variable (DV2) Type

Please indicate which code best applies to the relationship you are coding. These include Kirkpatrick levels of training evaluation including affective/reactional criterion, learning outcomes, performance outcomes, and organizational outcomes.

- **1= Trainee characteristics (not an umbrella code; simply used to denote that this is the section for trainee characteristic[s])**
  - **1.1 Motivation to transfer**. Motivation to transfer refers the "trainee's desire to use the knowledge and skills" learned in training on-the-job (Noe, 1986, p. 503). Specifically, motivation to transfer taps into commitment to apply training and can sometimes be evaluated as an item in trainee reactions to training and can be conceptualized by the intensity, direction and persistence of the desire.
- **2= Work Environment/transfer climate**. Characteristics of the work environment, including transfer climate, includes facets of support and opportunities to use the training.
  - **2.1= Organizational support.** This form of support represents changes that are made or introduced to policies, procedures, or practices that reinforce the use of training. This can include development of a reward system or provision of resources to help support use of training. Organizational support or perceived organizational support is characterized by help from the

organization used to support training initiatives. Some examples of organizational support include provision of resources (e.g., money, physical resources, space for teaching or practice of skills, transportation to/from training), support from top management for training initiatives, changes in policies and procedures, and sending positive messages regarding training attendance or use.(Tracey & Tews, 2005). Organizational support or perceived organizational support is characterized by help from the organization used to support training initiatives. Some examples of organizational support include provision of resources (e.g., money, physical resources, space for teaching or practice of skills, transportation to/from training), support from top management for training initiatives, changes in policies and procedures, and sending positive messages regarding training attendance or use.

- **Example,** "My organization provides resources to necessary to use the trained skills".

- **2.2= Supervisory support.** The degree to which managers and supervisors encourage innovative application of skills, and skill acquisition on-the-job and/or recognize employees for using training well which supports continued use of learning.
- Supervisory support can come in many forms and includes: feedback on the trained skills, support or perceived support for training, belief that the training is helpful, and goal setting.
    - **Example,** "My supervisor encourages me to use the training".
- **2.3= Peer support.** Peers reinforce use of the learning on the job (Holton, Bates, Seyler & Carvalho, 1997). Peer reinforcement or support of training include beliefs that training is useful, verbalized support for use of training, discussing how to best use the trained skills, and provide encouragement for using training.
    - **Example,** "My co-workers discuss how to best apply the trained skills".
- **2.4= Opportunities to use. "**The extent to which a trainee is provided with or actively obtains work experiences relevant to the tasks for which he or she was trained" (Ford et al., 1992, p. 512).

- **3= Training transfer.** Is the training intervention that is being discussed or studied targeting behavioral criteria? For example, is the training targeting the improvement of the team's performance by increasing their use of teamwork on the job? Specifically, behavioral criteria includes use of skills back to the another (i.e., transfer) environment. Applying the skills within a transfer environment can include the work environment, a simulator, or a separate task issued post-training that requires use of skills. For the purposes of this study, transfer starts as early as one day post-training and can continue to be evaluated at any point post-training. If training transfer is evaluated one of the following two ways, please use the following codes; otherwise, please apply '3' to indicate transfer.
    - **3.0= Training transfer**. The degree to which trainees use learning in the transfer environment [use this code if DV timing and/or description does not meet the criteria to apply more specific subcodes; includes quantity and quality of skill use].
    - **3.1= Proximal transfer**. The criterion tasks (i.e., tasks performed in the transfer environment) were assessed between 1 and 89 (i.e., <90) days after training.

- **3.2= Maintained transfer**. The criterion tasks (i.e., tasks performed in the transfer environment) were assessed between 90 and 179 (i.e., <180) days after training.
- **3.3= Distal transfer**. The criterion tasks (i.e., tasks performed in the transfer environment) were evaluated between180 days and 365 days (i.e., 1 year) after training.
- **3.4= Sustainment**. The criterion tasks (i.e., tasks performed in the transfer environment) were evaluated more than 365 days (i.e., 1 year) after training.

X. DV2 Construct name

Provide the name of the construct you have coded as labeled in the article. For example, relevance of training content could be labeled as "perceived content validity" in the article".

Y. DV2 Measure Detail

Provide a description of the measure and citation of the source for the measure. Information of interest for coding includes:

- Items listed in the appendix/article
- Citation if the measure was pulled from another article/pre-existing measure
- Indicate if it was developed in-house

This can be copied and pasted straight from the article.

Z. Dependent Variable (DV2) Criterion Measurement Method

Indicate how the DV was measured. Use one of the following labels:

- **1=Self-Report** (e.g., I report my perceptions of how well I performed on a task)
- **2=Coworker/peer report** (e.g., my peers and/or coworkers report my performance)
- **3= Leader or supervisor report** (e.g., my supervisor assesses my performance)
- **4=Observer Report** (e.g., an outside observer assesses my performance)
- **5=Automated/objective Report** (e.g., the technology automatically records my performance)
- **6=Other**
- **Other, explain (use tracked change comment to write-in an explanation for this response)**

AA. Number of items in scale (DV2)

Please record the number of items used to measure the particular construct recorded in DV2. For instance, if you were coding an article reporting a 50-item scale with a 4-item dimension of organizational support and organizational support was the construct recorded in DV 2, then the number of items would be 4 and not 50. Conversely, if a scale is reported to measure various forms of organizational support using 50 and reported results as dimensions of organizational support being assessed via 10 items (i.e., you were coding each construct on a separate row in excel for its correlations and intercorrelations), you would record 10 in this column.

BB. DV2 Reliability of Dependent Variable

Provide the specific Cronbach's alpha for the reliability of the measure. If not listed or other reliability metric is provided, leave blank. If a range of reliabilities is provided and never specified for

each scale, take the lowest number in the range as the most conservative estimate of reliability for the scale(s) you are coding.

CC. Level of Analysis

Describe the level at which the DV/Criterion was analyzed.

- **1=Individual**. Single person or person(s). This applies when analyses are conducted to draw inferences on trainees or individuals.
- **2=Dyadic**. Pairs of two individuals.
- **3=Team**. Three or more people who have interdependent goals. Measuring at the team level is possible using global assessment scores.
- **4=Unit/department.**. Unit or department refers to those areas of the organization, which provide specialized services to the organization at large and include more than one team. They include various hospital special care wards (e.g., intensive care unit)..
- **5=Organizational.** A group of persons organized for some end or work. Data is aggregated across units and departments to make inferences about organizational level phenomena.

DD. Design

In this column, please indicate the design type used for the study. This will have direct meaning in the SAS syntax. Please use the following numeric labels to indicate

- **1= Pre-post.** Study assesses dependent variable (DV) before and after training to make inferences about the effectiveness of an intervention or the relationship between transfer and a predictor separated in time.
- **2= Independent groups.** Study assesses dependent variable (DV) by comparing two groups to make inferences about the effectiveness of an intervention
- **3= Repeated measures.** Study assesses dependent variable (DV) at multiple time points
- **4= Post only.** Study assesses dependent variable (DV) and predictor variable after training.

EE. N

If the study only provides number of teams or organizations, please multiply by number of team members on team or people reported to have been trained within the organization to produce the number for this column. If the correlation was calculated using scales with different response rates and different N, please input the lower of the two numbers as "N".

FF. Type of Effect Size/Statistics

Although we will perform a series of meta-analyses using the correlation coefficient as the effect size of interest, other effect sizes reported in primary studies are useful and can be converted to correlation coefficients.

- e.g., *t*, *F*, *d*, chi-square, or *Z*

➢ Which of the following types of effect sizes is the original effect size or types of statistics used to derive as listed in the article?

1. R
2. F
3. T
4. Z
5. D
6. Means and Standard Deviations
7. Chi Square with one degree of freedom
8. One-tailed test p-value
9. Percentages
10. Odds ratio
11. Percent of change (difference score between pre-post or independent and control groups

GG. Original Effect Size/Statistics

Provide the original effect size or statistics used to arrive at the effect size from the article. If it is a percent of change effect size, please report the difference between pre and post training or between the control group and treatment group here.

HH. Mean 1

This is a supplemental column provided purely for calculation purposes and to expedite the consensus process; specifically, this column in the codesheet does NOT count toward consensus and merely allows specific recording of statistical information for mean of a control group or baseline.

II. Standard deviation 1

This is a supplemental column provided purely for calculation purposes and to expedite the consensus process; specifically, this column in the codesheet does NOT count toward consensus and merely allows specific recording of statistical information for standard deviation of a control group or baseline.

JJ. Mean 2

This is a supplemental column provided purely for calculation purposes and to expedite the consensus process; specifically, this column in the codesheet does NOT count toward consensus and merely allows specific recording of statistical information for mean of a treatment group or time 2.

KK. Standard deviation 2

This is a supplemental column provided purely for calculation purposes and to expedite the consensus process; specifically, this column in the codesheet does NOT count toward consensus and merely allows specific recording of statistical information for standard deviation of a treatment group or time 2.

LL. R

Report the converted (or original, if appropriate) between person R for this Variable 1-Variable 2 relationship.

- NOTE: *F*-tests and Chi-Squares must have 1 degree of freedom (*df*) in the numerator to be usable [e.g., *F*(1,60)].
  - There are a few exceptions to this; if unsure, ask someone.
- Means and SDs for the relationship(s) of interest also work (e.g., pre-post with one group; posttest comparison to a control group)
- ESs are BY INDEPENDENT SAMPLE. That is, there should be only one effect size for each outcome and independent sample in the research that is reported.
  - Conversions can be calculated by using the spreadsheet provided for you for conversion calculations as originally introduced by DeFife (2009). Please note that this converter takes the design of the study into account; therefore, you need to make sure you are using the column that is appropriate for calculating the effect size you are converting.
  - Also, when calculating R from means and standard deviation, please record the effect size as POSITIVE if the means increase from pre to post training OR are higher for the treatment group than the control group and as NEGATIVE if the means decrease from pre to post training OR are higher for the control group than the treatment group.

DISCUSSION

MM. Guidelines, Best Practices, or Lessons Learned

Report any guidelines, best practices, or lessons learned shared in the article.

NN. Study Limitations/Weaknesses

Report the limitations and weaknesses listed by the authors of the current study.

OO. Author-Suggested Future Research

Report avenues of future research suggested by the authors?

PP. Additional Comments

Add any additional comments that you think are helpful. A brief 2 of 3 sentence review of the purpose of the article may be helpful and appropriate here.

APPENDIX C: SUMMARY OF CODING

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
Al-Ammar (1995)	Unpublished	Other	-	Before and After	Organizational support	Opportunities to use	-	-	121	0.20
				Before and After	Organizational support	Proximal transfer	0.80	-	121	-0.05
				Before and After	Opportunities to use	Proximal transfer	0.69	-	121	0.16
Al-Eisa, Furayyan & Alhemoud (2009)	Published	Other	-	Before and After	Motivation to transfer	Organizational support	0.71	0.90	287	0.37
Axtell, Maitlis & Yearta (1996)	Published	-	-	After	Motivation to transfer	Transfer	0.81	-	45	0.36
				After	Motivation to transfer	Proximal transfer	0.81	-	62	0.39
				After	Motivation to transfer	Distal transfer	0.81	-	45	0.08

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
				After	Supervisor support	Transfer	0.81	-	45	0.39
				After	Supervisor support	Proximal transfer	0.81	-	62	0.12
				After	Supervisor support	Distal transfer	0.81	-	45	0.42
Baron & Morin (2009)	Published	Other	-	After	Supervisory support	Motivation to transfer	0.82	0.82	127	0.27
Bates, Holton & Burnett (1999)	Published	Other	Analogous transfer task	After	Supervisor support	Proximal transfer	0.92	-	68	0.23
				After	Opportunities to use	Proximal transfer	0.86	-	68	0.03
				After	Peer support	Proximal	0.83	-	69	0.22

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
						transfer				
				After	Peer support	Opportunities to use	0.86	0.83	69	0.45
				After	Supervisory support	Peer support	0.92	0.83	68	0.55
				After	Supervisory support	Opportunities to use	0.92	0.86	68	0.57
				After	Supervisory support	Proximal transfer	0.92	-	68	0.23
Bauer (2013)	Unpublished	-	-	After	Motivation to transfer	Proximal transfer	0.84	0.94	83	0.46
Bell & Ford (2007)	Published	Other	-	After	Motivation to transfer	Proximal transfer	0.96	0.87	113	0.10
Brinkerhoff & Montesino (1995)	Published	-	-	Before and After	Supervisory support	Training transfer	-	-	35	0.30
Burke (1997)	Published	Students	Analogous	After	Motivation to	Proximal	0.84	0.77	90	0.08

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
			transfer task		transfer	transfer				
Casper (2005)	Unpublished	Other	-	After	Motivation to transfer	Sustained transfer	0.85	-	52	0.39
				After	Supervisory support	Sustained transfer	0.75	-	52	0.41
				After	Peer support	Sustained transfer	0.76	-	52	0.34
				After	Organizational support	Sustained transfer	0.68	-	52	0.33
				After	Opportunities to use	Sustained transfer	0.75	-	52	0.37
Cheng (2000)	Published	Students	-	After	Organizational support	Sustained transfer	0.90	0.87	268	0.33
Chiaburu, Amanuel, Tekleab (2005)	Published	-	-	Before	Supervisor support	Proximal transfer	0.91	0.94	71	0.19
				Before	Motivation to	Proximal	0.89	0.94	71	0.23

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
					transfer	transfer				
Chiaburu, Van Dam & Hutchins (2010)	Published	-	-	During	Supervisor support	Proximal transfer	0.78	0.76	111	0.29
				During	Organizational support	Proximal transfer	0.86	0.76	111	0.26
				During	Motivation to transfer	Proximal transfer	0.75	0.76	111	0.44
				During	Motivation to transfer	Organizational support	0.86	0.75	111	0.24
				During	Motivation to transfer	Supervisor support	0.78	0.76	111	0.56
Cromwell & Kolb (2004)	Published	Other	-	After	Supervisor support	Training transfer	0.97	-	53	0.61
				After	Organizational support	Training transfer	0.82	-	53	0.57

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
				After	Peer support	Training transfer	0.95	-	57	0.60
				After	Organizational support	Supervisory support	0.82	0.97	46	0.66
				After	Organizational support	Peer support	0.82	0.95	46	0.60
				After	Supervisory support	Peer support	0.97	0.95	53	0.72
Curado, Henriques & Ribeiro (2015)	Published	-	-	After	Motivation to transfer	Organizational support	1.00	0.90	97	0.73
Devos, Dumay, Bonami, Bates & Holton (2007)	Published	Other	-	After	Motivation to transfer	Proximal transfer	-	0.91	106	0.43
				After	Motivation to transfer	Peer support	-	-	328	0.23

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
				After	Peer support	Opportunities to use	-	-	328	0.08
				After	Supervisor support	Peer support	-	-	328	-0.21
				Afte	Supervisor support	Opportunities to use	-	-	328	-0.28
				After	Motivation to transfer	Supervisor support	-	0.91	328	-0.13
				After	Supervisor support	Proximal transfer	-	-	106	0.17
Enos, Kehrhahn & Bell (2003)	Published	Finance	Analogous transfer task	After	Peer support	Training transfer	0.93	0.87	84	0.15

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
				After	Supervisor support	Training transfer	0.95	0.87	84	0.11
				After	Organizational support	Training transfer	0.85	0.87	84	0.18
				After	Supervisory support	Peer support	0.93	0.95	84	0.43
				After	Organizational support	Peer support	0.93	0.85	84	0.40
				After	Organizational support	Supervisor support	0.95	0.85	84	0.41
Fitzgerald (2002)	Unpublished	Healthcare	-	Before	Motivation to transfer	Maintained transfer	-	-	19	0.40

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
				Before	Supervisory support	Maintained transfer	-	-	19	0.20
				Before	Opportunities to use	Maintained transfer	-	-	19	0.01
				Before	Motivation to transfer	Peer support	-	-	33	0.10
				Before	Motivation to transfer	Opportunities to use	-	-	33	0.31
				Before	Peer support	Opportunities to use	-	-	33	0.19
				Before	Motivation to transfer	Supervisor support	-	-	33	0.27
				Before	Supervisor support	Peer support	-	-	33	0.27

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
				Before	Supervisor support	Opportunities to use	-	-	33	0.55
				Before	Supervisor support	Maintained transfer	-	-	33	-0.31
Frash (2004)	Unpublished	Other	-	After	Motivation to transfer	Training transfer	0.63	-	65	-0.12
				After	Peer support	Training transfer	0.63	-	65	0.00
				After	Motivation to transfer	Supervisory support	0.63	0.63	65	0.05
				After	Motivation to transfer	Peer support	0.63	0.63	65	0.29

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
				After	Supervisory support	Peer support	0.63	0.63	65	0.11
Futris, Schramm, Richardson & Lee (2015)	Published	Other	-	After	Supervisor support	Maintained transfer	-	-	316	0.28
				After	Peer support	Maintained transfer	-	-	316	0.29
Gegenfurtner (2013)	Published	Other	-	After	Motivation to transfer	Maintained transfer	0.88	0.88	131	0.17
Gilpin-Jackson & Bushe (2007)	Published	Healthcare	-	After	Opportunities to use	Training transfer	0.80	-	21	0.46
Giovengo (2014)	Unpublished	Military	-	After	Motivation to transfer	Training transfer	-	-	89	0.06
				After	Peer support	Training transfer	-	-	89	0.16
				After	Opportunities to use	Training transfer	-	-	89	0.13

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
Green (2002)	Unpublished	-	-	After	Motivation to transfer	Organizational support	0.86	0.82	118	0.09
				After	Motivation to transfer	Supervisory support	0.86	0.85	118	0.11
				After	Motivation to transfer	Peer support	0.86	0.66	118	0.15
Grohmann, Beller & Kauffeld (2014) Sample A	Published	Other	-	After	Motivation to transfer	Distal transfer	-	-	128	0.81
Grohmann, Beller & Kauffeld (2014) Sample B	Published	Other	-	After	Motivation to transfer	Distal transfer	0.80	0.94	373	0.65
Hicks (2006)	Unpublished	Other	-	Before and	Motivation to	Organizational	0.86	0.83	185	0.39

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
				After	transfer	support				
				Before and After	Motivation to transfer	Supervisory support	0.75	0.83	185	0.40
				Before and After	Organizational support	Supervisory support	0.86	0.75	185	0.76
				Before and After	Supervisory support	Organizational support	0.86	0.88	185	0.79
Hinrichs (2014)	Published	Other	-	After	Motivation to transfer	Proximal transfer	0.91	0.97	299	0.47
				After	Supervisor support	Proximal transfer	0.98	0.97	299	0.01
Hix (2013)	Published	Other	-	After	Motivation to transfer	Organizational support	0.61	0.86	22	0.47
Homklin, Takahashi & Techakanont (2014)	Published	-	-	After	Supervisory support	Sustained transfer	0.78	0.81	217	0.20
						Sustained				

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
				After	Peer support	transfer	0.79	0.81	217	0.17
				After	Organizational support	Sustained transfer	0.66	0.81	217	0.03
				After	Supervisor support	Peer support	0.78	0.78	217	0.24
				After	Organizational support	Supervisor support	0.78	0.66	217	0.30
				After	Organizational support	Peer support	0.66	0.66	217	0.20
Hutchins, Nimon, Bates & Holton (2013)	Published	Other	-	During	Peer support	Opportunities to use	0.85	0.71	235	0.38
					Motivation to	Supervisor				

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
				During	transfer	support	0.80	0.76	235	0.28
				During	Motivation to transfer	Peer support	0.85	0.76	235	0.43
				During	Motivation to transfer	Opportunities to use	0.71	0.76	235	0.20
				During	Supervisory support	Peer support	0.80	0.85	235	0.51
				During	Supervisory support	Opportunities to use	0.80	0.71	235	0.31
Jodlbauer, Selenko, Batinic & Stiglbauer (2011)	Published	-	-	After	Motivation to transfer	Sustainment	0.86	-	220	0.18
Kazbour, McGhee, Mooney,	Published	Other	-	Before	Supervisory	Distal transfer	1	-	51	0.20

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
Masica & Brinkerhoff (2013)					support					
Khalfani (2014)	Unpublished	Healthcare	-	After	Supervisory support	Peer support	-	-	89	0.47
Kirwan & Birchall (2006)	Published	Healthcare	-	After	Motivation to transfer	Opportunities to use	0.74	0.82	72	0.27
				After	Motivation to transfer	Peer support	0.90	0.82	72	0.32
Korunka, Dudak, Molnar & Hoonakker (2007)	Unpublished	Other	-	After	Supervisory support	Sustained transfer	0.93	-	116	0.51
Lee (2010)	Unpublished	Finance	-	After	Motivation to transfer	Peer support	0.86	0.89	484	0.46
				After	Supervisory support	Peer support	0.90	0.89	471	0.46
					Supervisory	Maintained				

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
				After	support	transfer	0.90	-	471	0.33
				After	Motivation to transfer	Supervisory support	0.86	0.90	484	0.29
Lee, Lee, Lee & Park (2014)	Published	Other	-	After	Organizational support	Training transfer	0.89	0.92	365	0.47
				After	Supervisory support	Training transfer	0.91	0.92	365	0.58
				After	Peer support	Training transfer	0.83	0.92	365	0.54
				After	Motivation to transfer	Training transfer	0.71	0.92	365	0.52
				After	Organizational support	Supervisory support	0.89	0.91	365	0.55

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
				After	Organizational support	Peer support	0.89	0.83	365	0.53
				After	Motivation to transfer	Organizational support	0.89	0.71	365	0.53
				After	Organizational support	Peer support	0.91	0.83	365	0.64
				After	Motivation to transfer	Supervisory support	0.91	0.71	365	0.67
				After	Motivation to transfer	Peer support	0.83	0.71	365	0.58
Liu & Smith (2011)	Published	Other	-	After	Supervisory support	Training transfer	0.93	0.75	92	0.15
Martineau (1995)	Unpublished	Other	-	Before and	Motivation to	Maintained	0.76	0.87	64	0.37

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
				After	transfer	transfer				
				Before and After	Motivation to transfer	Distal transfer	0.76	0.87	46	0.21
				Before and After	Motivation to transfer	Training transfer	0.76	0.87	46	0.33
Masenberg, Spurk & Kauffeld (2015)	Published	Other	-	After	Motivation to transfer	Proximal transfer	0.90	0.83	191	0.50
				After	Peer support	Proximal transfer	0.80	0.83	191	0.32
				After	Supervisory support	Proximal transfer	0.87	0.83	191	0.18
					Motivation to					

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
				After	transfer	Peer support	0.90	0.80	191	0.50
				After	Motivation to transfer	Supervisory support	0.90	0.87	191	0.46
				After	Supervisory support	Peer support	0.80	0.87	191	0.50
				After	Motivation to Transfer	Peer support	0.90	0.80	34	0.64
				After	Motivation to transfer	Supervisor support	0.90	0.87	34	0.59

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
				After	Peer support	Supervisor support	0.80	0.87	34	0.41
Mohamed (1994)	Unpublished	Other	-	After	Organizational support	Supervisor support	0.52	0.52	118	0.68
				After	Organizational support	Sustained transfer	0.52	-	118	0.79
				After	Supervisory support	Sustained transfer	0.52	-	118	0.85
Myers (1998)	Unpublished	Students	-	Before and after	Motivation to transfer	Proximal transfer	0.89	0.94	111	0.04
Nair (2007)	Unpublished	Other	Analogous transfer task	After	Motivation to transfer	Distal transfer	0.87	0.89	418	0.76
Naowaruttanavanit (2002)	Unpublished	-	-	After	Motivation to transfer	Sustained transfer	0.83	-	649	0.49
Ng (2015)	Published	-	-	After	Supervisory	Training	0.98	0.83	306	0.65

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
					support	transfer				
Peters, Cossette, Bates, Holton, Hansez & Faulx (2014)	Published	Other	-	After	Supervisory support	Peer support	0.84	0.78	118	0.32
				After	Supervisory support	Proximal transfer	0.84	0.93	118	0.28
				After	Peer support	Proximal transfer	0.78	0.9	118	0.24
Pham, Segers & Gijselaers (2012)	Published	Students	-	During and After	Supervisory support	Peer support	0.83	0.85	126	0.72
				During and After	Supervisory support	Maintained transfer	0.83	-	126	0.51
				During and After	Peer support	Maintained transfer	0.85	-	126	0.38
Poteet (1996)	Unpublished	Students	-	Before and After	Motivation to transfer	Peer support	0.93	0.85	136	0.29

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
				Before	Motivation to transfer	Proximal transfer	0.93	0.92	136	0.28
				After	Peer support	Proximal transfer	0.85	0.92	136	0.51
				Before	Motivation to transfer	Training transfer	0.93	0.96	136	0.33
				After	Peer support	Training transfer	0.85	0.96	136	0.24
Powell (2009)	Unpublished	Other	-	After	Organizational support	Proximal transfer	0.97	0.82	67	0.21
				After	Organizational support	Maintained transfer	0.97	0.82	67	0.13
					Organizational	Training				

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
					support	transfer				
				After			0.97	0.82	67	0.17
Richman (1998)	Unpublished	Other	-	After	Motivation to transfer	Proximal transfer	0.94	0.88	267	0.10
Ronen (2010)	Unpublished	-	-	After	Supervisory support	Training transfer	-	0.82	399	0.57
				After	Peer support	Training transfer	-	0.82	399	0.39
				After	Supervisory support	Peer support	-	-	399	0.44
Sekowski (2003)	Unpublished	Other	-	After	Motivation to transfer	Proximal transfer	0.94	0.78	45	0.12
Short (1997)	Unpublished	Other	-	After	Supervisory	Proximal	0.89	-	112	0.28

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
					support	transfer				
				After	Peer support	Proximal transfer	0.78	-	89	0.37
				After	Supervisory support	Peer support	0.89	0.78	89	0.57
Smith-Jentsch, Salas & Brannick (2001)	Published	Other	Analogous transfer task	Before and After	Supervisor support	Training transfer	-	-	58	-0.05
				Before and After	Supervisor support	Training transfer	-	-	58	0.18
Switzer, Nagy & Mullins (2005)	Published	Other	-	Before	Supervisor support	Proximal transfer	0.90	0.83	68	0.18
Tziner, Haccoun & Kadish (1991)	Published	Military	-	During	Motivation to transfer	Proximal transfer	-	0.90	81	0.24
Van den Bossche, Segers & Jansen (2010)	Published	Other	-	After	Motivation to transfer	Distal transfer	0.89	0.86	35	0.49
van der Locht, van Dam & Chiaburu	Published	-	-	After	Motivation to	Training	0.84	0.94	595	0.49

Citation	Published	Industry type	Task type	Timing of the predictor	Predictor	Outcome	Reliability of predictor	Reliability of outcome	N	*r*
(2013)					transfer	transfer				
Velada, Caetano, Michel, Lyons & Kavanagh (2007)	Published	Other	Analogous transfer task	After	Supervisory support	Maintained transfer	0.89	0.87	182	0.31
Warr, Allan & Birdi (1999)	Published	Other	-	-	Motivation to transfer	Training transfer	0.79	-	123	0.10
Wenzel (2014)	Unpublished	Other	-	After	Motivation to transfer	Training transfer	0.83	0.75	949	0.14
				After	Motivation to transfer	Training transfer	0.74	0.73	113	0.53
Zumrah & Boyle (2015)	Published	Other	-	After	Organizational support	Sustainment	0.71	0.80	222	0.26

APPENDIX D: SUSTAINMENT OF TRAINING TRANSFER

Predictor	*k*	N	$\bar{r}$	ρ	SD_ρ	% Variance	95 % CI		80% CV		*Q*
							Lower CI	Upper CI	Lower CI	Upper CI	
Trainee Characteristics											
Motivation	3	921	0.41	0.48	0.14	13.16	0.26	0.56	0.30	0.67	22.70**
Work Environment											
Organizational support	5	877	0.30	0.39	0.28	9.27	0.10	0.50	0.03	0.76	47.00**
Supervisory support	4	503	0.44	0.57	0.31	7.90	0.19	0.69	0.17	0.96	36.12**
Peer support	2	269	0.20	0.25	0	100	0.10	0.29	0.25	0.25	1.36
Opportunities to perform	1	52	0.37	0.47	0	-	0.37	0.37	0.47	0.47	-

Note. *p<.05, **p<.01

APPENDIX E: TIMING OF PREDICTOR EVALUATIONS

Predictor	*k*	N	$\bar{r}$	ρ	SD_ρ	% Variance	95 % CI		80% CV		*Q*
							Lower CI	Upper CI	Lower CI	Upper CI	
Trainee Characteristics											
Motivation to transfer											
Before	3	226	0.30	0.34	0	100	0.24	0.37	0.33	0.33	0.86
During	2	192	0.36	0.44	0.05	86.31	0.22	0.49	0.38	0.50	2.32
After	23	5,421	0.40	0.47	0.26	5.97	0.30	0.49	0.14	0.80	317.52**
Before and after	-	-	-	-	-	-	-	-	-	-	-
Before and during	-	-	-	-	-	-	-	-	-	-	-
During and after	-	-	-	-	-	-	-	-	-	-	-
Before, during and after	-	-	-	-	-	-	-	-	-	-	-
Work Environment											
Organizational support											
Before	-	-	-	-	-	-	-	-	-	-	-
During	1	111	0.26	0.32	0	-	0.26	0.26	0.32	0.32	0
After	10	2,645	0.31	0.38	0.21	9.37	0.20	0.42	0.11	0.65	84.93**
Before and after	1	121	0.05	0.07	0	-	-0.05	-0.05	-0.07	-0.07	0
Before and during	-	-	-	-	-	-	-	-	-	-	-
During and after	-	-	-	-	-	-	-	-	-	-	-
Before, during and after	-	-	-	-	-	-	-	-	-	-	-
Supervisor support											

Predictor	*k*	N	$\bar{r}$	ρ	SD_ρ	%	95 % CI		80% CV		*Q*
Before	4	209	0.19	0.22	0	100	0.18	0.19	0.22	0.22	0.02
During	1	111	0.29	0.38	0	-	0.29	0.29	0.38	0.38	0
After	22	4,510	0.39	0.47	0.19	12.37	0.31	0.46	0.23	0.71	111.55**
Before and after	2	93	0.23	0.39	0	100	0.15	0.30	0.39	0.39	0.32
Before and during	-	-	-	-	-	-	-	-	-	-	
During and after	1	126	0.51	0.60	0	-	0.51	0.51	0.60	0.60	0
Before, during and after	-	-	-	-	-	-	-	-	-	-	-
Peer support											
Before	1	33	-0.31	-0.52	0	-	-0.31	-0.31	-0.51	-0.40	0.00
During	-	-	-	-	-	-	-	-	-	-	-
After	15	3,214	0.40	0.48	0.18	13.31	0.32	0.48	0.26	0.71	13.31
Before and after	-	-	-	-	-	-	-	-	-	-	-
Before and during	-	-	-	-	-	-	-	-	-	-	-
During and after	1	126	0.38	0.45	0	-	0.38	0.38	0.45	0.45	0
Before, during and after	-	-	-	-	-	-	-	-	-	-	-
Opportunities to perform											
Before	1	19	0.00	0.00	0	-	0.00	0.00	0.00	0.00	0.00
During	-	-	-	-	-	-	-	-	-	-	-
After	3	209	0.16	0.19	0.07	81.78	0.01	0.31	0.11	0.28	3.66
Before and after	1	121	0.16	0.21	0	-	0.16	0.16	0.21	0.21	0
Before and during	-	-	-	-	-	-	-	-	-	-	-

Predictor	*k*	N	$\bar{r}$	ρ	SD_ρ	%	95 % CI		80% CV		*Q*
During and after	-	-	-	-	-	-	-	-	-	-	-
Before, during and after	-	-	-	-	-	-	-	-	-	-	-

Note. *p<.05, *p<.01

APPENDIX F: TRANSFER TASK TYPES

Predictor	*k*	N	$\bar{r}$	ρ	SD_ρ	% Variance	95 % CI		80% CV		*Q*
							Lower CI	Upper CI	Lower CI	Upper CI	
Trainee Characteristics											
Motivation											
Analogous	2	508	0.64	0.76	0.30	2.06	0.28	1.00	0.37	1.15	68.58**
Adaptive		-	-	-	-	-	-	-	-	-	-
Work Environment											
Organizational support											
Analogous	1	84	0.18	0.21	0	-	0.18	0.18	0.21	0.21	0
Adaptive		-	-	-	-	-	-	-	-	-	-
Supervisory support											
Analogous	4	392	0.24	0.27	0	100	0.16	0.31	0.29	0.29	2.41
Adaptive		-	-	-	-	-	-	-	-	-	-
Peer support											
Analogous	2	153	0.18	0.21	0	100	0.13	0.23	0.21	0.21	0.20
Adaptive		-	-	-	-	-	-	-	-	-	-
Opportunities to perform											
Analogous	1	68	0.03	0.04	0	-	0.03	0.03	0.04	0.04	0
Adaptive		-	-	-	-	-	-	-	-	-	-

Note. *p<.05, **p<.01

APPENDIX G: INDUSTRY TYPE EVALUATIONS

Predictor	*k*	N	$\bar{r}$	ρ	SD_ρ	% Variance	95 % CI		80% CV		Q
							Lower CI	Upper CI	Lower CI	Upper CI	
Trainee Characteristics											
Motivation											
Healthcare	1	19	0.40	0.47	0	-	0.40	0.40	0.47	0.47	0
Military	2	170	0.15	0.17	0	145.5	0.03	0.27	0.17	0.17	1.37
Finance	3	337	0.17	0.19	0.11	46.22	0.02	0.32	0.05	0.33	6.43*
Student	-	-	-	-	-	-	-	-	-	-	-
Other	18	3,819	0.38	0.45	0.29	5.39	0.26	0.50	0.08	0.83	275.80**
Work Environment											
Organizational support											
Healthcare	-	-	-	-	-	-	-	-	-	-	-
Military	-	-	-	-	-	-	-	-	-	-	-
Finance	1	268	0.33	0.37	0	-	0.33	0.33	0.37	0.37	0
Student	1	84	0.18	0.21	0	-	0.18	0.18	0.21	0.21	0
Other	8	1,447	0.26	0.32	0.31	7.28	0.08	0.44	-0.07	0.71	97.58**
Supervisory support											
Healthcare	1	19	0.20	0.25	0	-	0.20	0.20	0.25	0.25	0
Military	-	-	-	-	-	-	-	-	-	-	-
Finance	1	126	0.51	0.60	0	-	0.51	0.51	0.6	0.6	0
Student	2	555	0.30	0.33	0.1	47.65	0.19	0.41	0.25	0.42	4.17*
Other	19	2,415	0.34	0.41	0.20	17.37	0.25	0.42	0.15	0.67	84.46**
Peer support											
Healthcare	1	33	-0.31	-0.52	0	-	-0.31	-0.31	-0.52	-0.52	0
Military	1	89	0.16	0.19	0	-	0.16	0.16	0.19	0.19	0
Finance	2	262	0.31	0.35	0	100	0.22	0.41	0.35	0.35	1.5
Student	1	84	0.15	0.17	0	-	0.15	0.15	0.17	0.17	0

Predictor	*k*	N	$\bar{r}$	ρ	SD ρ	% Variance	95% CI		80% CV		Q
Other	10	1,539	0.33	0.41	0.16	22.32	0.24	0.43	0.20	0.62	40.76**
Opportunities to perform											
Healthcare	1	19	0.01	0.01	0	-	0.01	0.01	0.01	0.01	0
Military	1	89	0.13	0.17	0	-	0.13	0.13	0.17	0.17	0
Finance	-	-	-	-	-	-	-	-	-	-	-
Student	3	241	0.17	0.21	0.06	82.94	0.09	0.33	0.13	0.29	3.60
Other	3	241	0.17	0.21	0.06	82.94	0.03	0.30	0.13	0.29	3.60

Note. *p<.05, **p<.01

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