

BUILDING THE CLIMATE FOR OPTIMAL ORGANIZATIONAL TRANSFER OF  
LEARNING: AN EXAMINATION OF USDA-NATURAL RESOURCES  
CONSERVATION SERVICE EMPLOYEE TRAINING MOTIVATION AND  
PERCEIVED TRAINING TRANSFER

A Dissertation

by

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## **DEDICATION**

First, I would like to thank God for the making this accomplishment part of my life. You have provided me with so many opportunities and blessed me with the health, drive, and unwavering family support to get this done.

I dedicate this piece of work to Julia and Morris Lavergne, my mamma and papa. I so admire your values, never-ending faith and work ethic. I will never know the struggles and level of dedication it took to raise five children in rural Louisiana who all went on to raise families and do great things. I hope to have such a profound impact on my children and grandchildren when the time comes. Your legacy is great.

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## **ABSTRACT**

Significant strides have been made in the human resources field over the last two decades; however, securing transfer of learning from formal training to the work setting still poses a problem. Following Ford and Baldwin's (1988) Model of Training Transfer, USDA Natural Resources Conservation Service (NRCS) employees were surveyed to examine if they are motivated and able to transfer skills learned in formal training into the work environment.

Multiple regression analyses were utilized to determine which Learning Transfer System Inventory (LTSI) explanatory variables explained variance in self-perceived content recall and content transfer from an agency training series. This work identified personal, training, and work climate constructs indicative to this particular agency that at times are effective precursors to learning transfer.

USDA-NRCS employees who completed the Conservation Boot Camp training series, a 3-week in-boarding training, comprised the sample for the study. A total of 268 responses (50.0%) were returned for analysis.

It was concluded that significant relationships do exist between NRCS employees' self-perceived content recall and content transferred scores and selected demographics and explanatory variables measuring learning constructs.

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# **CHAPTER I**

## **INTRODUCTION**

Training is defined as a “strategic human practice that can benefit individuals, teams, organizations and society” (Saks & Burke, 2012). Mathieu, Tannenbaum, and Salas (1992, p. 828) noted, “individuals rely on training to improve their current skills and to learn new skills.” This systematic acquisition of knowledge, skills, and consequential attitudes is expected to lead an employee to improved performance (Grossman & Salas, 2011), and the attainment of training is considered beneficial to individuals, teams, organizations, and society as a whole (Aguinis & Kraiger, 2009).

Organizations generally view training one of two ways: as a universal panacea for all problems (Chaudron, 1996; Gomez-Mejia, Balkin, & Cardy, 2004) or an extra cost, in both time and dollars (Giangreco, Sebastiano, & Peccei, 2009). In 2011, public and private organizations invested approximately \$156.2 billion on employee development (Miller, 2012). Literature has shown training transfer to be problematic and oftentimes unlikely to occur (Vermeulen & Admiraal, 2009; Salas & Cannon-Bowers, 2001), with as little as 10% of knowledge, skills, and abilities delivered resulting in transfer to on-the-job performance (Kazbour & Kazbour, 2012).

The Natural Resources Conservation Service (NRCS) is a technical agency of the United States Department of Agriculture (USDA). Established as the Soil Conservation Service in 1935, the agency was developed to respond to significant soil and water resource concerns across the United States. Today, the NRCS is considered the premier governmental agency working with private landowners to help them conserve, maintain,

and improve their natural resources. The NRCS is known for voluntary, science-based conservation, technical assistance, partnerships, incentive-based programs, and cooperative problem solving at the community level. The NRCS currently employs approximately 10,700 employees mandated by Congress to assist landowners in reducing soil erosion, improving water supplies, enhancing water quality, increasing wildlife habitat, and reducing damages caused by floods and other natural disasters.

The National Employee Development Center (NEDC) is responsible for the professional development of NRCS employees nationwide. The primary function of NEDC is to provide timely, sequential, competency-based training to NRCS employees. The NRCS General Manual describes the responsibilities of employees and supervisors to promote learning transfer. Policy recommends supervisors to hold employees accountable for their learning, and encourages extension of opportunity to practice new skills in the work environment.

A solid understanding of factors contributing to organizational learning and performance is an essential component in human resource development (Joo, 2010; Chen & Huang, 2009; Rose, Kumar, & Pak, 2009; Kumpikaite, 2008; Swanson & Holton, 2001). Work is currently underway within NEDC to advance employee competency assessments and performance evaluations within the agency. Competency models are generally collections of knowledge, skills, abilities, and other characteristics needed for effective job performance (Green, 1999; Lucia & Lepsinger, 1999; Mansfield, 1996; Rodriguez, Patel, Bright, Gregory, & Gowing, 2002). Competency models are used by organizations to hire new employees based on compatibility with organizational needs

and culture; to provide employee training to enhance certain aptitudes; to promote employees through promotion criteria based on competencies; to establish competency-based career models and performance incentives; and to evaluate performance (Shippmann et al., 2000; Zinghem, Ledford, & Schuster, 1996; Bartram, 2005; Lucia & Lepsinger, 1999). Biemans, Niuwenhaus, Poell, Mulder, and Wesselink (2004) suggested familiar gaps between workforce performance and training can be reduced through competency-based education. When operationalized correctly, competencies tend to distinguish high performers from average performers. When linked to organizational objectives, the competencies serve as a deductive tool to evaluate performance, and retroactively identify necessary tasks to reach desired outcomes (Campion et al., 2011).

### **Statement of the Problem**

While the value of training and development is paramount, literature shows a pervasive problem with ensuring knowledge, skills, and abilities formally acquired are applied in the work environment. Educational and human resource development literature has consistently reinforced that employee acquisition of knowledge and skills is of little value if not generalized to the respective work setting (Yamnill & McLean, 2001; Kozlowski & Salas, 1997). Training interventions only improve work performance if employees use the newly acquired skills (Mooney & Brinkerhoff, 2008). Transfer of training depends on a number of variables, including transfer design, trainee characteristics, and work environment constructs (Baldwin & Ford, 1988).

## **Purpose of the Study**

The purpose of this study was to determine if meaningful associations exist between NRCS employees' self-perceived Conservation Boot Camp (CBC) content recall and content transfer scores and selected explanatory variables measuring learning transfer constructs (personal attributes, training, and work environment). This study examined the effects of a professional development training series utilized by NRCS for all field office employees.

## **Study Objectives**

To achieve the research purpose, the following research objectives guided this study:

1. To determine learning transfer factors influencing NRCS employees' self-perceived scores of content recalled (knowledge, skills, and abilities) from the NRCS CBC;
2. To determine learning transfer factors influencing NRCS employees' self-perceived scores of NRCS CBC content transferred the work setting; and,
3. To judge if significant relationships exist between NRCS employees' self-perceived CBC content recall and content transfer scores and selected demographic and explanatory variables measuring learning transfer constructs.

### **Significance of the Study**

This study provides a glimpse into organizational culture of the USDA-NRCS, as it relates to motivation to transfer knowledge, skills, and abilities learned in formal training to the work environment. It also provides research that has not been conducted for the federal agency USDA-NRCS. This study also aims to strengthen the body of knowledge for human resources researchers and practitioners.

### **Limitations**

Data was collected from past participants of the NRCS CBC training series. A potential limitation to this approach is that data obtained consists of self-reported perceptions from the respondents. Therefore, it is possible that sources of variability inherent to self-report will reduce data validity. The target population represented a single federal agency, which may limit the generalizability of findings. The findings should not be generalized outside of similar populations.

While 316 employees began the survey, only 268 completed. This may be due to the survey length. Survey attrition was found to be a limitation of the study.

### **Assumptions**

Two assumptions were made during this study. The assumptions were:

1. Participants in this study accurately completed all parts of the questionnaire.
2. The sample drawn was representative of USDA-NRCS employees who have completed the CBC training.

## **Definition of Terms/Acronyms**

Learner Readiness – The extent to which individuals are prepared to enter and participate in training [LTSI Personal Factor].

LTSI – Learning Transfer System Inventory

Motivation to Transfer – The direction, intensity and persistence of effort toward utilizing, in a work setting, skills and knowledge learned [LTSI Personal Factor].

Negative Personal Outcomes – The degree to which individuals believe that not applying skills and knowledge learned in training will lead to outcomes that are negative.

NRCS – Natural Resources Conservation Service

Openness to Change – The extent to which prevailing group norms are perceived by individuals to resist or discourage the use of skills and knowledge acquired in training [LTSI Work Environment Factor].

Opportunity to Use – The extent to which trainees are provided with or obtain resources and tasks on the job enabling them to use training on the job [LTSI Work Environment Factor].

Peer Support – The extent to which peers reinforce and support the use of learning on the job [LTSI Work Environment Factor].

Perceived Content Validity – The extent to which trainee's judge training content to reflect job requirements accurately [LTSI Training Factor]

Performance Self-Efficacy – An individual's general belief that he/she is able to change his performance when he/she wants to [LTSI Personal Factor].

Personal Capacity to Transfer – The extent to which individuals have time, energy and mental space in their work lives to make changes required to transfer learning on the job [LTSI Personal Factor].

Positive Personal Outcomes – The degree to which applying training on the job leads to outcomes that are positive for the individual [LTSI Personal Factor].

Self-efficacy - people's beliefs in their capabilities to mobilize the motivation, cognitive resources, and courses of action needed to exercise control over events in their lives.

Supervisor Sanctions – The extent to which individuals perceive negative responses from supervisors-managers when applying skills learned in training [LTSI Work Environment Factor].

Supervisor Support – The extent to which supervisors-managers support and reinforce use of training on the job [LTSI Work Environment Factor].

Transfer Design – The degree to which training has been designed and delivered to give trainees the ability to transfer learning on the job [LTSI Training Factor].

Transfer Effort-Performance Expectations – The expectation that effort devoted to transferring learning will lead to changes in job performance [LTSI Personal Factor].

Transfer of learning – The effective and continuing application of knowledge and skills, gained in training, by trainees both on and off the job

USDA – United States Department of Agriculture

## **CHAPTER II**

### **REVIEW OF LITERATURE**

A comprehensive explanation of concepts, theories, and approaches of training transfer is provided to enhance the reader's understanding of this study. A review of employee motivation to transfer learning, satisfaction with training and factors either promoting or hindering effective learning transfer is also presented. Finally, an overview of organizational learning climate and culture's impact on training transfer is offered.

#### **Transfer of Learning**

Baldwin and Ford (1988), authors of a well-cited review of training transfer articles, defined training transfer as a “learned behavior [that] is generalized to the job context and maintained over a period of time on the job” (p. 63). The authors developed the Model of the Transfer Process (Figure 1), which included individual characteristics, work-related characteristics, and transfer design. Individual characteristics include ability, or skill and motivation of the individual. Work-related characteristics are primarily climatic and comprised of supervisory and peer support, as well as opportunities or barriers to apply the learned behaviors when returning to the workplace. Transfer design factors relate to the relevance of instruction to employees' job situations

Baldwin and Ford (1988) posited that training outcomes and input factors have direct and indirect impacts on conditions of transfer with the model illustrating six proposed linkages that are involved in the transfer process. Trainee characteristics, including individual ability, personality, and motivation to transfer are found critical to learning and retention, as well as the generalization and maintenance of learned



knowledge, skills, and abilities. The model illustrates that three training input antecedents (trainee characteristics, training design, and work environment) have an indirect effect on training transfer.

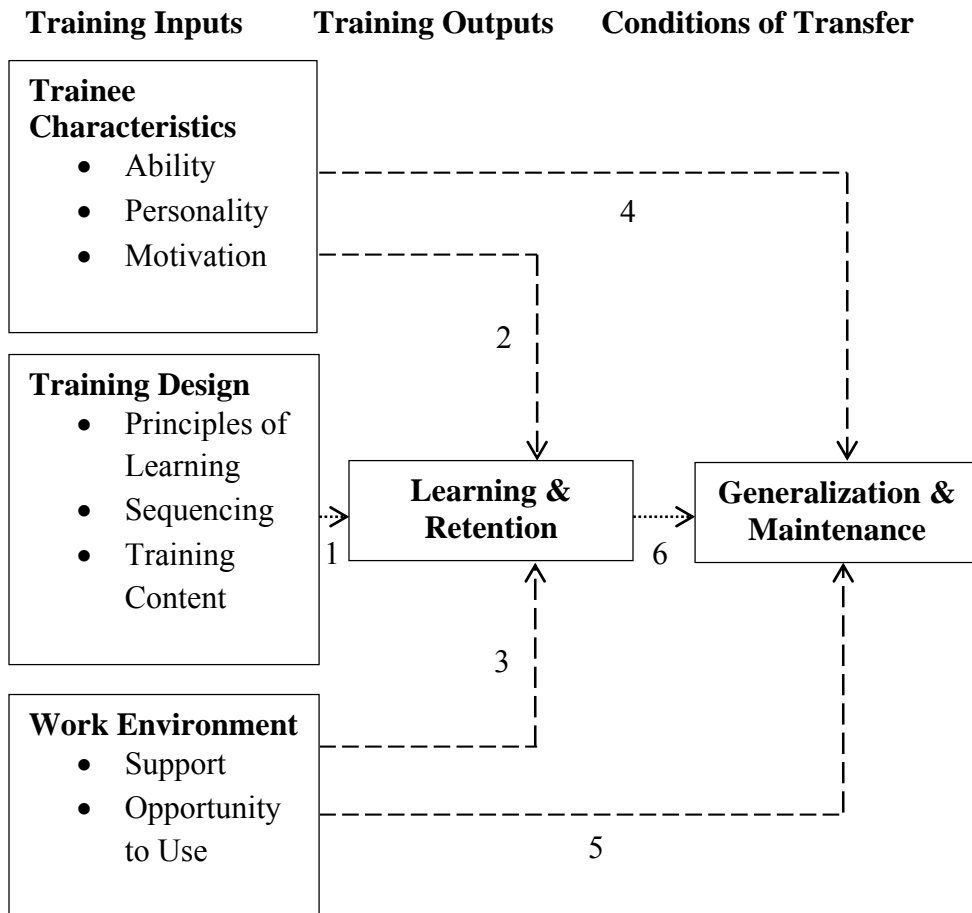


Figure 1. A Model of Training Transfer as depicted by Baldwin and Ford, 1988, pp. 65-66. Model conveys the direct connections between training input factors and outcomes through six linkages.

Baldwin and Ford (1988) concluded that training transfer literature held a number of gaps, including a general fragmentation through the diversity of scales used to measure transfer, a lack of consistent criterion of measurement, and an inconsistency in the amount of time between training intervention and the research query. Future research recommendations were offered to fill unexamined factors impacting successful transfer of knowledge, skills, and abilities from the training setting to the work environment. These included further investigation into the operationalization of training-design principles, including an explanation of the principle of identical elements. This assumes transfer is maximized when identical stimulus and response features are available both in the training and transfer settings. A second recommendation involved investigating redintegration, or the “capacity of one part of a stimulus complex to re- evoke or cue the entire complex” (p. 89). Efforts toward identifying training attributes that foster high redintegrative characteristics in trainees offer extensive investigative opportunities for research and practitioners. Further recommendations included a call for interactive, action-based research to more closely link trainee characteristics and training design, as well as examination of key skills most likely affected by management and the organizational environment.

Training design includes learning principles, sequence of training material, and job relevance of the training content. Trainee-specific characteristics include ability, skill, motivation, and personality factors. Work environment factors include organizational climate, social support from supervisors and peers, and constraints and opportunities to perform learned behaviors on the job (Ford & Weissbein, 1997).

Though introduced in 1988, the model and its linkages have withstood the test of time, and are consistently found throughout human resource development literature (Rouillier & Goldstein, 1993; Tracey, Tannenbaum, & Kavanaugh, 1995; Kirwan & Birchall, 2006; Saks & Belcourt, 2006; Burke & Hutchins, 2007; Saks & Burke, 2012; Simosi, 2012).

Ford and Weissbein (1997) revisited the Baldwin and Ford (1988) study to address four key limitations recorded in the original article: “(a) the criterion problem of how and when to measure training transfer, (b) the generalizability of results from training design studies, (c) the choice of which trainee characteristics to examine for their impact on transfer, and (d) the conceptualization and operationalization of work environment factors that can impact transfer” (p. 22). Twenty empirical articles addressing the four limitations were reviewed by Ford and Weissbein (1997). The authors reported more rigor in the studies conducted after the 1988 article. Regarding the void of criterion-related limitations, measures were applied to improve self-reporting limitations. For instance, in some studies behaviorally-anchored scales were used to improve self-reporting results. In others specific expected outcome variables were added, as opposed to the use of general statements. The second issue consisted of generalizing laboratory or experimental studies to practical settings. This erroneously related near transfer memory and motor task assumptions to more complex applied skills, which are required for far transfer.

A third shortcoming associated with the Baldwin and Ford (1988) model is that no theoretical framing for trainee characteristics is studied, including a lack of

operational modeling for categorizing trainee characteristics. To this end, ample studies were found in career development literature utilizing conceptual frameworks and attention has been given to pre-training factors affecting transfer.

The fourth limitation reviewed by Ford and Weissbein (1997) is the work environmental factors, specifically, the nebulous nature in which they were studied. Follow-up studies were found to increase efforts to understand work environment impacts on transfer. To summarize, it was concluded that strides have been taken following the original 1988 review to address the four key limitations, including (a) greater sensitivity to which criterion measures to use over self-reporting, (b) utilization of skills and tasks that more closely emulate those in vocational settings, (c) further development of theoretical or conceptual framing, and (d) inclusion of research on work environmental factors. Further research needs and direction were also provided.

While a substantial amount of public and private organizations' budgets are allocated to training, and significant research has been conducted on effective treatments to ensure training transfer (Brinkerhoff & Montesino, 1995; Lim & Morris, 2006; Burke & Hutchins, 2008), the proverbial gap between training and workplace performance has yet to be reduced. A number of foundational studies associated with transfer are available. As far back as 1901, Thorndike and Woodworth made predictions that transfer likely occurred if the aims, design method, and instructional methods mirrored the tasks (Blume et al., 2010).

While economically harmful, failure to transfer learning from formal training to work situations has also resulted in loss of life. In 2010, the British Petroleum (BP) Deep

Horizon oil spill in the Gulf of Mexico resulted in the loss of 11 lives and significant ecological damage. A U.S. National Commission investigation of this incident established one antecedent for the spill-causing blowout to be a systematic “lack of resources, technical training and experience in petroleum engineering” by the Minerals Management Service, the Federal oversight agency responsible for drilling operations in the Gulf of Mexico (National Commission on the BP Deep Horizon Oil Spill and Offshore Drilling, 2011, p. 57). As further example, literature estimates \$183 billion is spent annually on injuries and deaths linked to insufficient training (National Safety Council, 2010).

The transfer of learning in a professional training context has proven to be a complex undertaking (Leberman, McDonald, & Doyle, 2006; Holton, Bates, & Ruona, 2000; Cheng & Ho, 2001; Fitzpatrick, 2001; Blume, Ford, Baldwin, & Huang, 2010; Cheng & Hampson, 2008). While the skill and employee performance of any organization is critical to organizational growth and increased competitiveness (Yamnill & McLean, 2001), literature repeatedly exhibits as little as 10% of learning actually transfers to job performance (Holton & Baldwin, 2003; Kupritz, 2002; Baldwin & Ford, 1988; Cheng & Hampson, 2008; Chiaburu, Dam, & Hutchins, 2010; Saks & Burke, 2012; Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2012). However, Saks (2002) noted this assertion to be merely an estimate. Saks and Belcourt (2006) conducted a related study with manufacturing, service, and governmental employees affiliated with a Canadian training society. The intent was to measure the impact of specific activities on training transfer at three stages of development: prior to; during; and following training. Thirteen

pre-training activities, seven activities during the training, and 16 post-training activities were developed and tested through exploratory factor analysis. A 62% transfer rate was reported immediately after training. Six months after training, 44% reported transfer of trained abilities and skills. One year following training, 34% transfer was reported. While these data provide a positive report of training transfer, literature shows low transfer for organizations not implementing continuous training activity before, during, and after a training intervention.

Applicable transfer of knowledge and skills has been noted as necessary to organizational growth and increased competitiveness, yet attainment is extremely difficult and not always guaranteed (Baldwin & Ford, 1988; Cheng & Hampson, 2008; Chiaburu, Van Dam, & Hutchins, 2010; Saks & Burke, 2012; Salas et al., 2012). Leberman, McDonald, and Doyle (2006) noted transfer to be “one of the most complicated and pervasive issues in psychology and education (p. 29). Formal learning interventions in the contemporary workplace hold the expectation of improving organizational and employee performance (Burke & Hutchins, 2007). The metric used to evaluate training transferability is the point where desired changes in attitude, behaviors, and skills are seen in the workplace for an extended period. Unfortunately, minimal longitudinal data is gathered following employee training.

In relation to increasing transferability from training to workplace situations, Brinkerhoff and Montesino (1995) signaled a need for accelerated participation from trainers and trainees, as well as the employees’ immediate supervisor. The authors noted a skewed perception of roles, where supervisors see the training function as solely the

responsibility of the trainer. On the other hand, trainers view their role as designers and facilitators of “good” training. The two parties generally see their roles as having a separate, rather than overlapping nature. Trainees who had supervisors who explicitly supported training reported fewer factors inhibiting transfer of skills. Distinct training interventions were proposed: (a) implementing a before-training support session to discuss expectations, and (b) to hold an after-training support session to discuss methods of transferring knowledge, skills, and abilities learned.

Previous studies indicate the transfer of knowledge, skills, and abilities will not be realized without the appropriate transfer environment. Mathieu, Tannenbaum, and Salas (1992) noted the work environment following a training event might either support or inhibit application of learning on the job. Saks and Burke (2012) reported transfer of training consists of the movement of trained skills and behaviors from the training to the work environment and reinforced the importance of maintaining these new skills and behaviors for the length of time they are needed on the job.

Previous literature has called for both formal and informal reinforcement of knowledge, skills, and abilities gained from training events (Pellegrino & Hilton, 2013; Salas et al., 2012; Chiaburu & Marinova, 2005; Tracey, Tannenbaum, & Kavanaugh, 1995). Burke and Hutchins (2008) introduced a three-step process to assist in maximizing training, including recommendations that should occur before; during; and after training. Before training, Salas et al. (2012) recommended a training needs analysis (TNA) be conducted to prepare the learning environment. The TNA consists of a job-task analysis, organizational analysis, and personnel analysis. With the results from a TNA, focus can

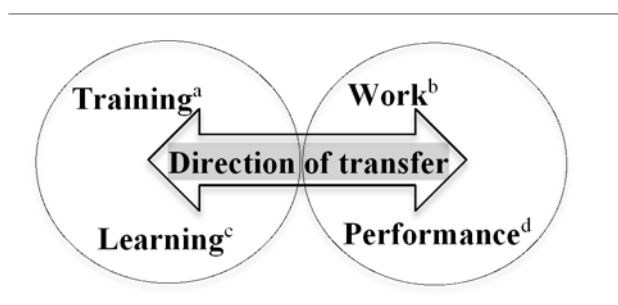
be given to selecting the appropriate instructional strategies and developing content to meet desired training outcome objectives. After the training, attention should be placed on removing obstacles to transfer identified in the TNA, providing tools and advice for supervisors, and encouraging the use of reinforcements to promote utilization and retention of training content.

Brinkerhoff and Montesino (1995) noted a number of forces that facilitate training transfer, such as training design, the linkage between training and an organization's strategic goal, and management support of respective trainings. Unfortunately, counter-transfer forces also exist, including unpredictability of work environments, resistance to innovation, ambivalence to change, and various organizational climate factors. Lim and Morris (2006) described these organizational factors as being related to work system or people-related dynamics and include open communications, an organizational commitment to training, a match between training and organizational goals, and an overall commitment to training transfer.

Vermeulen and Admiraal (2009) proposed a new model of transfer, positing transfer to be a two-way, recurrent process occurring both in the training context and work environment. This contrasts the traditional one-way model where skills are transferred from a training context to work one time. In this model, the trainee is said to assume two interconnected roles: (a) learner of knowledge, skills, and at times, attitudes; and (b) performer of learned skills in a work context. To remove the gap between learning and work performance, the authors introduced the concept of overlapping contexts, (Figure 2). The contexts in question are training and work with the model



representing the double role expected of the trainee/employee. Vermeulen and Admiraal assert that one context evokes the other context. For example, performance in the work context is maximized by consciously thinking of the training context, and mastery of learning occurs if work is considered during the training context. Strategies to hone training include: (a) visualizing training to performance in work situations, (b) setting goals and prioritizing, (c) asking for support or feedback from colleagues and supervisors, and (d) reviewing training materials while in the work context. Figure 2 provides a visual representation of this model.



*Figure 2.* Transfer as a Two-way Process. Adapted from Vermeulen & Admiraal, 2009, p. 54. Figure represents double role training participant plays as trainee and employee. <sup>a</sup>Training is provided to employee to improve performance. <sup>b</sup>Work provides the context where employees are expected to maximize performance. Both contexts may support or inhibit learning, and should be considered a recurrent process. <sup>c</sup>Learning should occur in both contexts, and include knowledge, skills, and attitudes. <sup>d</sup>Performance entails application of learned skills and incorporates organizational goals.

To test the model, Vermeulen and Admiraal (2009) conducted a quasi-experimental study with 56 middle managers to measure perceptions of learning, performance, and contexts. Additional variables tested were self-efficacy, motivation, and transfer strategies. It was concluded that training could be considered a recurrent,

two-way process given that skills continually grow over time and further learning occurs in the context of work.

### **Varying Degrees of Transfer**

If skills developed by training efforts do not transfer beyond the training context, much of the investment is considered wasted (Druckman & Bjork, 1994). Gagne (1965) provided seminal generalizations related to transfer, distinguishing types as lateral transfer or vertical transfer. Lateral transfer happens if a skill or ability spreads over a broad set of situations holding a similar level of difficulty. Vertical transfer occurs when application of the skill leads to attaining higher or more complex skills (Gagne, 1965).

Leberman, McDonald, and Doyle (2006) categorized transfer into five different groupings (a) positive transfer; (b) negative transfer; (c) simple or complex transfer; (d) near and far transfer; and (e) automatic or mindful transfer. Near transfer was defined by Laker, (1990) as the use of learning in situations similar in context to those in which initial learning occurred. Far transfer occurs in situations in completely different contexts to those of the original learning events. Achieving either degree of transfer has been said to depend on which transfer theory is used to gauge the transfer (Yamnill & McLean, 2001). Baldwin and Ford (1988) posited greater likelihood of near transfer occurring when training content and programs closely replicate the workplace. Clark and Voogel (1985) found specificity about where and how training is applied to be the optimal catalyst for near transfer.

In 2002, Barnett and Ceci sought to capture empirical evidence of strategies to assure human transfer of thinking and reasoning from one situation to the next. The

authors noted that even with more than a century of intense research, there was no clear operational definition of learning transfer, and argue this leads to comparing apples to oranges.

Work was conducted to establish a framework of varying dimensions in which far transfer may occur; detect where along those dimensions transfer is found to be a success or failure; and situate existing research findings against this established framework. The dimensions and context recommended to gauge far transfer include knowledge domain, physical, temporal, functional, social, and modality. Table 1 illustrates these dimensions. The dimensions were developed based on three sources, including reviewed transfer literature; evidence from psychological research and subsequent implications; and assorted questions derived from transfer-related literature. Assessing if far transfer occurs was said to depend on whether the skill in question is encoded as organizational procedure or established principle. It is important to re-emphasize, far transfer also relies on the performance measure used to gauge.

Table 1

*Six Dimensions for Far Transfer*

Dimension	Contextual Description
Knowledge Domain	Knowledge base which skill is applied
Physical Context	Whether training and transfer occur in the same environments
Temporal Context	Elapsed time between training and testing phases (minutes, weeks, years later)
Functional Context	Function for which skill is positioned; and mind-set evoked in the individual
Social Context	Whether skill or task is learned and performed individually or with a group
Modality	Auditory, written, verbal, or hands-on mode task exists

*Note.* Dimensions found in transfer literature, evidence from psychological research, and applied questions transfer scholars attempt to answer. Adapted from Barnett and Ceci (2002) p. 623.

The question of far transfer is still unresolved. As Barnett and Ceci (2002) note, “The picture is still unclear. What was presumed to be a basic and ubiquitous process of learning has been illusive.... This eventually leads us to question whether transfer is at all salvageable as an explanation” (p. 634).

The authors concluded that in far transfer, the relative distance between training context and actual transfer remains an evasive question, and noted one transfer task may be satisfied while others are not. The knowledge domain and the physical and temporal contexts were argued to hold practical relevance in transfer. Functional context, though

rarely investigated, was said to relate to transfer due to individuals' investment in general education.

Huang, Blume, Ford, and Baldwin (2015) conducted a meta-analytic study using 144 research articles to investigate respective predictors to maximum and typical transfer of skills from training to work settings. Maximum transfer was defined as an occurrence when trainees provided with explicit prompts tend to maximize performance over a short period. Typical transfer is considered the transfer of knowledge, skills, and abilities without explicit prompts for longer time settings. The authors sought to identify relationships between three antecedents (cognitive ability, conscientiousness, and workplace support) and four empirically derived outcomes (declarative knowledge, skills acquisition, post-training self-efficacy, and motivation to transfer). A catalyst to the study was a perceived lack of precision in transfer literature regarding ability to transfer and motivation to transfer. It was concluded that maximum and typical transfer did not hold a strong correlation, and more so, depended on varying antecedents. Ability factors (declarative knowledge, skills acquisition, and cognitive ability) were linked strongly to maximum transfer, while typical transfer was predicted by motivation factors, including post-training self-efficacy, motivation to transfer, conscientiousness, and workplace support. A notable conclusion for human resource development practitioners asserted that trainees willing to "adapt, generalize, and find opportunities to apply" learning tend to transfer successfully. Deductions related to future research suggests considering maximum transfer when investigating cognitive and skill acquisition, and utilizing typical transfer when concerned with trainees' volition and effort to transfer.

The social contribution to transfer spawned from the assumption that “learning is fundamentally a social activity” (Reder & Klatzky, 1994, p. 33). An example provided by Reder and Klatzky (1994) discussed a group of individuals in a learning setting who generate joint insight, and prompt others to recall previously acquired knowledge. Regarding the modality dimension, evidence was cited from an experimental study utilizing open-ended questions, questions read aloud, practical design, and oral argumentation as opposed to solely multiple choice questions to measure transfer. Conclusively, transfer was reported as a salvageable concept, only when knowledge, skills, or abilities are taken from reception stage through application.

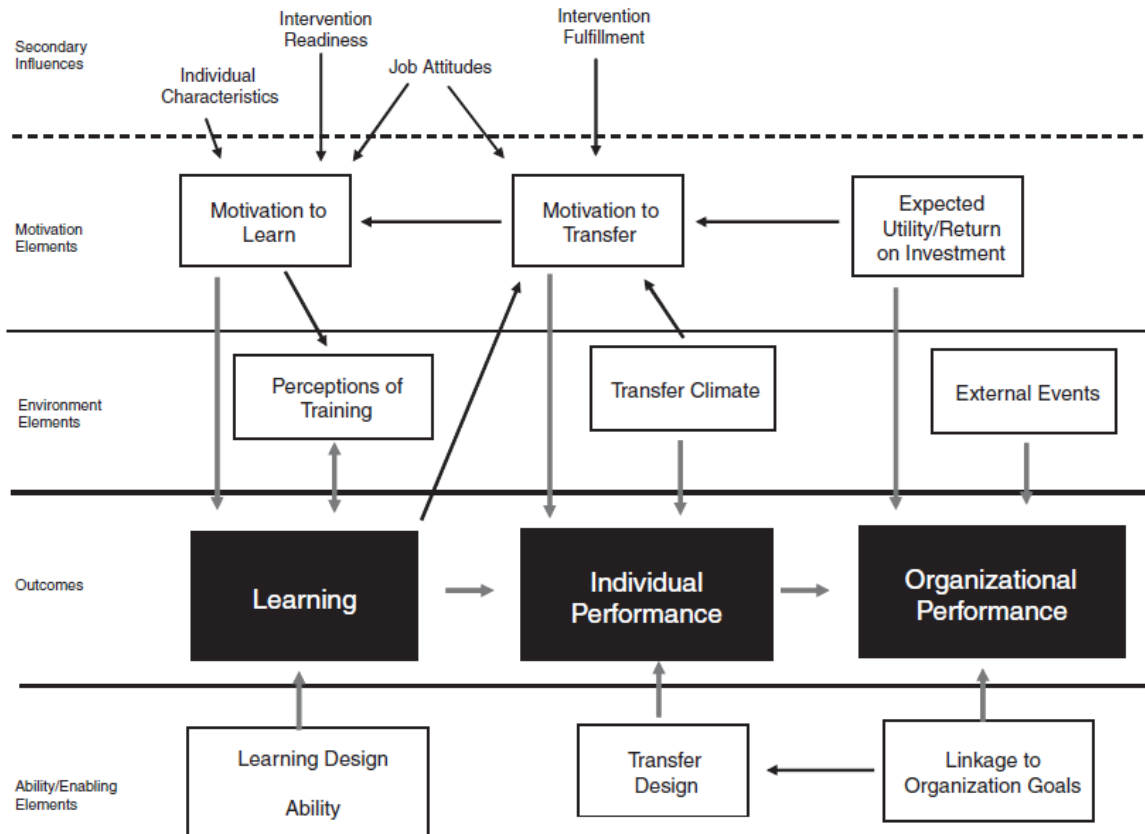
### **Model of Transfer**

Holton, Bates, Seyler, and Carvalho (1997) developed a comprehensive scale to measure learning and transfer. This development was in response to an eight-factor instrument established by Rouiller and Goldstein (1993), which could not be validated due to inadequate sample size. The lack of common measures used to assess learning transfer led Holton, Bates, Seyler, and Carvalho (1997) to develop the Learning Transfer System Inventory (LTSI). This instrument takes into account the variables impacting transfer or lack of transfer. Sixteen indicators were found to either promote or inhibit transfer of training. The inventory reportedly exhibits evidence of content, construct, and criterion validity (Bates, Holton, Seyler, & Carvalho, 2000; Kirwan & Birchall, 2006; Devos, Dumay, Bonami, Bates, & Holton, 2007; Holton, Bates, Bookter, & Yamkovenko, 2007). Scales within the instrument were based on literature, and sought to assess factors impacting ability to transfer learned knowledge, skills, and abilities to the

work environment, trainee motivation to transfer learning, as well as environmental factors promoting or hindering transfer.

To facilitate cross-study comparisons and better understand the transfer process, Holton, Bates, and Ruona (2000) expanded the original transfer system scale instrument with the development of Learning Transfer System Inventory (LTSI) version 2. LTSI v2 decreased the number of constructs measuring supervisor support; added function to measure motivation; and included performance self-efficacy, expectancy-related, personal capacity to transfer, feedback-performance coaching, and learner readiness constructs. To test the new instrument, 1,616 professionals in federal, public, profit, and non-profit organizational training activities completed the LTSI v2. The analysis resulted in identification of 16 explanatory factors affecting the transfer of learning; 11 classifying a specific training program, and five representing factors affecting any training program.

The scale has been determined to hold convergent and divergent validity, which Holton, Bates, Bookter, and Yamkovenko (2007) defined as both the demonstration that (a) two independent approaches for inferring an attribute lead to the same outcome, and (b) evidence of a measure's relative distinctiveness (p. 388). Exploratory factor analysis was used to determine validity of the LTSI instrument resulting in factor loading at .30 or higher, with the majority loading at .40 or higher. A conceptual framework for the Holton's Learning Transfer Inventory System is found in Figure 3.



*Figure 3.* Conceptual Model of the Learning Transfer System Inventory. Model built under assumption that training transfer is function of four intermingled categories (secondary elements, ability/enabling factors, motivational factors, and work environments). Primary relationships are represented with thick lines. Thin lines define the secondary relationships (from Holton, 1996).

The current LTSI has been found to provide a valid and practical tool with which to measure:

- potential transfer factor problems prior to conducting major learning interventions
- follow up on evaluations of existing training programs
- investigation into known transfer problems
- incorporative evaluation as part of regular employee assessments



- training programs developed to provide transfer skills to supervisors and trainers

Kirwan and Birchall (2006) tested Holton's model of learning transfer with a quantitative survey administered to 112 nurse managers involved in a management development program in Ireland. The authors' objectives were to investigate whether factors (i.e., trainee factors, training design factors, and work environment factors) in Holton's model reflected elements found in transfer literature, and if those factors exist in practice. Substantial correlations were found among the learning transfer inventory factors. Statistical analysis in this study showed strong correlations between trainees' motivation to transfer and personal capacity for transfer ( $r = 0.53, p < 0.01$ ). It was concluded "learners' motivation to transfer was an antecedent rather than an outcome of personal capacity for transfer" (Kirwan & Birchall, 2006, p. 262). Performance self-efficacy was improved by the combination of transfer design and perceived content validity, and learner readiness affected motivation to transfer independently. For work environments, important relationships were found between opportunity to use, peer support and feedback and coaching on personal capacity for transfer. Manager support and manager sanctions were found to hold significant correlation with openness to change. The conclusion of this study broadly supported Holton's model as a basis for learning transfer. Though it was said that unpredictable individual, training design, and organizational influences cause hesitation in affirming the model, it has repeatedly been found to predict learning transfer.

Hutchins, Nimon, Bates and Holton (2013) administered the LTSI, version 2 to a group of law enforcement personnel in attempt to determine the relationship between the scale variables and trainees' intent to transfer. Participants were administered the LTSI survey including four distinct questions to rate intent to transfer, (e.g., I intend to use at work all I have learned in this training). The authors reinforced that motivation to transfer serves as a strong correlate of transfer, and intent to transfer is a strong antecedent to motivation. Additional results exhibited transfer design and performance expectations as significant correlates to intent to transfer. The LTSI has been found to be a viable analytic and predictive tool for training transfer. Bookter (1999) reported both convergent and divergent validity in a study sampling 204 US postal employees. In an Arabic study, Khasawneh, Bates, and Holton (2006) administered the LTSI to 450 employees from 28 different public and private organizations and determined the instrument to hold sufficient validity and reliability.

The LTSI has been used to predict organizational transfer performance for 18 years, and has been utilized globally to evaluate training in different cultures and languages. Translations of the instrument included Saudi Arabia-Arabic, Jordanian-Arabic, German, Belgium-French, Ukrainian, Taiwanese, Thai, Portuguese, and Greek.

The instrument being used in this study is the LTSI version 4. This version reduced the number of questions from earlier versions from 89 to 47. Through other studies, the fourth generation instrument has also been found to hold both construct and criterion-related validity (Bates, Holton, Seyler, & Carvalho, 2000; Holton, Bates, Burnett, & Ruona, 2000; Seyler, Holton, Bates, Burnett, & Carvalho, 1998).

Grossman and Salas (2011) identified training inputs found to influence effective transfer. These inputs consist of trainee characteristics, training design, and the work environment. In their model, inputs included the trainees': (a) cognitive ability-trainees with higher cognitive ability have been found to have higher success in transferring knowledge, skills, and abilities from training; (b) self-efficacy-trainees with more confidence are better able to apply trained competencies; (c) motivation-a key component in ability to learn and transfer training to workplace; (d) perception of the utility of training-those who perceive training as beneficial and valuable are more likely to apply concepts post-training; and (e) the behavioral model of training design.

In an article spotlighting two case studies on transferring mathematical concepts, Carraher & Schliemann (2002) focused on the challenges of transferring knowledge from one context to the work setting. From a cognitive standpoint, learning was posited to be derived from the buildup of "structures, schemes, and intuitions" established over extended periods of time. The concept of situated generalization was introduced, which is the application and continuance of concrete and general knowledge. Similar to Piaget's assimilation and accommodation theory (1976), this concept explains how learning in one situation can be closely linked to understanding and application in an unrelated environment.

Taylor, Russ-Eft, and Chan (2005) found delivering a combination of both positive and negative application results in trainee ability to generalize learning to variable scenarios; (a) error management-offering trainees the ability to anticipate potential issues, as well as suggestions of handling and unanticipated consequences of

such problems enhances transferability; (b) a realistic training environment-providing authentic physical and social environment was also noted to be influencer of effective transfer; (c) trainees' work environment-opportunity must exist to utilize recently acquired competencies on the job; (d) support-the level of peer and supervisor support is said to be one of the most salient constructs of training transfer in a work environment. Examples of support include assistance with goal setting, directing attention, prompting use of newly-acquired skills, and providing recognition or encouragement; (e) opportunity to perform-resources and opportunities to apply new skills are essential, and the lack of this opportunity has been noted as a fundamental barrier to transfer; and (f) post-training follow-up and feedback are joint responsibilities of the trainer and supervisor.

### **Employee Motivation to Transfer Learning**

To be motivated means *to be moved* to do something (Ryan & Deci, 2000). Training motivation has been defined as the “direction, intensity and persistence of learning-directed behavior” in contexts of training (Colquitt, LePine, & Noe, 2000, p. 678). Al-Eisa, Furayyan, and Alhemoud (2009) posited that motivation to learn content in training is necessary, and without it the participant will perform poorly during training with negative affects to learning levels. Mathieu and Martineau (1997) grouped motivation that occurs before training into three categories: (a) motivation to learn, (b) self-efficacy, and (c) valence instrumentality-expectancy beliefs or motivation through expectation.

The motivation to learn is a trainee's specific desire to learn designated content of a training program (Noe, 1986). The motivation to learn has a direct effect on learning outcomes (Colquitt et al., 2000). Noe posited that motivation could be gauged through certain items assessing the trainee's enthusiasm for learning and individual persistence if material is problematic. Locus of control, defined as a steady personality trait, is said to be a key motivational factor affecting trainee's ability to learn. Rotter (1966) outlined this personality trait to be either internal or external. Individuals with an internal locus of control generally perceive the rewards or gratification taken from training to be contingent upon their own behavior or actions. Those possessing an external locus of control are more likely to attribute rewards, recognition, or reinforcement to be the "result of luck, chance, fate, or under the control of others" (Rotter, 1966, p. 1).

Self-efficacy was described by Wood and Bandura (1989) as "people's beliefs in their capabilities to mobilize the motivation, cognitive resources, and courses of action needed to exercise control over events in their lives" (p. 364). A difference was noted between having the required skills and bolstering a "resilient self-belief in one's capabilities to exercise control over events to accomplish desired" (p. 364) or mandated goals.

The authors offered strategies to enhance individuals' perception of their efficacy. The first is through mastery experiences. Success in performance was said to strengthen self-beliefs, while failures result in self-doubt. Individuals with experience overcoming obstacles generally possess a resilient, perseverant self-efficacy. The second suggestion to strengthen efficacy is by way of modeling. Modeling conveys methods of managing

varying situations, and provides a comparison lens. If an employee can match or exceed the performance of a given model, personal belief in ability increases. The third suggestion to increase personal worth of abilities is through social persuasion. Offering realistic encouragement and feedback leads to greater effort of the employee. Personal judgment of physiological status is the fourth strategy. Human beings measure vulnerability or poor performance through feelings of emotional arousal or tension. Fatigue, aches, and pains signal physical incapability.

Employees found to have higher self-efficacy generally set higher goals than those with lower self-efficacy (Bandura, 1986). These goals are synonymous with outcome expectancy, which Bandura defined as the individual's "estimate that a given behavior will lead to certain outcomes" (Bandura, 1977, p. 193). When one believes they can execute the behaviors necessary to meet those outcomes, efficacy expectation is reached. Chiaburu and Lindsay (2008) asserted training self-efficacy and training instrumentality to be influential motivational forces in human development. The authors defined self-efficacy as an "individual's belief that they can successfully perform the task" (p. 199). Training instrumentality is "an individual's belief that performing a specific behavior will lead to a desired outcome" (p. 200). However, human resource development research generally separates the two components during investigation. The authors examined training transfer using a social cognitive framework. As hypothesized, the results showed (a) training self-efficacy held influence on participants' motivation to learn, and (b) training instrumentality held bearing on motivation to transfer. It was

concluded that training instrumentality is the primary catalyst to transferring knowledge, skills, and abilities from formal training to the work environment.

Al-Eisa, Furayyan, and Alhemoud (2009) set trainees' motivation apart from the intent to transfer. These authors demarcated motivation to transfer as the starting point of motivational process, which is followed by the intent to transfer or deliberately perform learned knowledge, skills and abilities in a work environment.

Tharenou (2001) conducted a longitudinal study with 1,705 Australian employees in public and private sectors, and found motivation through expectation and motivation to learn increased employee motivation to participate in training. Per this study, employees' interaction with supervisors and employer support were found to be the most important precursor for training motivation.

Concerning Valence-Instrumentality-Expectancy, Yamnill and McLean (2001) published a meta-analysis clarifying the theoretical foundation of training transfer to encompass roots in expectancy theory, equity theory, and goal-setting theory. Vroom developed the Expectancy Theory in 1964. This theory focuses on work and training motivation and suggests that individuals acting through self-interest, adopt courses of action perceived as maximizing the probability of desirable outcomes. The theory concepts include Valence, Instrumentality, and Expectancy, (VIE Model). Valence is defined as the affective orientations toward outcomes (Van Eerde & Thierry, 1996). This concept speaks to the attractiveness, desirability, or anticipated satisfaction with outcomes or the rewards of utilizing the knowledge, skills, or abilities learned in a training session. Instrumentality incorporates the relationship between a perceived

outcome and another outcome, and has been inferred as the probability to obtain an outcome. Expectancy is an employee's "estimate of the probability that job-related effort will result in a given level of performance (Lunenburg, 2011). The VIE Model has been the foundation of numerous studies, and is considered by many to be the superior approach to assessing motivation (Mathieu & Martineau, 1997).

Lindner (1998) explained employee motivation through its connection to five key theories, including Maslow's need-hierarchy theory, Herzberg's two-factor theory, Adam's equity theory, Skinner's reinforcement theory, and previously discussed Vroom's expectancy theory. Maslow's need-hierarchy theory (1943) established employees possess five levels of needs: (a) physiological-such as food, water, and air; (b) safety-protection from harm and familial environment, (c) social-positive relationships with family, spouse, and friends, (d) ego-desire for achievement or recognition, and (e) self-actualization-the ultimate fulfillment or attainment of a terminal goal.

Maslow posited lower needs must be satisfied before higher needs become of concern, and do not necessarily follow a fixed order. Many needs have overlapping preconditions; for instance, the need to acquire knowledge and work within a systematic process may meet both safety and self-actualization needs. For example, employees lacking the social or love needs may compensate with self-confidence or an aggressive nature. It is possible to permanently lower or completely lose aspiration and need. For example, chronic unemployment may lead an individual to be satisfied with basic physiological needs, and abandon ego or self-actualization aspirations.



Herzberg's two-factor theory introduced two dimensions to explain job satisfaction: hygiene and motivators (Herzberg, Mausner, & Snyderman, 1959). Hygiene factors (dissatisfiers) consist of company policies, supervision, interpersonal relations, work conditions, and salary. Motivators (satisfiers) include achievement on the job, recognition, the work detail itself, and advancement. Motivators, the result of employee actions, lead to long-term positive work effects, while hygiene factors, dictated by work environment and relations within the work context, often result in demotivation.

Adams explained the theory of equity (1963, 1965) as the phenomenon occurring when individuals perceive themselves as either unrewarded or over-rewarded and experience distress. This leads to efforts to reduce the suffering or feelings of inequity. The theory proposes social exchange as interrelated exchanges of inputs and outcomes. Employees accept this exchange if they feel the outcome is more rewarding than invested input. The common theme in the theory is that of justice versus injustice.

Skinner's Reinforcement Theory explains that behaviors that lead to positive outcomes are generally repeated. Those that result in negative outcomes are avoided (Skinner, 1953). Regarding motivation, Skinner posited that employees repeat actions when the consequences are found to be "pleasant or satisfying" (Skinner, 1953, p. 81). The reinforcement of these behaviors both strengthens the behavior and generates feelings, both said to be functions of each other. For example, when an individual finds an experience is pleasant they tend to move toward further exposure to this experience. Reinforcement has also been found to reduce the state of deprivation.

## **Satisfaction with Training**

Noe (1986) posited satisfaction with training as a joint occurrence of learning and behavior change. Further research showed that when students are satisfied, they are more likely to be successful (Puzziferro, 2008). Briggs, Reinig, and Vreede (2006) noted satisfaction could be either the “judgment that certain constraints or requirements have been met,” or an emotion. They argue that for training purposes, satisfaction is an emotion, or affective arousal with positive valence toward an object. In an article seeking to validate a goal-attainment model of satisfaction, the authors built two constructs for meeting satisfaction, (a) satisfaction with meeting process (SP) and (b) satisfaction with meeting outcome (SO). SP considers the affective arousal of participant related to meeting procedures and tools. SO was explained as the affective arousal by participant related to what the meeting created or achieved. The authors assumed that all individuals possess predetermined goals going into the meeting. These goals are either met, resulting in a positive appraisal of meeting, or not fulfilled which results in negative appraisal of the meeting. Both SP and SO combine to be positive inputs of Perceived Net Goal Attainment (PGA). PGA is explained as “the degree to which one perceives that some object of satisfaction either advances or hinders the attainment of one’s salient individual goals” (Briggs, Reinig, & Vreede, p. 588). It was recommended that facilitators of meetings (including training) be aware of the collective group goals, and if possible, the prominent goals of individual participants. Additional facilitator training on non-verbal cues of dissatisfaction was also recommended. Through statistical analysis, the authors

determined the PGA model to be a useful and reliable instrument to measure meeting satisfaction.

Giangreco, Sebastiano, and Peccei (2009) examined pertinent factors impacting the overall satisfaction with training. The authors evaluated trainee initial reactions to training using 3,600 participants representing 208 Italian companies and 7,230 hours of training. Three distinct determinants to training satisfaction were developed and tested, including perceived training efficiency; perceived usefulness of training; and perceived trainer performance. All three antecedents tested were found to contribute to trainees' perceptions of satisfaction, with the perceived usefulness of a training holding a greater influence. The authors focused solely on Level 1 evaluation of Kirkpatrick's model, and contended businesses are not capable of fully evaluating training programs to the Level 4-Results level; "thereby highlighting a major gap between theoretical recommendations in the academic literature and real application in industry and business" (p. 99).

### **Factors that Hinder Transfer**

A number of factors have been found to hinder the transfer of knowledge, skills, and abilities to the work environment including a crisis work environment, work environment unpredictability, job characteristics that thwart change, peer influence, resistance to innovate, organizational policy and procedure, work overload, and certain organizational climate factors (Mmobuosi, 1987; Stiefel, 1974; Rouillier & Goldstein, 1993). Szulanski addressed perpetual impediments to transferring best practices within organizations stating internal transfer of learning should be faster than external transfers. However, internal transfer was said to be far from easy (Szulanski, 1996, p. 28). It was

found that a general lack of absorptive capacity by trainees—or ability to identify, value and apply new knowledge; a causal ambiguity—depth of knowledge; and arduous relationship between trainee and trainer to be the most important impediments to organizational learning. Szulanski noted that while most literature signals motivational factors as being culpable for lack of transfer, knowledge-related barriers should be considered more responsible.

Gunawardena, Linder-VanBerschot, LaPointe, and Rao (2010) noted the highest predictor of learning transfer to be collegial support from both peers and managers. In a study of corporate online education programs, the authors found that satisfaction is increased through the receipt of adequate resources to transfer learning.

Hesketh (1997) noted several issues that hinder transfer of learning, and asserted that without explicit efforts to develop adaptive expertise, automated recollection of skills desired for transfer would fail. Developing high levels of expertise in any given discipline were said to have a disruptive effect on absorbing adaptable or transferrable skills. It was recommended that including unpredictability and variation to the learning environment results in longer-term transfer. Delivering opportunities to practice in a random, rather than traditional blocked fashion was found to facilitate transfer of motor movement skills, as well as problem-solving tasks. The use of situated learning practices is the delivery of knowledge, skills or abilities in a work context.

Proponents of this strategy argue trainees are able to organize and apply the knowledge in appropriate conditions. Utilizing instructional methods known for fostering transfer requires greater effort from both the instructor and trainee. Hesketh noted the

higher level of resources needed, effort expended, and potential social threats trainees discover when attempting to actively process for transfer purposes. Threats to learner self-efficacy and reduced expectancy for success were also noted.

Kintsch (1994) found benefits to offering advanced organizers, which Ausubel (1960) defines as the deliberate introduction of related meaningful material prior to learning unfamiliar material, however Kintsch used inconsistent material as the advanced organizer. The inconsistency, while confusing at first, led students to further transfer of the material when needed. This was due to contextual interference (CI), a cognitive phenomenon said to “force learners to actively reconcile the discrepancy” (Kintsch, 1994, p. 326).

Lin, Wu, Udompholkul, and Knowlton (2010) discussed this concept’s relation to knowledge retention in aging adults. It was found that healthy older adults have the ability to remain highly active learners with capability to gain new knowledge for adaptation to environmental needs. However, for CI to work, learners must “have the ability to (a) selectively allocate attention to a given task; (b) switch from a previous task to a different task set; (c) temporarily hold multiple action plans in working memory; and (d) elaborate and distinguish the nature of multiple task sets.

### **Organizational Learning Climate**

Human resource development research has signaled the work environment, or climate, to be another dimension in learning transfer. Work climate has been empirically accepted as having influence on employee ability and opportunity to perform learned behaviors in the work setting (Baldwin & Ford, 1988; Rouillier & Goldstein, 1993;

Tracey, Tannenbaum, & Kavanaugh, 1995). Haskell (2001, p.143) postulated culture, or climate, to transmit norms that influence student learning. Burke and Hutchins (2008) gathered perceptions from training professionals affiliated with the American Society of Training and Development (ASTD) of best management practices to enhance training transfer. In their study, 49% of respondents identified strategies used within the work environment as the key influencer to transfer. The authors found that lower or middle management trainers indicated work environment as the strongest influencer on transfer. This was inconsistent with the executive-level who identified design and development as the stage of most influence on training transfer.

Kupritz (2002) investigated employee perceptions of the impact of workplace design on transferring knowledge, skills, and abilities from formal training to the work environment and found the physical environment to have both positive and negative influence on employee performance. Factors including the existence or lack of acoustical design barriers, which support privacy; the removal of the ambient stressor of noise; workplace layout and ergonomic design were listed as antecedents to transfer. In a qualitative study consisting of 24 office employee interviews, the author determined there was a connection between workplace environment and behaviors that promote or inhibit performance and contributions to training transfer. It was concluded the top four organizational factors facilitating transfer are a supportive workplace design, positive management support, availability of technology and equipment, and positive coworkers.

For the purpose of this study, organizational learning climate will be defined as the environment that integrates people and structure to move an organization in the

direction of continuous learning and change (Eagan, Yang, & Bartlett, 2004). A healthy organizational learning climate has been said to enhance employee job satisfaction. This was reinforced by Marsick and Watkins (1999) who contended organizations focusing on learning and development yield higher employee job satisfaction, higher productivity, and higher profits. Many authors have endorsed development of informal learning cultures. Organizational learning is oftentimes informal, non-intentional, and tacit in nature (Marsick, 2003). Organizationally, learning occurs first at the individual level, then collectively. This learning process is both interactive and interdependent, and depending on organizational culture may yield new understanding, new procedures, or the decision to discontinue practices. Necessary elements to foster an optimal learning climate include progressive leadership, co-operative teams, work clarity, a realistic workload, mechanisms to acknowledge staff, and opportunity to participate in decision-making (Schalk et al., 2010).

Baldwin and Ford (1988) viewed the work environment as the level of support trainees receive from supervisors, managers, and peers. This is in addition to the opportunity to use knowledge and skills learned in formal training environments.

Tracey, Tannenbaum, and Kavanaugh (1995) associate the optimal learning climate with a continuous learning work environment. They define this environment as one where knowledge and skill acquisition is paramount to the responsibilities of all employees; where knowledge and skill acquisition is supported by social interaction and work relationships; where formal systems have been developed to reinforce achievement and provide opportunities for personal development; and where emphasis is placed on

innovation and competition. A continuous-learning work environment was also said to foster collective expectations of exceeded levels of work performance.

Eraut (2004) reinforced the complex nature of transferring learning to the work environment. In examination of informal learning in work environments, the author discussed the complementary nature of informal learning with experiential learning. Informal, or reactive learning was defined as intentional learning that occurs in the middle of action. This differs from deliberative learning, which occurs with established definite learning goals and a time set aside to acquire new knowledge. Five stages were identified in transferring knowledge from a formal training setting to the work environment, including (a) extracting potentially relevant knowledge from the context of acquisition, (b) understanding the new (work) situation, which often depends on informal social learning, (c) recognizing what knowledge or skills are relevant, (d) transforming the knowledge or skills to fit the new situation, and (e) integrating formally learned knowledge and skills in order to think, act, and communicate in the work situation (Eraut, 2004). Eraut posited that all stages are not readily incorporated in workplace training, and indicated recognition of which knowledge and skills are relevant to increase performance is emphasized, but understanding new situations is often taken for granted.

Govaerts, Kyndt, Dochy, and Baert (2011) contend that organizations must establish a supportive learning and working climate. The authors defined this as an environment where employees both work and learn. To expound on the definition, they include the amount of empowerment, guidance, appreciation, the level of job choices offered, and provision of challenging yet meaningful work. Huber (1991) added that



organizations possessing a strong learning climate tend to create, acquire, and transfer knowledge within, while modifying employee behavior to reflect this acquired knowledge.

Rouillier and Goldstein (1993) offer the most applicable definition of organizational learning climate with “situations and consequences that either inhibit or help to facilitate the transfer of what has been learned in training into the job situation” (p. 379). Effective organizational learning climates should additionally invest in and reward learning, as well as reduce cultural elements that squelch learning (Marsick & Watkins, 2003).

In a study investigating the concept of organizational transfer climate, Rouillier and Goldstein adapted a behavior-modification model introduced by Luthans and Kreitner (1985) to study 102 employees of a large fast-food franchise in a nine-week assistant manager training program. The authors outlined certain items determined to facilitate transfer, including situational cues that remind trainees of their training. These cues contained goal cues, which remind trainees to use learned items once back on the job; social cues including behavioral and influence processes; task cues directed at the design and nature of the job itself; and self-control cues permitting trainees to use what they have learned. Consequences were also applied, including positive feedback about employee use of trained behavior; negative feedback informing employees of negative consequences to not using learned behavior; punishment, namely ridicule from experienced employees for using learned behavior; and no feedback or recognition for using knowledge, skills, and abilities learned. Following the training, a survey of

organizational training climate was administered. Results indicated the more positive the organizational transfer climate, the more employees will demonstrate transfer behaviors; the degree of learning in training directly affects the degree of transfer behavior to the job situation; and transfer behavior is related to job performance. However, no direct relationship was found between job performance and learning in training. No relationship was found between higher performance ratings and higher transfer behaviors.

### **Kirkpatrick's Hierarchical Evaluation Model**

Kirkpatrick developed a well-known and used evaluation model to evaluate training in 1959. The classic four-level model includes level 1-reaction, which defines how well trainees like a particular training program. This level measures feelings, not learning. Kirkpatrick explained it as customer satisfaction. The second level is learning, which measures knowledge acquired or skills learned in training. Behavior is the third level of the model. It measures the extent to which participants' attitudes or behaviors changed as result of training. Level 4-results, assesses whether sales or profits increased due to training interventions (Kirkpatrick 1994). This level also assesses whether organizational costs have been reduced, if overall product quality improved, or if employee turnover is decreased. The purpose of the model is to (a) decide if training program should be continued; (b) improve future training endeavors; and (c) validate organizational training and subsequent investments. Kraiger (2002) further defined the purpose of evaluation to be decision-making, provision of feedback, and marketing.

Accomplishing all four levels of Kirkpatrick's model is difficult, due to increasing costs in time and financial investment when moving from level 1 to level 4. White and

Branch (2001) note the natural connection between training evaluation and transfer of training, citing 89 % of training professionals report formative evaluation improves training effectiveness. Saks and Burke (2012) investigated this linkage through a survey of 150 Canadian training and development professionals, and found Level 1-Reaction, to be the most frequently utilized Kirkpatrick criteria, followed by Level 2-Learning. Evaluation of trainings at higher frequencies resulted in increased transfer rates. However, only Level 3-Behavior and Level 4-Results criteria were found related to transfer of training. For this reason, debates continue as to whether it is possible to meaningfully evaluate the impact of training in organizations (Warr et al, 1999; Holton, 1996; Bates, 2004; & Brown, 2005).

In a small study of 68 training professionals, only 50 % conducted evaluations at the Level 3-Behavior criteria and one-third at the Level 4-Results criteria. Motivations found for utilizing Level 3-Behavior criteria included desire to analyze what skills taught in training were being transferred to work settings. For Level 4-Results, trainers sought to demonstrate the contribution and value of their department to the organization. Recorded barriers to administering Levels 3 and 4 included a minimal access to data; a lack of support from leadership; a lack of time; and minimal evaluation expertise (Kennedy, 2014).

Holton (1996) published criticism of Kirkpatrick's four-level model, claiming it is flawed and while it has contributed to human resource development should not be held as the standard for evaluation. To begin, Holton labeled the four levels as taxonomies or classification schemes, noting the lack of empirical research to reinforce model

conclusions. Validation of conclusions was said to be implausible because taxonomies do not realize constructs framing a phenomena of interest. Further, Holton claims testing causal relationships cannot occur because taxonomies classify constructs, but do not define them. Holton suggested six necessary components of theory or model creation based on Klimoski's (1991) article on theory presentation. These included:

- Elements or units-represented as constructs-are the subject matter.
- There are relationships between the constructs.
- There are boundaries or limits of generalization.
- System states and changes are described.
- Deductions about the theory (model) in operation are expressed as prepositions or hypotheses.
- Predictions are made about units.

Holton argued Kirkpatrick's model does not meet any of these criteria, and developed a new human resources development model to serve as replacement for diagnosing causal influences to training interventions (p. 24). Holton claimed the four-level model erroneously concluded that any failure to achieve outcomes translated into a failure of the intervention entirely. Holton's model tests complementary factors to isolate the potential sources of failure, including learning, individual performance, and organizational performance. Attention was given to the intervening variables that influence employee learning and transfer, including trainee readiness, motivation, training design, and a reinforcement of past training in the workplace. Noticeable differences between Holton's proposed evaluation model and Kirkpatrick's four-level

taxonomy included (a) absence of reactions as the primary outcome; (b) behavior is replaced by individual performance, and (c) the inclusion additional influences on training outcomes. Holton, in concert with Baldwin and Ford (1988), concluded ability, motivation, and environment should collectively make up the framework for HRD evaluation.

### **Summary of Literature**

This literature review provided a framework for this study, including concepts, theories, and approaches to training transfer, employee motivation, satisfaction with training, and factors that either promote or hinder the transfer of training. The review concluded with discussion of optimal learning environments and work settings found to improve employee transfer of knowledge, skills, and abilities trained in a formal environment to the work setting.

Intentional transfer of knowledge from formal training to the work setting is a difficult task to accomplish. Several thousand work hours and organizational budget dollars have been invested in human resource development, however literature continuously reports a chasm between training and application. The preceding literature review provided an overview of strategies, tactics, and models developed to reduce this gap. The next chapters will examine whether the Learning Transfer System Inventory, a survey instrument developed based on the strategies presented in chapter two, is a valid and reliable tool to measure the transfer of learning in the USDA-NRCS.

## Chapter III

### Methods and Procedures

The following chapter explains the methods and procedures used to collect, measure, and analyze data. The purpose of this study was to determine if meaningful associations exist between NRCS employees' self-perceived CBC content recall and content transfer scores and selected explanatory variables measuring learning transfer constructs (personal attributes, training, and work environment). This study examined the effects of a professional development training series utilized by NRCS for all field office employees. To address the stated purpose, the following research objectives guided this study:

1. To determine learning transfer factors influencing NRCS employees' self-perceived scores of content recalled (knowledge, skills, and abilities) from the NRCS CBC;
2. To determine learning transfer factors influencing NRCS employees' self-perceived scores of NRCS CBC content transferred the work setting; and,
3. To judge if significant relationships exist between NRCS employees' self-perceived CBC content recall and content transfer scores and selected demographic and explanatory variables measuring learning transfer constructs.

This study was *ex post facto* in nature, designed to gather data of the strength and contributing influence of specific antecedents found in literature to affect transfer. The dependent variables were the self-reported amount of content learned and recalled from

CBC and the amount of content transferred into the work environment. The independent variables were the 16 indicators of learning transfer offered in the LTSI.

### **Research Design**

Descriptive, correlational design was selected for this study to “determine the degree of relationship” between the above-referenced variables and constructs (Coolidge, 2006, p. 153). The conceptual framework for this study was based upon Baldwin and Ford’s Model of Transfer Process (1988) as presented in Chapter II.

### **Population and Sample**

The target population consisted of employees of the United States Department of Agriculture - Natural Resources Conservation Service (NRCS) who participated in CBC between 2005 and 2014 inclusive. Conservation Boot Camp is a three-week training required for all employees within 24 months of employment. This training teaches new field employees methods of guiding private landowners through a comprehensive conservation planning process that complies with national policy. The training focused on basic conservation planning principles and the diversity of the conservation environment. Instruction was evenly split between a formal classroom environment and field-based lab settings. Within this training period, the population frame was 1,136 employees or approximately 10% of the agency workforce as of January 2015.

Bartlett, Kotrlik, and Higgins’ (2001) recommended equation was used to determine adequate sample size.

$$n_0 = \frac{(t)^2 * (p)(q)}{(d)^2}$$

$$n_1 = \frac{n_0}{(1 + n_0/Population)}$$

Following Cochran's (1977) basic sample size determination, the author's calculations for categorical data recommended sampling 297 employees. However, Salkind (1997) and Fink (1995) suggested oversampling by at least 40% - 50%. A random, probabilistic sample of this population frame yielded 445 employees who should receive invitation to participate in the study.

### **Population Response**

Email invitations to participate in the study were sent to 535 randomly selected USDA NRCS employees. At the close of survey, 313 survey instruments were completed. In reviewing the data, 45 instruments were found to be incomplete and removed from the data set providing 268 valid responses or 50% response rate.

### **Handling Nonresponse Error**

Dillman, Smyth and Christian addressed four sources of survey error that reduce the representativeness of data collected, including (a) coverage error, (b) sampling error, (c) nonresponse error, and (d) measurement error. Lindner, Murphey, and Briers (2001) proposed three methods for addressing nonresponse in social science research. These included (a) comparison of early to late respondents, which separates respondents into successive waves (b) using "days to respond" as a regression variable, and (c) comparing respondents with nonrespondents. The first method, comparing early to late respondents, was used to determine if nonresponse was a source of sampling error. The sample was divided into two waves corresponding with the dates survey reminders were sent out.



Comparison was made between participants who responded to the questionnaire between May 5 and May 12 and those responding between May 13 and June 19. ANOVA tests revealed no significant difference ( $p > .05$ ) existed between response waves for content recall or content transfer (Table 2).

Table 2.

*Early versus Late Response for the NRCS Learning Transfer Study*

Scale	Returned Status	<i>n</i>	<i>M</i>	<i>SD</i>	Min	Max	<i>F</i>	Sig.
Content Recall	Early	116	63.09	24.443	2	95	.205	.651
	Late	146	61.73	23.997	8	100		
	Total	262	62.34	24.159	2	100		
Content Transfer	Early	116	50.22	27.883	0	100	.000	.984
	Late	147	50.29	28.167	0	100		
	Total	263	50.25	27.989	0	100		

Note. Comparison of early to late survey respondents.

### Instrumentation

The survey instrument used for this study was the *Learning Transfer System Inventory* (LTSI), version 4 (Holton & Bates, 2011) (Appendix A). Permission was secured from *Learning Transfer Solutions* to use the instrument (Appendix G). The Learning Transfer System Inventory (LTSI) diagnoses barriers and catalysts to training transfer. Participants responded to each question using a five-point, summated or Likert scale. Clason and Dormody (1994) explained the difference between a Likert-type and true Likert scale. A Likert scale consists of single questions, but are generally not combined or summated during analysis, as Likert (1932) intended. The response scale for each item was: 1 = strongly disagree, 2 = disagree, 3 = neither agree or disagree, 4 = agree, 5 = strongly agree. The introduction screen for the survey described the study and sought the individual's consent to participate. Section I was composed of 32 LTSI

statements (Holton et al., 2000, 2003) as they related to the CBC training. The specific constructs analyzed included learner readiness, motivation to transfer, positive personal outcomes, negative personal outcomes, opportunity to use, positive capacity for transfer, peer support, supervisor support, supervisor sanctions, perceived content validity, and transfer design. Section II contained 13 statements designed to analyze transfer effort – performance expectations, performance outcomes-expectations, and openness to change, performance self-efficacy, and performance coaching. The instrument also included four demographic questions seeking the participants' gender, age, job title, and the number of NRCS trainings completed each year.

Through multivariate analysis, the 16 indicators produced three constructs commonly found in organizational behavior literature, (a) personal ability, (b) training, and (c) work environment (Holton, Bates, Seyler, & Carvalho, 1997; Holton, Bates, & Ruona, 2000; Holton, Chen, & Naquin, 2003; Holton & Bates, 2011). Table 3, adapted from Holton and Baldwin (2003), identifies the 16 indicators providing definitions, sample questions, the number of indicators used for analysis, and indicator identification. Holton et al. (2007) assert all indicators aligned with the four domains (motivation, trainee characteristics, work environment, and ability elements) representing a system of influences critical to learning, individual performance, and organizational results. The instrument has been found to possess validity and reliability, which is discussed further in this chapter.

Table 3

*Learning Transfer System Inventory Indicators and Definitions*

Indicators	Definitions	Sample Item	Indicators	Instrument Items
<u>CBC Training-Specific Indicators: Personal Attributes Construct:</u>				
Learner readiness (LR)	Extent to which individuals are prepared to enter and participate in training.	Before the training I had a good understanding of how it would fit my job-related development.	4	1, 2, 8, 9
Motivation to transfer (MT)	Direction, intensity and persistence of effort toward utilizing in a work setting skills and knowledge learned.	I get excited when I think about trying to use my learning on the job.	3	3, 4, 6
Positive Personal Outcomes (PPO)	Degree to which applying training on the job leads to outcomes that are positive for the individual.	Employees in our organization receive various perks when they utilize newly learned skills.	2	5, 7
Negative Personal Outcomes (NPO)	Extent to which individuals believe that not applying skills and knowledge learned in training will lead to negative personal outcomes.	If I do not utilize my training I will be cautioned about it.	3	12, 15, 16
Personal Capacity for Transfer (PCT)	Extent to which individuals have the time, energy, and mental space in their work lives to make changes required to transfer learning on the job.	My workload allows me time to try the new things I have learned.	3	10, 11, 14
Transfer Effort-Performance Expectations (TEP)	Expectation that effort devoted to transferring learning will lead to changes in job performance.	My job performance improves when I use new things I have learned.	3	36, 37, 40
Performance Self-Efficacy (PSE)	An individual's general belief in the ability to change performance at will.	I am confident in my ability to use newly learned skills on the job.	3	46, 47, 48
Performance-Outcomes Expectations (POE)	Expectation that changes in job performance will lead to valued outcomes.	When I do things to improve my performance, good things happen to me.	3	38, 39, 41
<u>CBC Training-Specific Indicators: Training Construct</u>				
Perceived Content Validity (PCON)	Extent to which trainees judge training content to accurately reflect job requirements.	What is taught in training closely matches my job requirements.	3	26, 27, 28
Transfer Design (TD)	Degree to which training has been designed and delivered to give trainees the ability to transfer learning to the job, and training instructions match job requirements.	The activities and exercises the trainers used helped me know how to apply my learning on the job.	3	29, 30, 31

Table 3 continued.

Indicators	Definitions	Sample Item	Indicators	Instrument Items
<b>Other NRCS Training-Specific Indicators: Work Environment Construct:</b>				
Peer Support (PS)	Extent to which peers reinforce and support use of learning on the job.	My colleagues encourage me to apply my training on the job.	3	18, 19, 49
Supervisor Support (SSUP)	Extent to which supervisors and managers support and reinforce use of training on the job.	My supervisor sets goals for me that encourage me to apply my training on the job.	3	20, 21, 25
Supervisor Sanctions (SSAN)	Extent to which individuals perceive negative responses from supervisors and managers when applying skills learned in training.	My supervisor opposes the use of the techniques I learned in training.	3	22, 23, 24
Opportunity to Use (OPP)	Extent to which trainees are provided with or obtain resources and tasks on the job enabling them to use training on the job.	The resources I need to use what I learned will be available to me after training.	3	13, 17, 32
Openness to Change (OTC)	Extent to which prevailing group norms are perceived by individuals to resist or discourage the use of skills and knowledge acquired in training.	People in my group are open to changing the way they do things.	2	42, 43
Performance Coaching (PCOACH)	Formal and informal indicators from an organization about an individual's job performance	After training, I get feedback from people about how well I am applying what I learned.	2	44, 45

*Note.* Constructs analyzed in Learning Transfer System Inventory instrument. Holton & Baldwin (2003), p. 66.

### **Development of the Instrument**

The instrument was initially established by Rouiller and Goldstein (1993) through a series of extended interviews. Holton et al. (1997) expanded the instrument through assessment of its dimensionality, finding a 9-factor structure named the ‘Learning Transfer Questionnaire.’ Further research and literature review led to the development of the latest versions of the LTSI (Devos, Dumay, Bonami, Bates, & Holton, 2007).

## **LTSI Instrument Validation**

In social science and educational research, validity refers to the investigator confidence that instruments used are actually measuring what is intended to be measured (Fraenkel & Wallen, 2009). The Learning Transfer System Inventory has been administered in numerous studies (Hutchins, Nimon, Bates, & Holton, 2013; Lee, 2010; Khasawneh, Bates, & Holton, 2006; Kirwan & Birchall, 2006). The instrument has been translated into seven different languages. All previous studies confirmed adequate content validity and reliability, meaning the extent to which it yields consistent results when the characteristics being measured have not changed. Estimates of reliability in previous studies found Cronbach's alpha coefficient scores ranging from .60 to .92 (Bates, Kauffield, & Holton, 2007; Chen, Holton, & Bates, 2005; Holton, Bates, & Ruona, 2000; Khasawneh, Bates, & Holton, 2006; Yamnill, 2001). Cronbach's alpha coefficient has been found to provide appropriate estimates of reliability (Miller, Torres, & Lindner, 2004, p. 15). Borg and Gall (1989) proposed reliability coefficients above .90 should be regarded as highly reliable; between .79 and .89, as moderately reliable; and below .60 generally concludes a weak reliability.

Reliability analysis procedure was employed in attempt to reinforce Kirwan and Birchall's (2006) findings, which found 14 of the 16 explanatory variables to hold statistical reliability. Cronbach's Alpha is the determination of the internal consistency or average correlation of a survey item to gauge its reliability (Santos, 1999). Schmidt (1996) spoke to the persistent use of Cronbach's Alpha in psychological and social science research to investigate internal consistency or reliability for multiple-item

measures. Cronbach's alpha reliability coefficient normally ranges from 0.0 to 1.0.

Internal consistency increases as the alpha moves toward 1.0.

The alpha score using item data from this study was .88, establishing a moderately reliable instrument for the NRCS employee sample. When analyzed both as a composite group of 16 items, and the three constructs in this study, reliability was met at a statistically significant level ( $\alpha = 0.76$ ). The individual instrument questions possessed the alpha of .87. Fraenkel and Wallen (2009) suggested a correlation of .65 or higher to be acceptable for individual predictions. However, individually, Transfer Effort-Performance Expectations, Performance Outcome Expectations, and Openness to Change scored below .70, which signaled opportunity for further investigation. Table 4 reports the Cronbach's alpha coefficient of reliability for the LTSI items if an item was deleted. Capturing this data assists decision makers in selecting the most effective treatment or program to implement. The current alpha coefficient is 0.76, calculating discounts from removing any one item would have negligible effects on the instrument's ability to diagnose gaps in training. As example, if learner readiness were removed from the set of constructs reliability would only decrease by .02. Deleting positive personal outcomes would increase reliability by .05. The package of LTSI constructs possessed an acceptable alpha level even if items were deleted.

Table 4

*Reliability Coefficients for the LTSI Survey Instrument (N = 268)*

Construct	LTSI Indicator	Number of Items	Cronbach's Alpha if item Deleted
Personal	Learner Readiness	4	.74
Attributes	Motivation to Transfer	3	.71
	Positive Personal Outcomes	2	.81
	Negative Personal Outcomes	3	.75
	Personal Capacity for Transfer	3	.73
	Transfer-Effort Performance Expectations	3	.74
	Performance Self-Efficacy	3	.76
	Performance Outcomes Expectations	3	.72
Training	Perceived Content Validity	3	.72
	Transfer Design	3	.72
Work	Peer Support	3	.71
Environment	Supervisor Support	3	.79
	Supervisor Sanctions (reverse)	3	.72
	Opportunity to Use	1	.77
	Openness to Change (reverse)	2	.75
	Performance Coaching	1	.73
Note. Calculation of Cronbach's Alpha if individual item removed from regression model. Scale = 0.00 to 1.00. Construct $\alpha = .76$			

Six of the 16 LTSI independent variables were found to be indicators of amount of information transferred from the CBC. For this study, the instrument included two sections, (a) perceptions related to the CBC; and (b) perceptions related to general organizational training. The LTSI instrument was entered into Texas Tech University Qualtrics system (online survey program) to collect data. Literature shows Internet surveys can be a useful means for research (Couper, Traugott, & Lamias, 2001; Sills & Song, 2002).

## **Data Collection**

Measures to ensure confidentiality and anonymity were followed to ensure no sensitive information was collected. All data storage, transfer and collection were in compliance with Texas Tech University IT Security Policies. Since this study included human subjects, appropriate measures were taken to receive approval from the Texas Tech University Institutional Review Board (Appendix H) and the Texas A&M University Institutional Review Board (Appendix I).

Procedures outlined in Dillman's Tailored Design Method were used to administer Internet surveys and collect data (Dillman, 2009). A pre-notice email was sent to the target audience (Appendix B). The purpose of this correspondence was to "provide a positive and timely notice that the recipient will be receiving a request to help" (Dillman, p. 244). The first email invitation with a link to the Learning Transfer System Inventory questionnaire was sent to the target audience on May 4, 2015. A second email (Appendix C) was sent to employees reminding of the participation request on May 13, 2015. The final request for participation was emailed to the population frame on June 1, 2015 (Appendix F). Data collection was discontinued on June 12, 2015.

At the close of data collection, 313 surveys were collected. Of these initial responses, 45 surveys were found to be incomplete and removed from the data set, yielding 268, or a 50.0% response rate.

## **Variables**

The dependent variables for this study were the percentages of self-perceived content recalled and content learned from the training transferred to the work setting. The



independent variables were the sixteen constructs found in the LTSI, condensed into three constructs, personal, training, and work environment (Holton, Bates, & Ruona, 2000).

### **Analysis of Data**

Following verification of completeness, all eligible surveys were uploaded into SPSS 22.0 Statistic Data Editor. LTSI survey questions were analyzed using descriptive statistics reporting frequencies, percentages and measures of central tendencies. Data analysis objectives were to (a) determine if respondents significantly agreed or disagreed with each LTSI statement, (b) determine if LTSI constructs explained recall of knowledge, skills, and abilities gained in formal training, and (c) determine if LTSI constructs explain motivation to transfer knowledge, skills, or abilities from formal training to the work setting. In order to achieve the established objectives for this study, Pearson's Product Moment Correlation was adopted to determine degree of relationships. Tests for instrument reliability was completed to find Cronbach's alpha coefficient, which confirms instrument reliability.

Pearson product-moment correlation coefficient ( $r$ ) was the statistical measure used to determine the degree of relationships, both strength and direction of association between the LTSI variables. Three variables were transformed prior to analysis to reduce skewness. Davis (1971) offered a scale of correlation values and the magnitudes of relationships (Table 5).

Table 5

*Correlation Coefficient Values and Relationships*

Correlation Coefficient	Description
.70 or higher	Very Strong Association
.50 to .69	Substantial Association
.30 to .49	Moderate Association
.10 to .29	Low Association
.01 to .09	Negligible Association

*Note.* Correlation values as interpreted by Davis (1971).

Multiple linear regression analysis was used to determine which combination of independent variable(s) influenced self-perceived content recall from the CBC training series and content transferred from the training series to the workplace. An extension of simple linear regression, multiple regression (MR) is utilized to ascertain “the role(s) that multiple independent variables play in accounting for variance in a single dependent variable” (Nathans, Oswald, & Nimon, 2012, p. 1). The authors offered the three methods of utilizing MR to include (a) assessment of *direct effects* of individual predictors in regression equation, (b) assimilation of *total effects* quantifying each variable’s contribution to a regression equation, and (c) quantifying *partial effects* of independent variables’ contributions to regression model. Fraenkel et al. (2012) found multiple regression to be an effective tool to assist researchers in finding relationships between a criterion variable and two or more explanatory variables.

There are four key assumptions to consider when utilizing multiple regression (Osborne & Waters, 2002), (Table 6). Homoscedasticity is defined as a homogeneity of variances (Wang & Riffel, 2011). Solutions for addressing the above-stated assumptions include (a) verifying linear relationships exist between independent variables and

dependent variables, (b) employing test of multicollienarity, (c) visual inspection for homoscedasticity, and (d) confirming normality of the residuals of the independent variables (Saucier, 2010).

Table 6

*Four Assumptions of Multiple Linear Regression*

ASSUMPTION	RATIONALIZATION
Variable are Normally Distributed	Assumption made to avoid highly skewed or kurtotic variables, which distort relationships
Linear relationship between independent and dependent variable(s)	Non-linear relationships underestimate the true relationship, causing risk of independent variable (IV) Type II error and Type I error for IVs sharing variance with tested IV. Relationships can only be accurately estimated if linear in nature
Variables measured reliably - without error	Risk of underestimation of relationships and overestimation of effect sizes leading to Type II errors
Assumption of Homoscedasticity	Significant homoscedasticity may lead to serious distortion of results

*Note.* Adapted from Osborne & Waters (2002) *Practical Assessment, Research, and Evaluation* 8(2).

Uncontrolled intercorrelation can lead to multicollinearity, though testing for this threat to validity resulted in no concern. These tests included visual inspection of histograms and PP Plots. Moreover, examination of tolerance factors and VIFs showed no concern of multicollinearity between any of the LTSI constructs.

## CHAPTER IV

### RESULTS AND DISCUSSION

Chapter Four presents the results for this study. The purpose of this study was to determine if meaningful associations exist between NRCS employees' self-perceived Conservation Boot Camp content recall and content transfer scores and selected explanatory variables measuring learning transfer constructs (personal attributes, training, and work environment). To achieve the research purpose, the following research objectives guided this study:

1. To determine learning transfer factors influencing NRCS employees' self-perceived scores of content recalled (knowledge, skills, and abilities) from the NRCS CBC;
2. To determine learning transfer factors influencing NRCS employees' self-perceived scores of NRCS CBC content transferred the work setting; and,
3. To judge if significant relationships exist between NRCS employees' self-perceived CBC content recall and content transfer scores and selected demographic and explanatory variables measuring learning transfer constructs.

Tests and procedures employed in the data analysis included bivariate and multivariate analyses. An alpha level of  $p < .05$  was set *a priori* to determine statistical significance for all analyses.

## Characteristics of Subjects

Prior to answering the first objective, the researcher sought to describe the personal and professional characteristics of NRCS employees who received training from the CBC and who participated in this study.

Table 7 shows that of the 268 employees who participated in the study, 62.0% were male ( $n = 160$ ), while 38.0% were female ( $n = 98$ ). The number of respondents that did not share their gender was 10, or 3.7%. This sample closely resembles the current proportion of females employed in the NRCS population, which is 35.7% (S. Alvarez, personal communication, September 30, 2015). Table 6 illustrates the demographic profile of the study's participants.

Regarding the age of USDA-NRCS respondents, seventeen participants (6.4%) were less than 26 years old; 142 (53.8%) were between 26 and 35 years old; 66 (25.0%) were between 36 and 45 years of age; 26 (9.8%) were between 46 and 55 years of age; and 13 (4.9%) were between 56 and 65 years old (Table 6). Eight participants, or 2.9 %, selected not to answer this question.

The USDA-NRCS offers a number of diverse position opportunities, all working to meet the mission to “help people help the land.” Table 6 reflects the occupational positions of study participants. In this study, the highest represented position was that of soil conservationist. Five (1.9%) respondents did not to answer this question.

Table 7

*Demographic of Participating NRCS Employees (N = 268)*

Variable	Sub-category	<i>f</i>	%
Gender <sup>a</sup>	Male	160	62.0
	Female	98	38.0
Age <sup>b</sup>	26-35 years of age	141	54.0
	36-45 years of age	65	24.9
	46-55 years of age	25	9.6
	56-65 years of age	13	5.0
Job Title <sup>c</sup>	Soil Conservationist	160	60.8
	Soil Conservation Technician	33	12.5
	Rangeland Management Specialist	14	5.3
	Other Position	14	5.3
	Natural Resource Specialist	9	3.4
	Soil Scientist	8	3.0
	Civil Engineer	8	3.0
	Civil Engineering Technician	7	2.7
	Forester	4	1.5
	Agronomist	3	1.1
	Ag Engineer	3	1.1
Trainings/yr. <sup>d</sup>	1-3 years	209	79.8
	4-6 years	41	15.6
	7-9 years	8	3.1
	More than 10 years	4	1.5
Years after CBC <sup>e</sup>	1-3 years	105	40.2
	4-6 years	79	30.3
	7-9 years	76	29.1
	>10 years	1	0.4

*Note.* <sup>a</sup>Ten (3.7%) participants chose not to respond to this question. <sup>b</sup> Seven (2.6%) of participants chose not to respond to this question. <sup>c</sup> Five (1.9%) participants did not answer this question. <sup>d</sup> Six (2.2%) participants did not answer. <sup>e</sup> (2.6%) selected not to answer this question.

Respondents were asked the average number of USDA-NRCS trainings completed annually (Table 7). Commitment to enhancing skills and abilities has been found to positively impact organizations (Noe & Wilk, 1993). Bartlett (2001) found training frequency to be positively related to employee affective commitment to an organization. Table 7 shares the majority of respondents (79.8%) reported attending between one and three USDA-NRCS trainings annually; 15.6% attended between four and six per year; 3.1% reported seven to nine trainings; and four respondents attended more than 10 agency-facilitated trainings per year.

The number of years since respondents completed CBC training varied from one to just over ten (Table 7). The duration was gauged between time of CBC training completion and participation in the current study to assess participants' ability to recall and transfer learned information. This aligns with Baldwin and Weissbein's (1997) recommendation to employ longer intervals between training and assessment or evaluation. The majority of respondents (40.2%) completed the training within the last three years, followed by within six years (30.3%) and within nine years (29.1%; Table 7). Only one respondent (0.4%) completed the training more than 10 years ago.

### **Objective 1: Learning Transfer Factors Influence on Content Recall**

Learning transfer factors in the CBC were constituted by three constructs, known as personal attributes, training, and work environment, as described by Baldwin and Ford (1988). The transfer factors were measured through 16 indicators (Table 8).



Table 8

*Descriptive Statistics for the Learning Transfer System Inventory (N = 268)*

Construct	Learning Transfer Indicators	Min.	Max.	<i>M<sup>a</sup></i>	<i>SD</i>
Personal	Learner readiness (LR)	5	20	13.49	2.77
Attributes	Motivation to transfer (MT)	3	15	9.93	2.42
	Positive Personal Outcomes (PPO)	2	10	5.58	1.81
	Negative Personal Outcomes (NPO)	3	14	7.37	2.27
	Personal Capacity for Transfer (PCT)	3	13	6.82	2.37
	Transfer Effort-Performance Expectations (TEP)	4	15	10.87	1.84
	Performance Self-Efficacy (PSE)	4	15	10.99	1.88
	Performance-Outcomes Expectations (POE)	5	15	10.07	1.92
Training	Perceived Content Validity (PCON)	3	15	10.00	2.69
	Transfer Design (TD)	3	15	11.23	2.21
Work	Peer Support (PS)	5	20	13.46	2.69
Environment	Supervisor Support (SSUP)	3	15	9.11	2.62
	Supervisor Sanctions (SSAN)	3	15	6.29	2.36
	Opportunity to Use (OPP)	3	15	11.13	2.07
	Openness to Change (OTC)	2	10	4.98	1.67
	Performance Coaching (PCOACH)	1	5	2.57	0.91

*Note.* Five-point Likert scales. <sup>a</sup>1 = Strongly disagree, 2 = Disagree, 3 = Neither agree or disagree, 4 = Agree, 5 = Strongly agree.

The personal (attribute) construct has been found to either promote or hinder employee motivation to transfer knowledge, ability, and skills (Baldwin & Ford, 1988; Holton et al., 2003). Table 8 provides univariate analysis of respondent perceptions on the eight items that constitute the personal attribute construct, including learner readiness, motivation to transfer, personal capacity for transfer, positive personal outcomes, negative personal outcomes, transfer effort-performance expectations, performance self-efficacy, and performance outcome-expectations.

Four personal indicators were considered to be substantial barriers to learning transfer including motivation to transfer ( $M = 9.93$ ,  $SD = 2.42$ ), personal capacity for transfer ( $M = 6.82$ ,  $SD = 2.37$ ), positive personal outcomes ( $M = 5.58$ ,  $SD = 1.81$ ), and negative personal outcomes ( $M = 7.37$ ,  $SD = 2.27$ ). A notable finding was the number of respondents reporting not having the time, energy, or mental space to make necessary changes to transfer what was learned in CBC ( $M = 6.8$ ,  $SD = 2.37$ ). These factors relate to perceptions that new skills and knowledge will lead to positive or negative outcomes. The data indicated no perceived positive or negative consequences to utilizing new knowledge or skills.

In answering objective one, “to determine learning transfer factors influencing NRCS employees’ self-perceived scores of content recalled (knowledge, skills, and abilities) from the NRCS CBC,” a correlational model was constructed. Table 9 displays low to moderate ( $p \leq 0.01$ ) correlations between content recalled and 12 LTSI predictors, including learner readiness (0.44), motivation to transfer (0.35), positive personal outcomes (0.25), personal capacity for transfer (0.28), transfer-effort performance

expectations (0.19), personal self-efficacy (0.17), perceived content validity (0.41), transfer design (0.40), peer support (0.29), supervisor support (0.17), opportunity to use (0.40), and performance outcome expectations (0.19).

Table 9

*Summary of Bivariate Correlations between Content Recall and Explanatory Variables  
(n = 246)*

VARIABLES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Content Recall	—	.48**	.35**	.26**	.02	-.28**	.19**	.19**	.29**	.17**	.41**	.40**	.19**	-.09	.40**	.01	.03
2. LR		—	.42**	.33**	.05	-.25**	.14*	.15*	.41**	.18**	.39**	.39**	.26**	-.11	.48**	-.04	.11
3. MT			—	.73**	.21**	-.31**	.23**	.44**	.59**	.41**	.55**	.60**	.43**	-.21**	.62**	-.11	.17**
4. PPO				—	.29**	-.23**	.21**	.45**	.45**	.33**	.42**	.41**	.45**	-.08	.46**	-.11	.15*
5. NPO					—	.05	-.10	.07	.21**	.08	.16*	.126*	.25**	.17**	.11	.066	.11
6. PCT						—	-.18**	-.27**	-.41**	-.27**	-.43**	-.36**	-.28**	.31**	-.54**	.32**	-.03
7. PSE							—	.25**	.20**	.22**	.22**	.16*	.23**	-.02	.15*	-.12	.08
8. POE								—	.43**	.68**	.37**	.33**	.49**	-.19**	.37**	-.29**	.23**
9. PS									—	.42**	.52**	.45**	.59**	-.32**	.66**	-.27**	.41**
10. TEP										—	.33**	.31**	.47**	-.24**	.39**	-.23**	.18**
11. PCON											—	.66**	.42**	-.22**	.63**	-.198**	.16*
12. TD												—	.47**	-.18**	.62**	-.083	.10
13. SSUP													—	-.22**	.53**	-.26**	.22**
14. SSAN														—	-.37**	.46**	-.01
15. OPP															—	-.27**	.10
16. OTC																—	.08
17. PCOACH																	—

*Note.* <sup>a</sup> Dependent Variable. <sup>b</sup> Predictors: (Constant), LR, MT, PPO, PCT, PSE, POE, PS, TEP, PCON, TD, SSUP, SSAN, OPP, OTC, PCOACH. \*p<.05 (2-tailed) \*\*p<.01 (2-tailed). LR = learner readiness, MT = motivation to transfer, PPO = Positive personal outcomes, NPO = Negative personal outcomes, PCT = Personal capacity for transfer, PSE = Personal self-efficacy, POE = Performance outcome expectations PS = Peer support, TEP = Transfer effort-performance expectations, PCON = Perceived content validity, TD = Transfer design, SSUP = Supervisor support, SSAN = Supervisor sanctions, OPP = Opportunity to use, OTC = Openness to change, PCOACH = Performance coaching

## **Objective 2: Learning Transfer Factors Influence on Content Transfer**

The second objective of this study was to determine learning transfer factors influencing NRCS employees' self-perceived scores of NRCS CBC content transferred to the work setting. Bivariate and multivariate procedures were employed to answer the second objective, determine learning transfer factors influencing NRCS employees self-perceived scores of NRCS CBC content transferred to the work setting.' The research model is designed to examine associations between NRCS employees' self-reported transfer of learning (dependent variable) and 16 explanatory variables. These included (a) learner readiness, (b) motivation to transfer, (c) positive personal outcomes, (d) negative personal outcomes, (e) personal capacity for transfer, (f) transfer effort-performance expectations, (g) performance self-efficacy, (h) performance outcome expectations (i) perceived content validity, (j) transfer design, (k) peer support, (l) supervisor support, (m) supervisor sanctions, (n) opportunity to use, (o) openness to change, and (p) performance coaching. These Learning Transfer System Inventory antecedent variables constitute 3 learning transfer constructs: personal attributes, training, and work environment.

As shown in Table 10, content transferred exhibited statistically significant ( $p = .001$ ) correlation with 15 LTSI explanatory variables. Substantial correlations were observed with opportunity to use ( $r = .69$ ); perceived content validity (.68), transfer design (.59), peer support (.59), motivation to transfer (.57), and personal capacity for transfer (.50). Moderate correlations were found with learner readiness (.48), positive personal outcomes (.45), supervisor support (.46), performance outcome expectations (.35), and transfer effort-performance expectations (.31). Personal self-efficacy (.23), performance coaching (.18), supervisor sanctions (.18), and negative personal outcomes

(.16) held low associations with the content transferred dependent variable. The only non-correlated LTSI variable was openness to change (-.10).

Table 10

*Summary of Bivariate Correlations between Content Transferred and Explanatory Variables (n = 246)*

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Content Transfer <sup>a</sup>	—	.48**	.57**	.45**	.16**	-.50**	.23**	.35**	.59**	.31**	.68**	.59**	.46**	-.18**	.69**	-.10	.18**
2. LR		—	.42**	.33**	.05	-.25**	.14*	.15*	.41**	.18**	.39**	.39**	.26**	-.11	.48**	-.04	.12
3. MT			—	.73**	.21**	-.30**	.23**	.44**	.59**	.41**	.55**	.60**	.43**	-.21**	.62**	-.11	.17**
4. PPO				—	.29**	-.23**	.21**	.45**	.45**	.33**	.42**	.41**	.45**	-.08	.46**	-.11	.15*
5. NPO					—	.05	-.10	.07	.21**	.08	.16*	.13*	.25**	.17**	.11	.07	.11
6. PCT						—	-.18**	-.27**	-.41**	-.27**	-.43**	-.36**	-.28**	.31**	-.54**	.32**	-.03
7. PSE							—	.25**	.20**	.22**	.22**	.16*	.23**	-.02	.15*	-.12	.07
8. POE								—	.43**	.68**	.37**	.33**	.49**	-.19**	.37**	-.28**	.22**
9. PS									—	.42**	.52**	.45**	.59**	-.32**	.66**	-.27**	.40**
10. TEP										—	.33**	.31**	.47**	-.24**	.39**	-.23**	.18**
11. PCON											—	.66**	.42**	-.22**	.63**	-.20**	.16*
12. TD												—	.47**	-.18**	.62**	-.08	.10
13. SSUP													—	-.22**	.53**	-.26**	.22**
14. SSAN														—	-.37**	.46**	-.01
15. OPP															—	-.27**	.10
16. OTC																—	.08
17. PCOACH																	—

Note. <sup>a</sup> Dependent Variable. <sup>b</sup> Predictors: (Constant), LR, MT, PPO, PCT, PSE, POE, PS, TEP, PCON, TD, SSUP, SSAN, OPP, OTC, PCOACH. \*p<.05 (2-tailed)

\*\*p<.01 (2-tailed). LR = learner readiness, MT = motivation to transfer, PPO = Positive personal outcomes,

NPO = Negative personal outcomes, PCT = Personal capacity for transfer, PSE = Personal self-efficacy, POE = Performance outcome expectations

PS = Peer support, TEP = Transfer effort-performance expectations, PCON = Perceived content validity, TD = Transfer design,

SSUP = Supervisor support, SSAN = Supervisor sanctions, OPP = Opportunity to use, OTC = Openness to change, PCOACH = Performance coaching

### **Objective 3: Significant Relationships between Variables of Interest**

The third research objective attempted to judge if significant relationships existed between NRCS employees' self-perceived CBC content recall and content transfer scores and selected demographic and explanatory variables measuring learning transfer constructs. Multivariate analyses of data using the forced entry multiple regression method provided the potential model to explain the variance in NRCS employees' abilities to recall information received from the CBC training.

The forced entry method allows the researcher to enter all independent variables into the multiple linear regression equation, where they remain in the equation throughout analyses. Independent variables that contribute to the explanation of variance in content recall (or content transfer) scores will have significant *t*-values, using the forced entry procedure. This is a necessary condition to determine “the proportion of the variation in the criterion [dependent] variable, that can be attributed to the variation of the combined predictor [explanatory] variables” (Hinkle, Wiersma, & Jurs, 1994, p. 460).

The dependent variable ‘content recalled’ and 16 potential explanatory variables and selected demographic variables (gender, age, job title, number of trainings/year, and years since the NRCS CBC training) were inputted into a multiple regression equation. Demographic variables were collapsed to assured at least 30 cases were used per variable. Dummy coding was also implemented in order to utilize in the regression analysis. This grouping is required of categorical variables in regression analysis to “indicate whether there is a relationship between the dummy variables and the dependent variables” (Alkharusi, 2012). For example, membership in one group (soil conservationist) is coded one, whereas non-membership (All Other Positions) is coded zero.



The findings of the first multivariate analysis of data (Table 11) revealed a total of 35.2% of the variance in NRCS employees' ability to accurately recall content from the CBC was accounted for by combination of the 16 LTSI and demographic variables.

Table 11

*Forced Entry Multiple Regression Analysis on the Dependent and Selected Independent Variables*

Source of Variation	df	Sum of Squares	Mean Square	F-Ratio	F-Prob.
Regression	25	57954.821	2318.193	6.163	.000 <sup>b</sup>
Residual	213	80125.706	376.177		

Variable	B	SE B	Beta	t	Sig.
Content Recalled <sup>a</sup>	-0.192	17.732		-0.011	0.991
Male	-4.314	2.890	-0.087	-1.493	0.137
Age-46 or more	-1.251	4.437	-0.018	-0.282	0.778
Age-35 or less	-3.797	3.216	-0.077	-1.180	0.239
Job-Soil Con. Tech.	0.675	4.401	0.009	0.153	0.878
Job-All Others	-9.362	3.134	-0.171	-2.987	0.003*
Yrs. after CBC (4-6)	-0.224	3.333	-0.004	-0.067	0.947
Yrs. after CBC (7+)	-10.862	3.476	-0.207	-3.125	0.002*
Trainings/year (4-6)	2.621	3.828	0.039	0.685	0.494
Trainings/year (7+)	-18.399	6.556	-0.160	-2.806	0.005*
LR	1.514	0.563	0.178	2.691	0.008*
MT	0.054	0.956	0.006	0.057	0.955
PPO	0.144	1.120	0.011	0.128	0.898
NPO	-0.466	0.651	-0.043	-0.715	0.475
PCT	-0.741	0.668	-0.074	-1.109	0.269
PSE	1.179	0.742	0.092	1.588	0.114
POE	1.250	1.022	0.101	1.224	0.222
PS	-0.104	0.826	-0.011	-0.126	0.900
TEP	-0.476	1.045	-0.036	-0.456	0.649
PCON	1.697	0.728	0.187	2.332	0.021*
TD	1.834	0.894	0.168	2.050	0.042*
SSUP	-0.385	0.709	-0.042	-0.543	0.588
SSAN	0.116	0.683	0.011	0.170	0.865
OPP	0.219	1.108	0.019	0.197	0.844
OTC	1.684	0.975	0.118	1.726	0.086
PCOACH	-1.382	1.672	-0.054	-0.827	0.409

Note. <sup>a</sup> Dependent Variable. <sup>b</sup> Predictors: (Constant), PCOACH, SSAN, Job-All Others, Age (35-less), Training/Yr. (4-6), Years after CBC (4-6), Trainings/Yr. (7+), PSE, NPO, Male, Job-Soil Con. Tech., TD,

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PCT, LR, TEP, Age (46+), Years after CBC (7+), PPO, OTC, SSUP, PCON, POE, PS, OPP, MT. \* $p < .05$ .  
LR = learner readiness, MT = motivation to transfer, PPO = Positive personal outcomes,  
NPO = Negative personal outcomes, PCT = Personal capacity for transfer, PSE = Personal self-efficacy, POE  
= Performance outcome expectations, PS = Peer support, TEP = Transfer effort-performance expectations,  
PCON = Perceived content validity, TD = Transfer design, SSUP = Supervisor support, SSAN = Supervisor  
sanctions, OPP = Opportunity to use, OTC = Openness to change, PCOACH = Performance coaching

It is important to emphasize that no practical method exists for determining how much variance in content recall scores was attributed to each of the significant independent variables. This belief is strongly supported in the writing of Pedhazur (1982), as the “variance partitioning is *not* a valid approach for the purpose of determining the relative importance of the effects of independent variables on the dependent variable” (p. 176).

The amount of variance explained in NRCS employees’ content recall scores was attributed to all the statistically significant independent variables in the multiple regression equation. A finite set of independent variables explains as much variance in the dependent variable as does an infinite number of explanatory variables. Therefore, a second multiple regression analysis of data on the dependent and independent variables, with deletion of intercorrelated independent variables, was conducted to better understand significant contributing variables. Table 11 contains results from a second multiple regression analysis of data for the dependent variable, self-perceived content recalled, and the statistically significant independent variables from the first multiple regression analyses.

Table 12

*Forced Entry Multiple Regression Analysis on the Dependent and Selected Independent Variables with Deletion of Intercorrelated Variables*

Source of Variation	df	Sum of Squares	Mean Square	F-Ratio	F-Prob.
Regression	6	52446.500	8741.083	22.509	0.000 <sup>b</sup>
Residual	247	95919.012	388.336		

<u>Variable</u>	<u>B</u>	<u>SE B</u>	<u>Beta</u>	<u>t</u>	<u>Sig.</u>
Content Recalled <sup>a</sup>	11.023	8.290		1.330	0.185
Job-All Others	-9.747	2.908	-0.177	-3.352	0.001*
Yrs. after CBC (7+)	-10.328	2.894	-0.194	-3.568	0.000*
Trainings/year (7+)	-17.329	6.242	-0.146	-2.776	0.006*
LR	1.666	0.526	0.193	3.165	0.002*
PCON	1.630	0.633	0.182	2.576	0.011*
TD	1.675	0.762	0.154	2.198	0.029*

Note. <sup>a</sup> Dependent Variable. <sup>b</sup> Predictors: (Constant), TD, Trainings/Yr. (7+), Yrs. after CBC (7+), Job-All Others, LR, PCON. \* $p < .05$ . LR = learner readiness, MT = motivation to transfer, PPO = Positive personal outcomes, NPO = Negative personal outcomes, PCT = Personal capacity for transfer, PSE = Personal self-efficacy, POE = Performance outcome expectations, PS = Peer support, TEP = Transfer effort-performance expectations, PCON = Perceived content validity, TD = Transfer design, SSUP = Supervisor support, SSAN = Supervisor sanctions, OPP = Opportunity to use, OTC = Openness to change, PCOACH = Performance coaching

Table 13 provides a comparison of the first multivariate analysis, and the second with reduction of intercorrelated variables. A comparison of both multivariate analyses for content recall displays the first model explained 35.2% of variance in content recalled, as opposed to the second model report of 33.8%. This may be explained by a confounding effect that can occur when the relationship between two or more independent variables distorts association with the dependent variable (MacKinnon, Krull, & Lockwood, 2000). The second F-ratio was a statistically significant 22.509 compared to 6.163 in the first. Both models had acceptable  $p$ -values ( $p \leq .05$ ). The F-Ratio and F-Prob are used to determine the overall significance of an independent group of variables in the regression model (Fraenkel & Wallen, 2012). It was determined the independent variables learner readiness, perceived content validity, transfer design, Jobs-

All Others, 7+ years after completing CBC training, and completing 7+ NRCS trainings annually contributed 33.8 % of NRCS employees' self-perceived scores in content recall.

Table 13

*R Square Comparison between First and Second Multivariate Analyses of Data for Content Recall and Selected Independent Variables*

Forced Entry Multiple Regression Equation	Multiple R	R Square	Adjusted R Square	Standard Error
First multiple regression model	0.648	0.420	0.352	19.395
Second multiple regression model	0.595	0.353	0.338	19.706

The second half of the third research objective was to judge if significant relationships existed between NRCS employees' self-perceived CBC content transfer scores and selected demographic and explanatory variables measuring learning transfer constructs. Multivariate analyses of data (forced entry multiple regression methods) provided a potential model for explaining the variance in NRCS employees' abilities to transfer information received from CBC training to their work environments.

Similar to the multivariate analyses conducted on content recall, all 16 LTSI explanatory variables and selected demographic variables (gender, age, job title, number of trainings/year, and years since the NRCS Conservation Boot Camp training) were entered into SPSS to determine if significant associations existed to explain the variance in NRCS employees' perceived abilities to transfer knowledge from training to work environments.

Results (Table 14) of the multiple regression analysis exploring learning transfer factor influence on NRCS employees' self-perceived scores of NRCS content transferred

to the work setting showed 62.0% of the variance in NRCS employee' self-perceived content transfer scores were contributed through a combination of four LTSI explanatory variables including openness to change, perceived content validity, personal capacity for transfer, and opportunity to use, and the Jobs-All Others variable. A demographic variable was included in this equation: job-all others, positions which included natural resource specialists, rangeland specialists, range aids, foresters, soil scientists, agronomists, civil engineering technicians, civil engineers, agricultural engineers, and other supportive positions. The remainder of items were removed from the regression equation because respective *p*-value was greater than .05, and posed a risk of confounding the effects of the contributing variables.

Table 14

*Forced Entry Multiple Regression Analysis on the Dependent and Selected Independent Variables*

Source of Variation	df	Sum of Squares	Mean Square	F-Ratio	F-Prob.
Regression	25	120636.342	4825.454	16.602	0.001 <sup>b</sup>
Residual	214	62198.621	290.648		

Variables	B	SE B	Beta	t	Sig.
Content Transfer <sup>a</sup>	-59.359	16.170		-3.671	0.001
Female	2.521	2.533	0.044	0.996	0.321
Age 46+	0.907	3.872	0.011	0.234	0.815
Age 35-less	0.418	2.792	0.007	0.150	0.881
Job-Soil Con. Tech.	-2.090	3.868	-0.024	-0.540	0.590
Job-All Others	-8.113	2.752	-0.129	-2.948	0.004*
Yrs. after CBC (4-6)	4.961	2.901	0.083	1.710	0.089
Yrs. after CBC (7+)	-2.004	3.055	-0.033	-0.656	0.512
Trainings/year (4-6)	2.592	3.315	0.034	0.782	0.435
Trainings/year (7+)	-4.314	5.758	-0.033	-0.749	0.455
LR	0.730	0.493	0.075	1.483	0.140
MT	1.226	0.840	0.109	1.460	0.146
PPO	-.709	0.981	-0.047	-0.723	0.470
NPO	0.342	0.572	0.028	0.598	0.551
PCT	-2.529	0.586	-0.221	-4.312	0.000*
PSE	0.652	0.652	0.044	1.001	0.318
POE	0.681	0.892	0.048	0.763	0.447
PS	0.848	0.712	0.082	1.191	0.235
TEP	-0.560	0.914	-0.036	-0.613	0.541
PCON	3.155	0.639	0.302	4.937	0.001*
TD	0.589	0.786	0.047	0.750	0.454
SSUP	0.754	0.622	0.071	1.211	0.227
SSAN	0.315	0.599	0.027	0.526	0.599
OPP	2.306	0.974	0.171	2.368	0.019*
OTC	2.370	0.856	0.145	2.768	0.006*
PCOACH	0.872	1.466	0.030	0.595	0.552

Note. <sup>a</sup> Dependent Variable. <sup>b</sup> Predictors: (Constant), PCOACH, SSAN, Job-All Others, Age (35-less), Training/Yr. (4-6), Years after CBC (4-6), Trainings/Yr. (7+), PSE, NPO, Female, Job-Soil Con. Tech., TD, PCT, LR, TEP, Age (46+), Years after CBC (7+), PPO, OTC, SSUP, PCON, POE, PS, OPP, MT. \*p<.05. LR = learner readiness, MT = motivation to transfer, PPO = Positive personal outcomes, NPO = Negative personal outcomes, PCT = Personal capacity for transfer, PSE = Personal self-efficacy, POE = Performance outcome expectations, PS = Peer support, TEP = Transfer effort-performance expectations, PCON = Perceived content validity, TD = Transfer design, SSUP = Supervisor support, SSAN = Supervisor sanctions, OPP = Opportunity to use, OTC = Openness to change, PCOACH = Performance coaching

The results provided in Table 14 displayed statistically significant correlations between the content transferred dependent variable and five explanatory variables. Perceived content validity had the highest statistically significant *t*-value (*t* = 4.937). Other contributing variables included jobs-all others (sans soil conservationist or soil

conservation technicians (.004), personal capacity for transfer (.001), opportunity to use (.019), and openness to change (.006).

Again, a second multiple regression analysis of data on the dependent and independent variables, with deletion of intercorrelated independent variables, was conducted to better understand significant contributing variables to the explanation of variance in NRCS employees' scores for content transferred from the CBC training to their work environments. Table 15 contains results from a second multiple regression analysis of data for the dependent variable, content transferred, and the statistically significant independent variables from the first multiple regression analyses.

Table 15

*Forced Entry Multiple Regression Analysis on the Dependent and Selected Independent Variables*

Source of Variation	df	Sum of Squares	Mean Square	F-Ratio	F-Prob.
Regression	5	119120.806	23824.161	79.955	0.001 <sup>b</sup>
Residual	246	73300.857	297.971		

<u>Variable</u>	<u>B</u>	<u>SE B</u>	<u>Beta</u>	<u>t</u>	<u>Sig.</u>
Content Transfer <sup>a</sup>	-34.745	10.526		-3.301	0.001***
Job-All Others	-7.877	2.545	-0.125	-3.095	0.002**
PCT	-2.301	0.561	-0.199	-4.103	0.000***
PCON	4.008	0.525	0.390	7.636	0.000***
OPP	4.561	0.745	0.341	6.118	0.000***
OTC	2.349	0.691	0.143	3.399	0.001***

Note. <sup>a</sup> Dependent Variable. <sup>b</sup> Predictors: (Constant), OTC, Job-All Others, PCON, PCT, OPP. \*p<.05. LR = learner readiness, MT = motivation to transfer, PPO = Positive personal outcomes, NPO = Negative personal outcomes, PCT = Personal capacity for transfer, PSE = Personal self-efficacy, POE = Performance outcome expectations, PS = Peer support, TEP = Transfer effort-performance expectations, PCON = Perceived content validity, TD = Transfer design, SSUP = Supervisor support, SSAN = Supervisor sanctions, OPP = Opportunity to use, OTC = Openness to change, PCOACH = Performance coaching

The results of the second multiple regression analysis exhibit a clear F-Ratio increase from 16.602 to the statistically significant 79.955. A comparison of the two

models shows a reduction in Adjusted R<sup>2</sup> changed from .66 to .61. This can be interpreted as 66% of variance in NRCS employees’ self-perceived scores for content transfer could be explained by all LTSI explanatory variables, and selected demographic variables. Following removal of confounding variables, four independent variables and the Jobs-All Others variable explained 61.1% of the variance in NRCS employees’ self-perceived scores for content recall.

Table 16

*R Square Comparison between First and Second Multivariate Analyses of Data for Content Transfer and Selected Independent Variables*

Forced Entry Multiple Regression Equation	Multiple R	R Square	Adjusted R Square	Standard Error
First multiple regression model	0.812	0.660	0.620	17.048
Second multiple regression model	0.787	0.619	0.611	17.262

It was displayed that significant relationships exists between NRCS employees’ self-perceived CBC content recall and content transferred scores and selected demographics and explanatory variables measuring learning constructs displayed positive evidence. A comparison of the two multiple regression analyses revealed

### **Chapter Summary**

The results of the study indicated several factors within the forced entry multiple linear regression analysis significant to NRCS employees’ self-perceived perceptions of both content recall and content transfer. Through multiple linear regression using the forced entry method, it was confirmed the predictor variables explaining the variance in content recall included learner readiness, openness to change, and perceived content validity. Using similar multivariate measures, the contributors to content transferred were



investigated. Results revealed a 61.1% contribution when applying four LTSI explanatory variables (PCON, PCT, OPP, and OTC) and the Jobs-All Others demographic variable to the regression equation. This holds practical implications, which will be reported in Chapter V.

This chapter provided a review of descriptive statistics, factor analysis, bivariate and multiple regression results, which established a profile of USDA NRCS employees. Results from this study help answer questions regarding employee perception of learning transfer, ability to recall information from the CBC training. The LTSI instrument as applied in this study should be considered a valid diagnostic tool and investigated for further use. One issue found was the complexity of analysis required to yield usable data. This researcher questions whether human resource professionals uninformed of robust statistical analysis methods would find the tool user-friendly.

## **CHAPTER V**

### **SUMMARIES, CONCLUSIONS, AND RECOMMENDATIONS**

Training is defined as a strategic human practice benefitting individuals, teams, and organizations (Saks & Burke, 2012). This systematic acquisition of knowledge, skills and consequential attitudes leads an employee to improved performance (Grossman & Salas, 2011). In 2011, public and private organizations invested approximately \$156.2 billion on employee development (Miller, 2012). However, the rate of knowledge, skills, and abilities transferred from formal training to the work environment can be as low as 10% (Baldwin & Ford, 1988; Cheng & Hampson, 2008; Chiaburu, Dam, & Hutchins, 2010; Holton, & Baldwin, 2000; Kupritz, 2002; Saks & Burke, 2012; Salas et al., 2012).

Literature repeatedly shows transfer of learning to be a difficult activity to accomplish (Leberman, McDonald, & Doyle, 2006; Holton, Bates, & Ruona, 2000; Cheng & Ho, 2001; Blume, Ford, Baldwin, & Huang, 2010; Cheng & Hampson, 2008). Failure to transfer learning to the work setting is often the cause for reduced job performance and economic strife.

This research examined training within the United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS). The USDA-NRCS is a federal agency responsible for assisting farmers, ranchers, and other landowners with applying conservation practices on both public and private land. Continual training for agency employees is practiced, however the need exists to retain and apply this training in the work setting. Literature shows transfer of training to be a pervasive undertaking. This final chapter will provide a summary of the study, with

conclusions for each objective, as well as recommendations for the human resource development professionals of USDA-NRCS.

### **Purpose of the Study**

The purpose of the study was to determine if meaningful associations exist between NRCS employees' self-perceived CBC content recall and content transfer scores and selected explanatory variables measuring learning transfer constructs (personal attributes, training, and work environment). This study examined the effects of a professional development training series utilized by NRCS for all field office employees.

### **Conclusions**

This section will provide conclusions to objectives of the study, followed by practical recommendations for NRCS training professionals, researchers, and human resource development practitioners. Descriptive statistics were calculated to describe the sample. These indicated that 163 males and 98 females responded, respectively. Respondents ranged in age from less than 26 up to 65 years. The majority of respondents were between the ages of 26 and 35 years old. There was diversity in position titles participating, with the most common being a soil conservationist ( $n = 163$ ). From *Objective 1: Learning Transfer Factors Influence on Content Recall*

The first objective was to determine learning transfer factors influencing NRCS employees self-perceived scores of content recalled (knowledge, skills, and abilities) from the NRCS CBC training. Multivariate analysis found explanatory variables that do influence retention of training content. A combination of six factors contributed to NRCS employees' ability to recall content learned in Conservation Boot Camp training series, including training design, learner readiness, perceived content validity, and two

demographic variables. Four explanatory factors were determined to be substantial barriers to recall of training. Several questions were raised from these results. Why aren't supervisors perceived as a resource to recalling skills needed on the job? Are employees receiving the pre-training and post-training support needed and opportunity to use what was learned? What part of recollection is really determined by personal attributes (personal self-efficacy, personal capacity for transfer)? Does the agency foster a work environment that is open to change?

*Objective 2: Learning Transfer Factors Influence on Content Transfer*

Objective 2 sought to determine learning transfer factors influencing NRCS employees self-perceived scores of NRCS CBC content transferred to the work setting. The sample population reported high levels of perceived transfer of the knowledge, skills, and abilities learned at the CBC. Analyses determined five antecedent variables contributed 61.1% of the variance in content transfer: openness to change, perceived content validity, personal capacity to transfer, opportunity to use, and all other jobs.

Conservation Boot Camp was perceived to reflect real-work situations (perceived content validity), which promotes both recall and the eventual transfer of knowledge and skills, however training design did not receive expected scores.

*Objective 3: Significant Relationships between Variables of Interest*

The third objective was to judge if significant relationships exist between NRCS employees' self-perceived CBC content recall and content transfer scores and selected demographic and explanatory variables measuring learning transfer constructs. The forced-entry multiple regression models provided evidence of several explanatory variables that influence both recall and transfer. Many of these are included in the

Learning Transfer System Inventory, yet there are still unanswered questions, which will be covered in the recommendations section. The data from this study confirmed Baldwin and Ford's (1988) and Grossman and Salas' summary that organizational transfer can be explained by three constructs: personal, training, and work environment.

Literature provides a number of strategies to enhance employee transfer of knowledge (Barnett & Ceci, 2002; Vermeulen & Admiraal, 2009; Holton & Baldwin, 2003). The organizational learning climate was found to be crucial for transfer. From supervisor and peer support, applicable training design and reduction of perceived supervisor sanctions, the effectiveness of employee development occurs well before they step into the training venue.

#### **Recommendations to NRCS Human Resource Development Personnel**

Long-term maintenance and application of trained skills was found to be a difficult task. It is recommended that USDA-NRCS human resource personnel consider investing in methods to develop and offer ancillary resources to supervisors to assist them in providing support to employees returning from trainings. Brinkerhoff and Montesino (1995) suggested that supervisors conduct a pre-training meeting with employees to set learning goals and expectations, followed by a post-training meeting to discuss how newly learned skills and abilities can be applied. This includes providing opportunity to use newly learned skills. Trainees should be encouraged to consider training as an overlapping process involving both the training and work environments. The two settings should reinforce the knowledge and skills to enhance performance.

Developing discipline work groups or communities of practice would provide training personnel collaborative opportunity and a forum for brainstorming methods to

increase transfer from a design and delivery point of measure. Raymond and Robinson (2013) positioned a community of practice as existing when “members share a similar set of interests, expertise, roles and goals; opportunities exist for members to interact with one another through both formal and informal spaces; and groups share a common practice or set of practices.” (p. 104). This can be agency specific or expand to partner agencies within the U.S. Department of Agriculture. A long-term strategic training plan would provide the agency with ability to meet challenges for years to come. This plan should include competency model identification for each job series with provision of recurrent training opportunities, both online and face-to-face to adapt and maintain skillsets as required. The key areas to consider organizational changes include focus on increasing supervisor support, openness to change, opportunity to use and establishing opportunity for performance coaching.

The lowest mean score for a LTSI explanatory variable was performance coaching ( $M = 1.27$ ). This variable speaks to both formal and informal indicators from an organization about an individual’s job performance. Inviting retirees or Earth Team Volunteers to engage new employees in informal training or reverse shadowing would support immediate supervisors, while reinforcing mission-specific awareness. Openness to change was found not to contribute to content recall or content transferred in the forced-entry multiple regression models. This implies that NRCS employees perceive the agency to possess an organizational climate that either resists or discourages the use of newly acquired skills. If this perception is widespread, the expansive benefits of training will not be realized.

Finally, possessing a real-time valuation of how transferrable each course is to employee responsibilities will position the agency as training evolves to intended certification-specific courses. Thoughtfully building a continuous learning environment is key to the mission of “helping the people help the land.”

### **Recommendations for Additional Research**

This study examined transfer of learning in a federal agency seeking to determine factors that either promote or hinder transfer. There was an abundance of literature related to learning transfer in private organizations, however very little from federal organizations. It is recommended that future research investigate transfer of training and learning strategies currently used in federal agencies. Specifically, researching the Return on Investment, both discovered and lost, due to transferring or failing to transfer organization learning would quantify training efforts and expenditures. This manuscript shared cost estimates associated with training, which are not likely not decrease. Researching trends and providing strategies for human resource development in this sector stands to improve the performance and productivity of those working for the citizens of this country. Additional questions and opportunities to study, possibly through qualitative or an organizational values investigation, included what specific components in an NRCS employees’ field, area, or state office provides the catalyst to succeed in retaining and applying skills learned at trainings? How does motivation to transfer in the federal context differ from a private organization? Researchers are also recommended to consider the length of survey when using the LTSL. In this study, 315 participants began the survey, however only 268 completed resulting in a 9% attrition rate. This can lead to

potential non-sampling error. The cause of suppression may be from fatigue, boredom, non-prioritization, or simply lack of interest.

There were a number of models presented in Chapter 2, which combined with the LTSI may provide federal organizations with a valid diagnostic tool to assess transfer with alignment to organizational mission.

Lastly, investigating transfer of a public organization through a qualitative research study would likely provide first-hand knowledge of participants, and insight that has not been achieved to this point.



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**APPENDIX A - LTSI INSTRUMENT**

**For the following questionnaire items, please limit your thinking to your participation in the CONSERVATION BOOT CAMP training. For each statement, please select the response that most closely reflects your opinion as it relates to the training using the following scale.**

- 1 = Strongly Disagree
- 2 = Disagree
- 3 = Neither agree or disagree
- 4 = Agree
- 5 = Strongly Agree

1. Prior to this training, I knew how this training was supposed to affect my performance.	1 2 3 4 5
2. Prior to this training, I knew this training would increase my personal productivity.	1 2 3 4 5
3. When I left this training, I couldn't wait to get back to work to try what I learned.	1 2 3 4 5
4. When I left this training, I believed this training would help me do my job better.	1 2 3 4 5
5. When I left this training, I believed that successfully using this training would help me get a salary increase.	1 2 3 4 5
6. When I left this training, I believed that if I use this training I would be more likely to be rewarded.	1 2 3 4 5
7. I am likely to receive some recognition if I use newly learned skills from this training on the job.	1 2 3 4 5
8. Before this training, I had a good understanding of how it would fit my job-related development.	1 2 3 4 5
9. I knew what to expect from this training before it began.	1 2 3 4 5
10. I don't have time to try to use this training on my job.	1 2 3 4 5
11. Trying to use this training will take too much energy away from my other work.	1 2 3 4 5
12. Employees in this organization will be penalized for not using what they have learned in this training.	1 2 3 4 5
13. I will be able to try out this training on my job.	1 2 3 4 5
14. There is too much happening at work right now for me to try to use this training.	1 2 3 4 5
15. I will be reprimanded if I do not use new techniques taught in this training.	1 2 3 4 5
16. If I do not utilize this training, I will be cautioned about it.	1 2 3 4 5
17. The resources needed to use what I learned in this training will be available to me.	1 2 3 4 5

18. My colleagues will appreciate my using the new skills I learned in this training.	1 2 3 4 5
19. At work, my colleagues will expect me to use what I learned in this training.	1 2 3 4 5
20. My supervisor will meet with me regularly to work on problems I may have in trying to use skills learned in this training.	1 2 3 4 5
21. My supervisor will meet with me to discuss ways to apply this training on the job.	1 2 3 4 5
22. My supervisor will oppose the use of techniques I learned in this training.	1 2 3 4 5
23. My supervisor will think I am less effective when I use the techniques I learned in this training.	1 2 3 4 5
24. My supervisor will probably criticize this training when I get back to work.	1 2 3 4 5
25. My supervisor will help me set realistic goals for job performance based on my training.	1 2 3 4 5
26. The instructional aids (equipment, illustrations, etc.) used in this training are very similar to real things I use on my job.	1 2 3 4 5
27. The methods used in this training are very similar to how we do it on the job.	1 2 3 4 5
28. I like the way this training seems so much like my job.	1 2 3 4 5
29. It is clear to me that the people conducting this training understand how I will use what I learn.	1 2 3 4 5
30. The trainer(s) used lots of examples that showed me how I could use my learning on the job.	1 2 3 4 5
31. The way the trainer(s) taught the material made me feel more confident I could apply it on the job.	1 2 3 4 5
32. I will get opportunities to use this training on the job.	1 2 3 4 5
33. How many years has it been since you completed Conservation Boot Camp training?	<ul style="list-style-type: none"> <li>•1-3 years</li> <li>•4-6 years</li> <li>•7-9 years</li> <li>•More than 10 years</li> </ul>

Use slide rule below to indicate the percentage of content that you accurately recall today from Conservation Boot Camp training you completed.

0    10    20    30    40    50    60    70    80    90    100

Content Recalled

34.

Use the slide rule below to indicate the percentage of content that you learned in Conservation Boot Camp that you have transferred to the work environment?

0    10    20    30    40    50    60    70    80    90    100

Content Transferred

35.

**For each statement, please select the response that most closely reflects your opinion as it relates to USDA-NRCS training in general using the following scale.**

- 1 = Strongly Disagree
- 2 = Disagree
- 3 = Neither agree or disagree
- 4 = Agree
- 5 = Strongly Agree

36. My job performance improves when I use new things that I have learned.	1 2 3 4 5
37. The harder I work at learning, the better I do my job.	1 2 3 4 5
38. For the most part, the people who get rewarded around here are the ones that do something to deserve it.	1 2 3 4 5
39. When I do things to improve my performance, good things happen to me.	1 2 3 4 5
40. The more training I apply on the job, the better I do my job.	1 2 3 4 5
41. My job is ideal for someone who likes to get rewarded when they do something really good.	1 2 3 4 5
42. Experienced employees in my group ridicule others when they use the techniques they learn in training.	1 2 3 4 5
43. My work group is reluctant to try new ways of doing things.	1 2 3 4 5
44. People often make suggestions about how I can improve my performance.	1 2 3 4 5
45. I get a lot of advice from others about how to do my job better.	1 2 3 4 5
46. I never doubt my ability to use newly learned skills on the job.	1 2 3 4 5
47. I am sure I can overcome obstacles on the job that hinder my use of new skills and knowledge.	1 2 3 4 5



48. At work, I feel very confident using what I learned in training even in the face of difficult or taxing situations.	1 2 3 4 5
49. People often tell me things to help me improve my job performance.	1 2 3 4 5
50. Including the Conservation Boot Camp training, how many trainings provided by USDA-NRCS do you typically complete each year?	<ul style="list-style-type: none"> <li>•1-3 trainings</li> <li>•4-6 trainings</li> <li>•7-9 trainings</li> <li>•More than 10 trainings</li> </ul>

**The following demographic questions are being asked to compare your responses to others participating in the study.**

51. What is your gender	<ol style="list-style-type: none"> <li>1. Male</li> <li>2. Female</li> </ol>
52. Which category would represent your age as of March 1, 2015?	<ol style="list-style-type: none"> <li>1. Less than 26 years of age</li> <li>2. 26-35</li> <li>3. 36-45</li> <li>4. 46-55</li> <li>5. 56-65</li> <li>6. 66 years or older</li> </ol>
53. What is your current job title?	<ol style="list-style-type: none"> <li>1. 401-Natural Resource Specialist</li> <li>2. 454-Rangeland Specialist</li> <li>3. 455-Range Aid</li> <li>4. 457-Soil Conservationist</li> <li>5. 458-Soil Conservation Technician</li> <li>6. 460-Forestor</li> <li>7. 470-Soil Scientist</li> <li>8. 471-Agronomist</li> <li>9. 802-Civil Engineering Technician</li> <li>10. 810-Civil Engineer</li> <li>11. 890-Ag Engineer</li> <li>12. Other (please specify)</li> </ol>

Thank you for taking the time to complete survey. Your contributions to improving employee development are appreciated. Best regards.

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**APPENDIX B – PRENOTICE of STUDY EMAIL**

March 19, 2015

Good morning,

A few days from now, you will receive an email requesting you to fill out a questionnaire for an important research project being conducted by Texas Tech University's Department of Agricultural Education & Communications and the NRCS National Center for Employee Development (NEDC). There are two major components of this study. The first is to assess USDA-NRCS employee motivation to transfer knowledge, skills and abilities learned at formal training back to the work environment. The second component explores employee perceptions of learning transfer and forces that enable or hinder transfer. Transfer is defined as learned behavior that is generalized to the job context and maintained over a period of time on the job. You have been selected because you completed Conservation Boot Camp between the years of 2005 and 2014.

We are writing you in advance because we have found many people like to know ahead of time that they will be contacted. The study is designed to help NEDC deliver courses that advance employees and the mission of NRCS. This will also help me complete my doctoral dissertation. An additional email will follow soon with directions to help support this effort. Thank you and best regards.

Chris

Christopher Lavergne

Instructional Training Specialist

USDA-NRCS

National Employee Development Center

Lafayette Parish – 646 Cajundome Blvd., Ste. 180

Lafayette, LA 70506

.....

P (337) 291-3066

[christopher.lavergne@ftw.usda.gov](mailto:christopher.lavergne@ftw.usda.gov)

## APPENIX C – EMAILED INVITATION

May 5, 2015

As you know the focus of USDA-NRCS is to “provide resources to farmers and landowners to aid them with conservation”. We help people help the land. Providing timely, research-based training to help NRCS employees build the skills needed to assist customers is an agency priority.

The central question is “are employees motivated and able to transfer the knowledge, skills, and abilities from formal training back to the field office or work environment?” To answer this question, you are being asked to participate in a voluntary research study to determine: 1) are NRCS employees motivated to transfer skills learned in formal training back to the field office; 2) does organizational climate have a positive or negative impact on transferring skills back to the field office; and 3) are NRCS employees given opportunity to practice skills learned in formal training?

To make this study manageable, we are focusing on a course most NRCS employees have taken – Conservation Boot Camp. You have been asked to participate because you completed Conservation Boot Camp between the years of 2005 and 2014.

You do not have to participate in this survey. Your participation in this survey is **100% voluntary**. Your voluntary participation, however, may help benefit NRCS with crucial insight into employee needs. The findings will be shared with the NEDC in order to improve their processes and curricula regarding Conservation Boot Camp training.

Not only is your participation in this survey completely voluntary, but the information gathered from this is completely confidential. No identifiers linking you to the study will be included in any sort of report that might be published. Research records will be stored securely and only Christopher Lavergne and his graduate committee will have access to the records. Your decision whether or not to participate will **NOT** affect current or future relations with the NEDC or any other NRCS representative. Your voluntary assistance in providing data is very helpful. Please take a few minutes to let us know how you see training within the agency. Your contribution to this study will assist with employee development, and could help identify uncovered employee and system needs.

The survey can be accessed by clicking [http://tlpdc.qualtrics.com/SE/?SID = SV\\_01byJbFTMKP6kSN&O\\_JFE = 0](http://tlpdc.qualtrics.com/SE/?SID=SV_01byJbFTMKP6kSN&O_JFE=0)

Thank you and best regards,

Chris

Christopher Lavergne  
Instructional Training Specialist  
USDA-NRCS  
National Employee Development Center  
Lafayette Parish - 646 Cajundome Blvd., Ste. 180  
Lafayette, LA 70506  
P (337) 291-3066  
[christopher.lavergne@ftw.usda.gov](mailto:christopher.lavergne@ftw.usda.gov)

**APPENDIX D - INFORMED CONSENT/SURVEY FRONT PAGE**

As you know, the focus of USDA-NRCS is to “provide resources to farmers and landowners to aid them in conservation”. Providing timely, research-based training to help NRCS employees build the skills needed to assist customers is an agency priority.

Transferring knowledge and skills learned in professional training back to the job is often difficult to accomplish. USDA-NRCS invests significantly toward training and development, and needs to ensure employees are receiving adequate professional development which can be used in the work environment. As such, understanding what enhances the transfer to the workplace while identifying potential barriers to the outcome is necessary for our success.

You are being asked to participate in a research study designed to learn employee motivation to transfer knowledge, skills, and abilities learned at formal training back to the work environment, and to be a potential participant because you represent USDA-NRCS employees who have completed the Conservation Boot Camp training between 2005 and 2014. The purpose of the study is to examine employee motivation and ability to transfer knowledge, skills, and abilities. This information will help NRCS develop timely, effective, and usable training offerings.

The benefits to participation include providing NRCS and the National Employee Development Center with crucial insight into employee needs. This study is confidential. The records of this study will be kept private. No identifiers linking you to the study will be included in any sort of report that might be published. Research records will be stored securely and only Christopher Lavergne (project chair) and Dr. David Doerfert, Associate Chair and Professor in the Department of Agricultural Education and Communications at Texas Tech University, who is assisting in the study, will have access to the records. The data will be reported as summary results and will only be further analyzed by the demographic data collected (e.g., gender).

If you agree to be in the study, you will be asked to provide your honest opinion and participate in this study for its duration. This VOLUNTARY study will take approximately 20 minutes. Your decision whether or not to participate will NOT affect current or future relations with the National Employee Development Center or Texas Tech University. If you decide to participate, you are free to refuse to answer any of the questions that may make you uncomfortable. You can withdraw at any time, and can contact Christopher Lavergne (337-291-3066) or David Doerfert (806-724-2816) with any questions about this study.

This research study has been reviewed by the Texas Tech University and Texas A&M University Human Research Protection Programs prior to contactin you. For research-related questions regarding subjects’ rights, contact Human Research Protection Program, Office of the Vice President for Research at (806-742-2064) or email [hrpp@ttu.edu](mailto:hrpp@ttu.edu).

**Please click YES below to express consent to participate in this study. Thank you and best regards.**

<input type="radio"/> Yes
<input type="radio"/> No

## **APPENDIX E – FOLLOW-UP EMAIL**

May 13, 2015

A week ago, you received invitation to participate in a research study related to Conservation Boot Camp and your transfer of skills and abilities. If you have already completed and submitted the questionnaire, please accept our sincere thanks. If not, please do so today. I am especially grateful for the assistance.

You do not have to participate in this survey. Your participation in this survey is **100% voluntary**. Your voluntary participation, however, may help benefit NRCS with crucial insight into employee needs. The findings will be shared with the NEDC in order to improve their processes and curricula regarding Conservation Boot Camp training.

*The questionnaire can be accessed by clicking [http://tlpdc.qualtrics.com/SE/?SID = SV\\_01byJbFTMKP6kSN&O\\_JFE = 0](http://tlpdc.qualtrics.com/SE/?SID=SV_01byJbFTMKP6kSN&O_JFE=0)*

Thank you and best regards,

Chris  
Christopher Lavergne  
Instructional Training Specialist  
USDA-NRCS  
National Employee Development Center  
Lafayette Parish - 646 Cajundome Blvd., Ste. 180  
Lafayette, LA 70506  
.....  
P (337) 291-3066  
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## **APPENDIX F - FINAL FOLLOW-UP EMAIL**

June 1, 2015

During the last month we have sent several emails about an important research project being conducted to gauge the level of motivation and organizational support provided to transfer knowledge, skills, and abilities gathered during Conservation Boot Camp back to the work environment. This project is drawing to a close, and this is the last contact that will be made to all selected participants to answer the survey.

Thank you to all who have completed the survey. We are sending this final contact because of our concern that people who have not responded may have different opinions and experiences than those who have responded. Hearing from everyone helps assure that survey results are as accurate as possible.

I'd like to assure you that your response to this study is voluntary, and if you prefer not to respond that is fine. Finally, I personally appreciate your willingness to consider our request as we conclude this effort to better understand USDA-NRCS employee motivation to transfer learned skills and how the workplace environment helps or hinders applicability of learned skills and abilities to our mission. Thank you again for your time and have a great summer!

*The questionnaire can be accessed by clicking [http://tlpdc.qualtrics.com/SE/?SID = SV\\_01byJbFTMKP6kSN&O\\_JFE = 0](http://tlpdc.qualtrics.com/SE/?SID=SV_01byJbFTMKP6kSN&O_JFE=0)*

Sincerely,  
Christopher Lavergne  
Christopher Lavergne  
Instructional Training Specialist  
USDA-NRCS  
National Employee Development Center  
Lafayette Parish - 646 Cajundome Blvd., Ste. 180  
Lafayette, LA 70506

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**APPENDIX G - PERMISSON TO USE THE LTSI QUESTIONNAIRE**



**Learning Transfer Systems Inventory User's Agreement**

Permission is hereby granted to use the Learning Transfer Systems Inventory (LTSI), an organizational assessment instrument, owned by Elwood F. Holton III and Reid A. Bates. Permission is granted to the following people for the timeframe, and purposes specified below:

Permission granted to: <i>(Name, company, address, phone number, e-mail, etc.)</i>	Christopher Lavergne 646 Cajundome Blvd., STE 180 Lafayette, LA 70506
Purpose	Ed.D.-based study determining employee motivation to transfer knowledge, skills, and abilities learned in training, and perceptions of learning transfer. Target audience are USDA-NRCS employees. I am studying whether work environments foster a climate for transfer of training.
Time Period	September 2014 to February 2015
Other Conditions	Waived on the condition that the instrument is used for research purposes only and not for any service for which the use receives a salary or other monetary compensation. Otherwise, the LTSI will be provided at a cost of U.S. \$6.00 per copy.

It is understood that, by agreeing to use the Learning Transfer Systems Inventory, you are accepting the following conditions:

1. Any use other than that specified above is prohibited without prior written authorization by the authors (E. F. Holton III & R. A. Bates).
2. No changes whatsoever can be made to the LTSI without prior written consent of the authors.
3. The authors retain full copyright authority for the LTSI and any translations that are developed as a result of granting this permission. Every copy of the LTSI (paper or online) must carry the following copyright notice:

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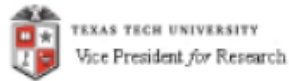
4. Discussion and presentation of the LTSI will accurately reflect the composition of the instrument and will use only original scale names and scale definitions.
5. Users of the LTSI may not publish or otherwise disseminate into the public domain the survey items or item groupings. This means the items or item groupings may NOT be included in thesis or dissertations documents unless authorized by the authors.
6. If the LTSI is to be translated into a new language as part of this project, the authors of the LTSI must be included in the translation process as per their supplemental instructions.
7. If one or both of the authors of the LTSI contributes in a meaningful way to data analysis or collection, conceptualizing a study, contributing to the writing of a manuscript or makes any other substantive contribution to a manuscript submitted for publication then it is agreed that the contributing LTSI author will be included as a co-author on that manuscript.
8. A copy of all data collected with the instrument must be given to the authors free of charge, in a timely manner, and formatted in an Excel spreadsheet or SPSS database. This data will only be used for research purposes and will not be reported in such a manner that would identify individual organizations, without written permission of the organization.
9. The authors reserve the right to withdraw the LTSI from use at any time if any terms or conditions of this agreement are violated.
10. By signing this agreement, LTSI users acknowledge that the scoring algorithms will be retained by the authors and that the data collected with the LTSI must be submitted to the authors for scoring.

A copy of this Permission Agreement should be signed and returned to indicate your agreement with the above restrictions and conditions. A fully executed copy will be returned to you for your records if you so desire. Upon receipt of the signed agreement you will be sent a copy of the LTSI that you may reproduce.

LTSI user (print name)	<i>Christopher Lavergne</i>	
Title	<i>Student</i>	
LTSI user signature	<i>C. Lavergne</i>	Date <i>4/29/14</i>
Elwood F. Holton III or Reid A. Bates, LTSI authors		Date <i>6-22-15</i>



**APPENDIX H - TEXAS TECH UNIVERSITY PROTECTION OF HUMAN  
SUBJECTS APPROVAL LETTER**



January 28, 2015

Dr. David Doerfert  
Ag Ed & Communications  
Mail Stop: 2131

Regarding: 504941 Building the Climate for Optimal Organizational Transfer of Training

Dr. David Doerfert:

The Texas Tech University Protection of Human Subjects Committee approved your claim for an exemption for the protocol referenced above on January 28, 2015.

Exempt research is not subject to continuing review. However, any modifications that (a) change the research in a substantial way, (b) might change the basis for exemption, or (c) might introduce any additional risk to subjects must be reported to the Human Research Protection Program (HRPP) before they are implemented.

To report such changes, you must send a new claim for exemption or a proposal for expedited or full board review to the HRPP. Extension of exempt status for exempt protocols that have not changed is automatic.


The HRPP staff will send annual reminders that ask you to update the status of your research protocol. Once you have completed your research, you must inform the HRPP office by responding to the annual reminder so that the protocol file can be closed.

Sincerely,

A handwritten signature in black ink that reads "Rosemary Cogan".

Rosemary Cogan, Ph.D., ABPP  
Protection of Human Subjects Committee

## APPENDIX I - TEXAS A&M UNIVERSITY PROTECTION OF HUMAN SUBJECTS APPROVAL LETTER

<b>DIVISION OF RESEARCH</b> Research Compliance and Biosafety	IRB00	
DATE: February 25, 2015		
MEMORANDUM		
TO:	Gary Wingenbach ALRSRCH - Agrilife Research - Ag Leadership, Education & Communication	
FROM:	Dr. James Fluckey Chair Institutional Review Board	
SUBJECT: Expedited Approval – Initial Review		
<hr/>		
Study Number:	IRD2015-00010	
Title:	Building the Climate for Optimal Organizational Transfer of Training	
Approval Date:	02/25/2015	
Continuing Review Due:	01/15/2016	
Expiration Date:	02/15/2016	
Documents Reviewed and Approved:	USDA-NRCS Employee Training Transfer Informed Consent version 1.0 Recruitment version 1.0 Survey version 1.0	
Document of Consent: Waiver approved under 45 CFR 46.117 (c) 1 or 2/ 21 CFR 56.109 (c)1		
<hr/>		
This research project has been approved. As principal investigator, you assume the following responsibilities:		
<ol style="list-style-type: none"><li>1. <b>Continuing Review:</b> The protocol must be reassessed by the expiration date in order to continue with the research project. A Continuing Review application along with required documents must be submitted by the continuing review deadline. Failure to do so may result in processing delays, study termination, and/or loss of funding.</li><li>2. <b>Completion Report:</b> Upon completion of the research project (including data analysis and final written papers), a Completion Report must be submitted to the IRB.</li><li>3. <b>Unanticipated Problems and Adverse Events:</b> Unanticipated problems and adverse events must be reported to the IRB immediately.</li><li>4. <b>Reports of Potential Non-compliance:</b> Potential non-compliance, including deviations from protocol and violations, must be reported to the IRB office immediately.</li><li>5. <b>Amendments:</b> Changes to the protocol must be requested by submitting an Amendment to the IRB for review. The Amendment must be approved by the IRB before being implemented.</li><li>6. <b>Consent Forms:</b> When using a consent form or information sheet, you must use the IRB stamped approved version. Please log into IRIS to download your stamped approved version of the consenting instruments. If you are unable to locate the stamped version in IRIS, please contact the office.</li><li>7. <b>Audit:</b> Your protocol may be subject to audit by the Human Subjects Post Approval Monitor. During the life of the study please review and document study progress using the PI self-assessment found on the RCB website as a method of preparation for the potential audit. Investigators are responsible for maintaining complete and accurate study records and making them available for inspection. Investigators are encouraged to request a pre-initiation site visit with the Post Approval Monitor. These visits are designed to help ensure that all necessary documents are approved and in order prior to initiating the study and to help investigators maintain compliance.</li><li>8. <b>Recruitment:</b> All approved recruitment materials will be stamped electronically by the HSPP staff and available for download from IRIS. These IRB-stamped approved documents from IRIS must be used for recruitment. For materials that are distributed to potential participants electronically and for which you can only feasibly use the approved text rather than the stamped document, the study's IRB Protocol</li></ol>		
750 Agronomy Road, Suite 2701 1186 TAMU College Station, TX 77843-1186 Tel. 979.458.1467 Fax. 979.862.3176 <a href="http://rcb.tamu.edu">http://rcb.tamu.edu</a>		