

# Can the LTSI Predict Transfer Performance? Testing intent to transfer as a proximal transfer of training outcome

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**Law enforcement personnel ( $n = 235$ ) were administered the Learning Transfer Systems Inventory (LTSI) and a transfer measure after completing leadership development training. Although most studies using the LTSI have focused on validation efforts in different linguistic settings, this study is one of the few to examine the relationship between the LTSI factors and a proximal transfer outcome score (as measured by intent to transfer). Motivation to transfer, transfer design, and transfer performance expectations had the strongest relationship with intent to transfer, and the motivation subscales (motivation to transfer, performance expectations, and outcome expectations) accounted for the largest amount of unique variance in intent to transfer.**

## 1. Introduction

Research on training transfer continues to be one of the more pervasive topics in the training and human resource development literature. In the last several years, several meta-analyses and comprehensive literature reviews have been published across psychology, management, and training outlets (cf. Blume, Ford, Baldwin, & Huang, 2010; Taylor, Russ-Eft, & Taylor, 2010) each noting advances to the measurement and study of training transfer. Indeed, inquiries into factors related to transfer are persistent given increased financial and strategic accountability of the learning function in most organizations. However, despite decade's worth of research findings on what factors influence successful training transfer, organizations continue to struggle with making trainee knowledge and skills (learned through training) translate to performance improvement on the job.

Extant research on transfer offers many useful strategies for affecting training outcomes. Factors found to be predictors or correlates to transfer include trainee cognitive, dispositional, motivational, and ability

characteristics (Chiaburu, Van Dam, & Hutchins, 2010; Sitzmann, Ely, Brown, & Bauer, 2010); design factors based on adult learning and instructional design principles (Keith & Frese, 2008; Saks & Belcourt, 2006); and work climate cues, consequences, and support for training application (Lim & Morris, 2006; Martin, 2010). Among these factors, work environment variables (sometimes called the transfer climate) have garnered the most consistent support (Burke & Hutchins, 2008). The concept of transfer climate is based on Luthans and Kreitner's (1985) organizational modification model and refers to either individual perceptions or group-level-shared interpretations of factors in the organizational environment that can affect successful application of learned skills on the job (Rouiller & Goldstein, 1993). Specifically, Rouiller and Goldstein suggested that transfer climate consisted of two general types of workplace cues: situational cues and consequence cues. *Situational cues* remind trainees of what they have learned, provide opportunities for them to use what they have learned and include for types of cues: goal cues, social cues, task cues, and self-control cues. *Consequence cues* are on-the-job outcomes that affect the extent to which training is

transferred. Although they and subsequent studies (cf. Tracey, Tannenbaum, & Kavanagh, 1995) showed these factors added significantly to the explained variance in posttraining job performance, they were unable to validate the construct structure of the transfer climate factors. Still, other research provided evidence that transfer climate constructs were perceived according to organizational referent (i.e., supervisor, coworkers, organization, or self) as opposed to the psychological cues proposed by Rouiller and Goldstein's work (Holton, Bates, Seyler, & Carvalho, 1997).

### 1.1. Study purpose and significance

In an attempt to extend the emerging research on transfer factors into a validated scale, Holton, Bates, and Ruona (2000) developed the Learning Transfer System Inventory (LTSI), a diagnostic assessment of 16 training-specific and general training factors grounded in the extant transfer literature. The conceptual framework for the LTSI views training transfer as a function of four categories of elements (secondary elements, ability/enabling factors, motivation factors, and work environment factors) that are assessed using 16 constructs (see Figure 1).

Holton et al.'s (2000) approach assumes that transfer climate is but one set of factors that can influence transfer. Other important sets of factors influencing transfer include those related to training design and delivery, personal characteristics such as efficacy beliefs and learner readiness (Ruona, Leimbach, Holton, & Bates, 2002), opportunity to use new learning (Facteau, Dobbins, Russell, Ladd, & Kudisch, 1995; Ford, Quinones, Segó, & Sorra, 1992), and motivational fac-

tors (Colquitt, LePine, & Noe, 2000) such as expectations (Carlson, Bozeman, Kacmar, Wright, & McMahan, 2000; Kozlowski et al., 2001) and motivation to improve work through learning (Naquin & Holton, 2002). Thus, rather than assess only work environment factors that are typically associated with interpretations of transfer climate (as represented in Rouiller and Goldstein's (1993) work), the LTSI assesses a broader array of factors, including additional work environment variables and uses the term 'transfer system' instead of 'climate' to characterize the extended focus. This approach is consistent with a rapidly expanding research base indicating that factors affecting transfer extend well beyond the work environment (Baldwin, Ford, & Blume, 2009).

Research done with the LTSI in recent years has supported the 16-factor structure of the instrument (Bates, Kauffeld, & Holton, 2007; Devos, Dumay, Bonami, Bates, & Holton, 2007; Holton et al., 2000), and provided evidence of the convergent and divergent validity of the LTSI scales (Holton, Bates, & Bookter, 2007), and evidence of the instrument's criterion-related validity. Although the majority of research using the LTSI has focused on refining the psychometric stability and validity of the subscales across different groups, few studies that we found have examined whether the scores on the LTSI can predict actual training transfer. For example, a few studies have shown individual LTSI scales to be correlated with self-reported learning transfer (Devos et al., 2007), intent to transfer (Holton & Bates, 2011), and perceived utility of training (Ruona et al., 2002). Still, other studies have provided preliminary evidence of the LTSI scales' capacity to predict learning and posttraining knowledge retention (Myers, 2009), motivation to transfer (Seyler, Holton, Bates, Burnett, & Carvalho, 1998),

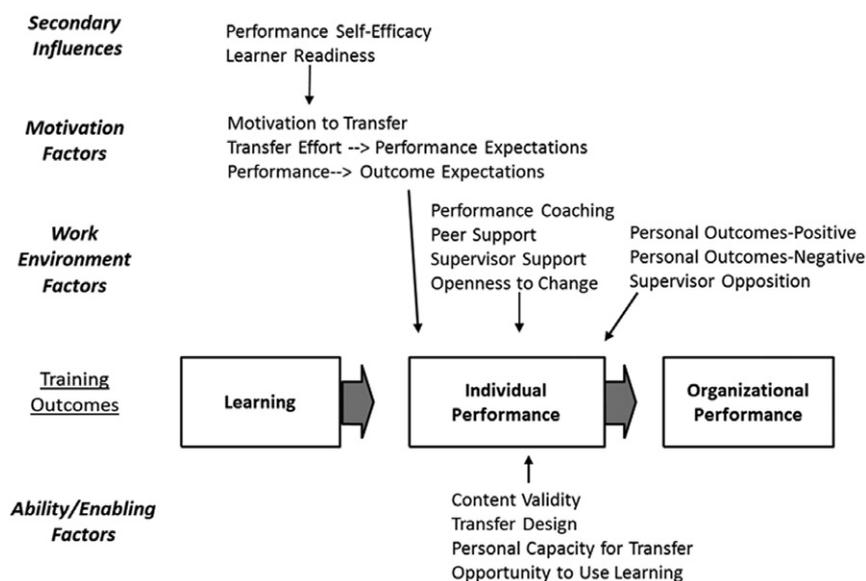


Figure 1. Conceptual model of the Learning Transfer Systems Inventory (Holton, Bates & Ruona, 2000).

organizational performance (Bates et al., 2007), and organizational innovation (Bates & Khasawneh, 2005), factors only *associated* with training transfer. Only a few studies have examined changes in job performance as a result of learning transfer with the full LTSI instrument (cf. Bates, Holton, Seyler, & Carvalho, 2000; Bates et al., 2007), suggesting that work has just begun on examining the extent to which the LTSI is an effective predictor of transfer outcomes.

In addition to the limited research in this area, studies examining the LTSI as predictive of training transfer are often challenged by either limited sample sizes or sample attrition common when collecting data at multiple intervals. One approach to addressing this issue is through testing on a proximal outcome measure known as intent to transfer (further discussed in the next section). To further the emerging work on the LTSI as predictive of transfer outcomes and mitigating for diminishing responses commensurate with posttraining transfer research, we examine the LTSI as a predictive measure of transfer by testing a proximal transfer outcome measure (intent to transfer) administered as part of the LTSI. Thus, the purpose of our study examined the relationship between transfer system factors measured by the LTSI on training transfer.

## 2. Conceptual framework and research questions

To further explain our study rationale and theoretical grounding, we review current research on the LTSI literature, explicating specific support for our research questions that we include within the review.

### 2.1. LTSI validation and application

For the past 15 years, efforts have been directed at moving toward validating through the development of the LTSI. The LTSI was developed to identify a select set of factors with the potential to substantially enhance or inhibit transfer of learning to the work environment. In early development of the LTSI, Holton et al. (1997) factor analyzed nine constructs for transfer climate. Holton, Bates, and Ruona (2000) expanded the instrument by fitting the factors to an evaluation model (Holton, 1996) and including additional motivation-related (i.e., expectancy and motivation to transfer), ability-related (i.e., personal capacity for transfer), and trainee-characteristics-related factors (i.e., learner readiness and performance self-efficacy). Exploratory factor analysis of the resulting 16 factors with a large heterogeneous sample provided evidence of construct validity (Holton et al., 2000).

A specific area in validation studies has been to assess the LTSI across different languages and cultures. Pub-

lished studies of this type include translations into Saudia Arabia-Arabic (Yaghi, Goodman, Holton, & Bates, 2008), Jordanian-Arabic (Khasawneh, Bates, & Holton, 2006), German (Bates et al., 2007; Kauffeld, Bates, Holton, & Muller, 2008), Belgium French (Devos et al., 2007), Ukrainian (Yamkovenko, Holton, & Bates, 2007), Taiwanese (Chen, Holton, & Bates, 2005), Thai (Yamnill & McLean, 2001), Portuguese (Velada, Caetano, Bates, & Holton, 2009), and Greek (Holton & Bates, 2011). Remarkably, the 16 factors of the LTSI have largely been confirmed and the convergent and divergent validity of the instrument has been established (Bates, Holton, & Hatala, 2012; Holton et al., 2007).

### 2.2. Intent to transfer

Despite the increasing call for multirater (e.g., peer, manager, trainer) and objective (content-based) assessments in reporting transfer outcomes, trainee self-reported data continue to be a common source of evaluation in many studies (cf. Arthur, Bennett, Edens, & Bell, 2003; Taylor, Russ-Eft, & Taylor, 2010). Gathering self-reported data is often easiest and ensures for a higher response rate that tends to diminish when collecting data at posttraining intervals. One way to address the proximal challenge of not having a posttraining measure of transfer is to include a proxy outcome score to capture the trainees' *intent* to transfer knowledge and skills learned in training to the workplace. Intent to transfer is based on the Ajzen's (1991) theory of planned behavior and refers to an individual's willingness and purposeful aim to perform a desired behavior. Ajzen suggests that intentions are an immediate antecedent to behavior and are likely directly proportional to an individual performing the said behavior or action. That is, the stronger the intention to act, the more likely the individual is to engage in his or her behavioral goals. The theory of planned behavior hypothesizes three antecedents to intent: *beliefs* about the *consequences of the intended behavior*; the *social norms and expectations* about the intended behavior; and an individual's *perceived control* over factors affecting the ability to engage in the behavior. Even if the transfer behavior is a novel behavior, trainees will likely have produced beliefs about the transfer behavior by the time they go back to work and attempt to transfer their learning. In other words, by the end of the training program, trainees will usually have made the decision about the extent to which they will apply their learned knowledge to work. This intention is then strengthened by their dispositional traits and attitudes about the training content, performance outcomes and expected consequences, and the overall support the trainee will receive when returning to work, thus tapping factors that are captured in the major scales of the LTSI. Thus, based on preliminary work on examining intent to transfer and the LTSI (cf. Holton &

Bates, 2011), we continue this line of inquiry for our first research question exploring this relationship (RQ1): *What is the relationship between the LTSI factors and intent to transfer?*

### 2.2.1. Intent to transfer and motivation to transfer

Given that intent to transfer has not been examined much in terms of direct transfer outcomes but rather individual attributes that can predict intentions (supervisory support, motivation to learn, Al-Eisa, Furayyan, & Alhemoud, 2009; efficacy, transfer activities, Machin & Fogarty, 2004), there is little prior research that examines multiple transfer factors on intent to transfer. However, there has been compelling research on a related factor known as motivation to transfer, described as a learner's anticipated efforts to utilize skills and knowledge learned in training setting to a real-world work situation (Noe & Schmitt, 1986). Motivation to transfer has been found as a predictor of transfer in some studies (Axtell, Maitlis, & yearta, 1997; Derk-Jan, Nijhof, Wognum, & Veldkamp, 2006), but moreover as an outcome variable influenced by participant motivation to learn (Kontoghiorghes, 2002), self-efficacy (Machin & Fogarty, 2004), extraversion and emotional stability (Rowold, 2007), and utility reactions (Ruona et al., 2002).

Because motivation to transfer is a factor in the LTSI, it is important to provide conceptual clarity between it and intent to transfer. Al-Eisa et al. (2009) differentiate between motivation to transfer and intent to transfer in terms of the role each plays in the motivational process. According to Ajzen's (1991) theory of planned behavior, an individual's intention to act includes the motivational factors of behavior and will influence the amount of effort an individual is willing to put forth into actualizing the behavior. A trainee can have a strong desire to act (motivation), but may only perform the action if there is also a deliberate tendency (intention) or plan to behave in a certain way or under specific circumstances. Al-Eisa et al. (2009) describe the relationship between motivation to transfer and intent to transfer as a continuum, whereby motivation to transfer is a starting point of the motivational process that *may* develop into a commitment to transfer the knowledge and skills acquired in training. Put differently, motivation to transfer relates more to the desire to initiate transfer of new knowledge and skills whereas intent to transfer refers to a deliberate or purposeful commitment to perform. Motivation to transfer would then precede intention to transfer likely to be a strongly related but conceptually different factor. Although we expect that motivation to transfer be related to intent to transfer as found in more recent work (cf. Yamkovenko & Holton, 2010), we include transfer intentions as the criterion variable because it

indicates a stronger propensity to apply the trained knowledge and skills to the work setting.

### 2.2.2. Intent to transfer as a transfer measure

We recognize that a self-report of intent is not equivalent to an observer's rating or an objective measure of transfer. However, as a criterion measure, a self-report of intent to transfer has value for several reasons. First, it has not been used in the past other than in conceptual calls for including more psychological factors in transfer research (cf. Cheng & Hampson, 2008), thus marking an expansion of the criterion space of learning transfer research (Baldwin et al., 2009). Second, several important behavioral theories, including the theory of planned behavior (Ajzen, 1991), the model of interpersonal behavior (Triandis, 1980), and goal-setting theory (Locke & Latham, 1990), focus on the idea that intentions *are* a major determinant of behavior. These theories are supported by a number of meta-analyses (Trafimow, Sheeran, Conner, & Finlay, 2002; Godin & Kok, 1996; Sheppard, Hartwick, & Warshaw, 1988; Webb & Sheeran, 2006), showing intentions are reliably associated with behavior. In fact, Sheeran's (2002) meta-analysis of 10 meta-analyses indicated that, on average, intentions accounted for 28% of the variance in behavior with an  $r = .53$ , a large effect size (Cohen, 1992). Thus, we believe intent to transfer is an important training outcome and has a theoretical base that can expand our understanding of the learning transfer process and provides the grounding for our second research inquiry (RQ2): *To what extent can the LTSI predict intent to transfer?*

## 3. Methodology

This section describes the sample and data collection procedures, specific data measures, and data analysis procedures.

### 3.1. Sample and data collection

In our study, we used a convenience sample ( $n = 235$ ) of law enforcement participants enrolled in leadership development training sessions at a state-supported training facility in the south-central region of the United States. Participants were enrolled in one of three leadership development programs – Police Chief Series, TPCS (43%); Command Staff Leadership Series, CSL (30%); and a Leadership Command College, LCC (28%) – during the data collection period. Although each program focused on leadership development (i.e., communication, conflict resolution, teams), the LCC program was focused more on entry-level agency personnel with a minimum of 5 years of experience. The CSL and the TPCS participants

included more administrators, but the TPCS was focused more on executive leadership development for police chiefs. Of the 244 surveys that were administered, 235 were returned for a response rate of 95%. Of these, six cases were dropped for incomplete data, and the remaining random missing data were handled by person mean substitution (e.g., a value calculated by nonmissing items for the case). Person mean substitution has been found to be advantageous to listwise deletion as it does not increase the probability of type II errors or reduce the sample size by eliminating the case from analysis (Hawthorne & Elliott, 2005).

Participants included in the study were mostly male (93%), had some college preparation (37%), or completed a 4-year or advanced degree (35%), and were over 40 years old (73%). The majority of participants worked in agencies of fewer than 25 employees (55%); however, 35% of participants worked in agencies with >50 employees. Participants with varying job titles attended the training, with the majority holding the position of 'Chief or 'Chief of Police' (42%), 'Lieutenant' (17%), and 'Assistant Chief' (8%). The remaining job titles were indicative of other agency positions (game warden, corporal, and deputy). Participants reported having an average of 21 years (*SD* = 7.91) of experience in law enforcement, and an average of 13 years (*SD* = 8.60) in their current agency or organization.

### 3.2. Instruments

Participants were administered the LTSI toward the end of their training program that included four items to measure intent to transfer. Participants completed the LTSI in written form. The LTSI (Version 2; Holton et al., 2000) includes 68 items (see Figure 1 for subscales and Table 1 for reliability of subscales) that measure general and specific training factors across four transfer scales. These included a trainee characteristics scale (8 items), motivation scale (13 items), work environment scale (30 items), and an ability scale (17 items). We included four items that measured intent to transfer ( $\alpha = .92$ ), with sample items including 'I anticipate making every effort in the coming weeks to put into practice what I learned in this training' and 'As soon as it is feasible, I intend to use at work all that I learned in this training.'

### 3.3. Data analysis

Multiple linear regression (MLR) was used to answer the study's research questions. We tested the data against the statistical assumptions for MLR including normality, linearity, reliability, and homoscedasticity (cf. Osborne & Waters, 2002). Normality was assessed and satisfied by

Table 1. Descriptive statistics for entire sample

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Intent to transfer	6.08	.92	.92																
2. Learner readiness	3.58	.67	.20	.83															
3. Performance self-efficacy	3.98	.48	.32	.26	.79														
4. Motivation to transfer learning	4.15	.49	.60	.26	.33	.78													
5. Performance expectations	4.02	.43	.39	.21	.49	.46	.76												
6. Outcome expectations	3.67	.58	.18	.15	.45	.18	.52	.76											
7. Feedback/coaching	3.31	.63	.24	.21	.37	.24	.27	.38	.67										
8. Supervisor/manager support	3.03	.88	.28	.14	.25	.31	.30	.43	.52	.91									
9. Supervisor/manager sanctions	1.98	.72	-.09	-.07	-.19	-.08	-.21	-.26	.09	-.13	.68								
10. Peer support	3.59	.62	.32	.17	.43	.45	.50	.49	.40	.46	-.21	.85							
11. Resistance to change	2.63	.67	-.07	.04	-.31	-.04	-.24	-.41	-.23	-.30	.27	-.41	.82						
12. Personal outcomes – positive	2.24	.76	.06	.10	.02	.16	.09	.17	.36	.20	.27	.29	.02	.68					
13. Personal outcomes – negative	2.14	.64	.04	.09	.04	.18	.12	.16	.27	.30	.28	.31	.03	.62	.75				
14. Opportunity to use	3.59	.62	.22	.18	.38	.12	.35	.33	.12	.16	-.30	.21	-.10	-.04	-.02	.71			
15. Personal capacity for transfer	3.60	.52	.17	.15	.27	.13	.17	.25	.12	.14	-.22	.23	-.19	-.02	.00	.40	.54		
16. Perceived content validity	3.60	.53	.30	.18	.39	.36	.49	.30	.27	.28	-.13	.38	-.17	.05	.14	.40	.30	.81	
17. Transfer design	3.89	.52	.42	.27	.37	.53	.41	.23	.29	.29	-.07	.38	-.08	.15	.21	.31	.14	.53	.83

Note: Coefficient alpha reported on the diagonal.

examining Q-Q plots and kurtosis statistics. Linearity was assessed and satisfied by examining residual plots. Reliability was assessed via coefficient alpha. With the exception of personal capacity for transfer (see Table 1), all measures exceeded or came close to meeting the reliability coefficient threshold of .70 used in exploratory research. Given the low reliability of personal capacity for transfer, it was omitted from the regression analyses, thus making the total number of LTSI factors examined 15. Homoscedasticity was accessed and satisfied by examining a plot of the standardized residuals by the regression-standardized predicted values.

To interpret the MLR results, we analyzed beta weights and structure coefficients (Courville & Thompson, 2001) as well as conducted regression commonality analysis, in keeping with Nimon and Reio (2011). In the presence of correlated predictors, 'one must look at both  $\beta$  and structure coefficients when evaluating the importance of a predictor' (Thompson, 2006, p. 233). 'Beta weights support the definition of importance that considers the credit that predictor variables receive in the regression equation, holding constant all other predictors. Structure coefficients support the definition of importance that considers the ability of a single predictor variable to reproduce the predicted  $y$ -hat scores' (Nimon & Reio, 2011, p. 332). Commonality analysis adds to the interpretation of MLR by decomposing the regression effect into unique and common effects. That is, unique effects identify how much variance is unique to a predictor, and common effects identify how much variance is common to a group of predictors.

#### 4. Results

We explored the relationship of intent to transfer with the LTSI measures (RQ1). Noted in Table 1, most of the LTSI factors were moderately and positively correlated with intent to transfer. Commensurate with prior research, motivation to transfer ( $r = .60, p < .001$ ) had the strongest relationship with intent to transfer, followed by transfer design ( $r = .42, p < .001$ ) and performance expectations ( $r = .39, p < .001$ ).

In the second research question (RQ2), we examined to what extent the LTSI factors explained variance in intent to transfer. As depicted in Table 2, the 15 LTSI measures examined explained 41.3% of the variance in individuals' intent to transfer training. With the exception of motivation to transfer, no LTSI measure made a statistically significant contribution to the regression equation ( $ps > .05$ ). In addition to making the largest contribution to the regression equation ( $\beta = .47$ ), motivation to transfer contributed the most unique variance (30%) and explained ~86% of the regression effect. For some of the LTSI measures, the lack of a statistically significant beta weight can be attributed to multicollinearity. Only a few of the LTSI measures (i.e., learner readiness, resistance to change, supervisor/manager sanctions, personal outcomes) shared less than 10% of variance with the regression effect (e.g.,  $r_s^2 < .10$ ). Across the four main LTSI factors (motivation, ability, work environment, and trainee characteristics), at least one measure explained at least 10% of variance in the regression effect ( $r_s^2 > .10$ ).

Table 2. Regression results

Predictor (x)	R	R <sup>2</sup>	R <sup>2</sup> <sub>adj</sub>	$\beta$	p	$r_s$	Unique	Common	Total (r <sup>2</sup> )	% of R <sup>2</sup> (r <sub>s</sub> <sup>2</sup> )
	.642	.413	.372							
Trainee characteristics										
Performance self-efficacy				.034	.520	.477	.001	.094	.094	22.81
Learner readiness				-.021	.718	.276	.000	.031	.031	7.60
Motivation										
Motivation to transfer				.472	<.001	.928	.124	.232	.356	86.10
Performance expectations				.084	.258	.604	.004	.147	.151	36.54
Outcome expectations				-.078	.288	.251	.003	.023	.026	6.32
Work environment										
Peer support				.036	.637	.527	.001	.114	.115	27.82
Supervisor/manager support				.086	.217	.427	.004	.071	.076	18.31
Feedback/coaching				.037	.606	.341	.001	.047	.048	11.65
Resistance to change				<.001	.991	-.128	.000	.007	.007	1.62
Supervisor/manager sanctions				.027	.666	-.160	.001	.010	.011	2.54
Personal outcomes – positive				-.017	.813	.067	.000	.002	.002	.46
Personal outcomes – negative				-.106	.145	.065	.006	-.004	.002	.44
Ability										
Transfer design				.094	.182	.665	.005	.178	.183	44.21
Perceived content validity				<.001	.937	.506	.000	.106	.106	25.59
Opportunity to use				.112	.082	.365	.008	.047	.055	13.34

Notes: Unique = x's unique effect. Common =  $\sum$  x's common effects. Total = Unique + Common. % of R<sup>2</sup> = Total/R<sup>2</sup>.

Table 3. Decomposition of regression effect using LTSI scale score sets

Predictor set	Total	% of $R^2$
Trainee characteristics	.0009	.23
Motivation	.1523	36.84
Work environment	.0146	3.54
Ability	.0196	4.73
Trainee characteristics, motivation	.0049	1.19
Trainee characteristics, work environment	.0015	.36
Motivation, work environment	.0289	6.99
Trainee characteristics, ability	.0033	.80
Motivation, ability	.0442	10.69
Work environment, ability	.0026	.64
Trainee characteristics, motivation, work environment	.0172	4.17
Trainee characteristics, motivation, ability	.0255	6.18
Trainee characteristics, work environment, ability	.0014	.35
Motivation, work environment, ability	.0415	10.05
Trainee characteristics, motivation, work environment, ability	.0547	13.24
Total	.4133	100.00

Note: LTSI = Learning Transfer Systems Inventory.

To decompose the regression effect into a practical number of components, we conducted regression commonality analysis using software from Nimon, Lewis, Kane, and Haynes (2008) and predictor sets in keeping with Zientek and Thompson (2006). That is, we decomposed the regression effect into unique and common effects using sets of variables associated with motivation, ability, work environment, and trainee characteristics. Table 3 presents the decomposition of the regression effect using the four predictor variable sets. Approximately 88% of the regression effect was associated with motivation factors. Motivation factors uniquely explained ~37% of the regression effect and in common with other predictor sets explained ~51% of the regression effect. For the most part, the remainder of the regression effect (12%) was composed of unique variance associated with ability and work environment factors.

## 5. Discussion

To test the utility of the LTSI as a predictive measure of transfer, we regressed the 15 factors on intent to transfer. Regarding our RQ1, we expected that motivation to transfer would have a strong relationship with intent to transfer given the similarities between the constructs. This result both confirms the role of motivation to transfer as a strong correlate of transfer and advances it as a worthy predictor of transfer, a finding that is limited in the extant literature. Motivation to transfer and intent to transfer are both instrumental in influencing the motivational process; however, intent encompasses a more deliberate tendency to initiate transfer (Ajzen, 1991), therefore suggesting it is an advanced disposition of just being motivated to act. This may also help explain

why the motivation scale (motivation to transfer, performance expectations, and outcome expectations) accounted for the largest amount of unique variance (37%) in intent to transfer scores (RQ2). While prior research has demonstrated that work environment factors (e.g., peer and supervisor support, opportunity to perform, and feedback) are also critical determinants of training transfer (Blume et al., 2010; Burke & Hutchins, 2008), it was participants' motivational factors that accounted for most of the unique variance influencing their transfer intentions. This finding is consistent with recent work that found direct effects between motivation to transfer and transfer outcomes (Chiaburu & Lindsey, 2008; Chiaburu, Dam et al. 2010; Van den Bossche, Segers, & Jansen, 2010).

Factors that may direct trainee motivation to developing into intentions may lie in the perceived usefulness of the training content. Yelon, Sheppard, Sleight, and Ford's (2004) work on how medical fellows formed and used their intentions to transfer from a faculty development workshop suggests that perceived utility is a major influence in transforming motivation to intent to transfer. In their study, medical fellows reported having stronger intentions to transfer their training knowledge when they perceived the material (in this case, instructional methods to use with medical students) was credible and practical, and they had a proximal need to apply the information. While trainees in this study formed their intentions through the interplay of reflecting on past experiences on the job with new approaches presented in training, they formed intentions to use their new knowledge when they judged it to be useful to their work. Although how law enforcement participants developed their intent to transfer was not a focus in our study, there was a modest correlation between perceived content validity and intent to transfer ( $r = .30$ ), suggesting that the continuum perspective (Al-Eisa et al., 2009) between motivation to transfer and intent to transfer may prove valid.

Other positive and significant correlates were transfer design (training has been designed to give trainees the ability to transfer learning to job application and the training instructions match the job requirements) and performance expectations (the expectation that effort devoted to transferring learning will lead to changes in job performance). Similar to motivation to transfer, when trainees perceive that the training makes it easy to apply training on the job and it will yield performance improvements, they are likely to develop more of a commitment to transfer. Participants also reported a modest correlation between intent to transfer and performance self-efficacy ( $r = .32$ ), supporting other considerable work on the role of individual agency in predicting behavioral outcomes (Blume et al., 2010; Chiaburu, Dam et al., 2010; Tziner, Fisher, Senior, & Weisberg, 2007).

5.1. Limitations and suggestions for future inquiry

Despite our results, several limitations influence generalizing our findings to other groups. First, that the motivation scales, and motivation to transfer specifically, accounted for such a large effect on intent to transfer may not have occurred had we used an actual posttraining transfer measure. In our data collection, we actually collected transfer outcomes 4 weeks after participants completed the LTSI in an attempt to compare the results (see Table 4 for descriptive statistics on restricted sample); however, the sample size was too low to ensure we had sufficient power to run the analyses and therefore was eliminated from the study. Low response rates are a common issue when collecting posttraining outcomes, thus making intent to transfer a useful proxy because it can be administered with the LTSI at the end of training. Thus, future research should compare the LTSI factors against intent to transfer and a posttraining performance outcome score to further explore the utility of a self-report and proximal transfer of learning measure.

Additionally, we recognize that despite its ubiquity in organizational research (Sacket & Larson, 1990) and the relative ease with which it can be obtained, self-report data are prone to a variety of response biases (Stone et al., 1999) and the problem of common method variance which can inflate inferences about correlational and causal relationships (Borman, 1991). Although prior research has already established, in both primary (Chiaburu, Sawyer, & Thoroughgood, 2010; Frese, Beimeel, & Schoenborn, 2003) and meta-analytic (Sitzman et al., 2010; Taylor, Russ-Eft, & Chan, 2005) work that individuals tend to overestimate a number of training outcomes including their knowledge gain, there has yet to empirical evidence that suggests the reason is linked to intentional or unintentional attempts to create a favorable impression. While socially desirable responding (SDR) has been shown to overestimate some behaviors like voting (Silver, Anderson, & Abramson, 1986) and church attendance (Hadaway, Marler, & Chaves, 1993) and underestimate others like substance abuse (Mensch & Kendel, 1988), there is no evidence that social desirability plays a role in specific learning transfer situations. In fact, in the context of self-reports, very little is known about how, when, or where SDR operates (Holtgraves, 2004) with some recent research suggesting that self-report validity problems more commonly stem from individuals who score low, rather than high, on social desirability measures (O'Connor, 2006). The role of SDR in learning transfer contexts is perhaps best viewed as a legitimate empirical question for future transfer research such as represented emerging work of Chiaburu, Huang, Hutchins, and Gardner (unpublished manuscript) in exploring the role of motives, impression management as

Table 4. Descriptive statistics for sample that completed the transfer outcome measure (n = 103)

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Intent to transfer	6.09	.91	.91																	
2. Learner readiness	3.70	.64	.13	.81																
3. Performance self-efficacy	4.00	.55	.43	.25	.84															
4. Motivation to transfer learning	4.22	.49	.62	.16	.39	.79														
5. Performance expectations	4.06	.44	.45	.14	.57	.34	.75													
6. Outcome expectations	3.69	.68	.15	.03	.44	.09	.56	.82												
7. Feedback/coaching	3.43	.68	.24	.26	.45	.29	.36	.38	.73											
8. Supervisor/manager support	3.02	.96	.23	.07	.28	.31	.31	.36	.48	.92										
9. Supervisor/manager sanctions	1.99	.75	-.16	-.08	-.23	-.08	-.11	-.30	.10	-.18	.55									
10. Peer support	3.64	.61	.29	.03	.50	.40	.48	.36	.39	.38	-.18	.86								
11. Resistance to change	2.67	.75	-.06	.06	-.35	-.09	-.26	-.44	-.24	-.23	.33	-.42	.84							
12. Personal outcomes – positive	2.22	.78	-.01	.11	.04	.22	.15	.15	.36	.18	.30	.33	.05	.68						
13. Personal outcomes – negative	2.10	.66	.00	.02	-.02	.22	.17	.09	.22	.31	.25	.31	.19	.66	.81					
14. Opportunity to use	3.57	.69	.22	.26	.38	.07	.33	.35	.17	.15	-.34	.20	-.08	-.04	-.03	.72				
15. Personal capacity for transfer	3.62	.54	.14	.15	.24	.05	.21	.32	.11	.15	-.33	.31	-.25	.06	-.02	.42	.59			
16. Perceived content validity	3.60	.53	.25	.25	.46	.23	.48	.34	.35	.27	-.17	.39	-.19	.04	.18	.39	.33	.80		
17. Transfer design	3.89	.52	.51	.28	.42	.57	.51	.20	.37	.35	-.02	.39	-.05	.19	.19	.16	.04	.43	.83	
18. Transfer outcome	3.99	.58	.41	.18	.15	.48	.22	.04	.10	.27	-.17	.28	-.05	.08	.14	.11	.11	.16	.43	.36

Note: Coefficient alpha reported on the diagonal.

related to SDR, and reports of knowledge gain resulting from training.

While acknowledging these limitations, we believe the use of self-report data in this study has value for several reasons. First, the use of self-report data in the collection of transfer system data is consistent with a key assumption underlying the development of the LTSI. The LTSI was designed to measure individual perceptions of transfer system constructs. These individual-level constructs are viewed as 'psychologically meaningful representations of proximal organizational structures, processes, and events' (Parker et al., 2003, p. 390) that enable an individual to interpret events, anticipate outcomes, and respond with appropriate behavior. Self-reports of these factors were valuable in this context because we know very little about the nature of transfer systems in the law enforcement context and these data provided one of the first views of psychologically meaningful transfer-related factors operating in this context.

Second, the use of self-reported perceptions of such factors is consistent with and supported by a long line of climate research, indicating those perceptions can mediate the relationship between organizational characteristics and individual outcomes (i.e., Brown & Leigh, 1996; Ford et al., 1992; Kozlowski & Hults, 1987). In short, while conceding the study may have been stronger with an objective or other-source outcome measure, the use of self-reports is not without some value. That is, the data do provide some insights into potentially important transfer system factors and relationships and can be useful for deriving future hypotheses about how people react to transfer system factors in this context.

Our use of a convenience sample also limited our generalizing results to a larger group, although the selection of groups was based on a preset schedule within the training organization and was used by the lead researcher to select opportunities for data collection to ensure contact with the three training programs. We also suggest additional research to better differentiate between motivation to transfer from intent to transfer. Although Al-Eisa et al. (2009) suggest that motivation to transfer is a precursor to intent, additional research needs to substantiate that these factors are conceptually distinct and are not tapping the same underlying construct. Finally, the low reliability of personal capacity for transfer for our sample is concerning and should be examined in more detail, especially given the consistently high reliabilities reported in other work reported in our literature review.

## 5.2. Contributions to transfer of learning research and practice

Concerning implications for research and practice, our study adds to the growing body of work on the LTSI, supporting its utility as both a diagnostic tool of transfer

climate and now as a potential measure predictive of transfer. We recommend additional psychometric work to tease out the differences between motivation to transfer and intent to transfer, and to continue to explore the relationship of intent to transfer to the other LTSI scales. As discussed, the theory of planned behavior hypothesizes three antecedents (e.g., behavior consequences, social norms, and individual control) that align well with the LTSI major scales. For example, *consequences* would relate to personal outcomes (negative, positive); *work support scale* (coaching/feedback, supervisor support, etc.), *resistance to change*, *effort performance*, and *performance-outcome expectations* could tap *social norms/expectations*; and for *control*, the *trainee characteristics scale* that includes self-efficacy and readiness to learn. Although the motivation scales accounted for the largest amount of unique variance (37%) in intent to transfer scores, it is possible that additional studies using intent to transfer will show a closer alignment with the other three LTSI scales.

Additional work on transfer intentions can also advance preliminary studies on the role of dispositional factors on transfer. Most of the research examining motivation and intent to transfer (ours included) has focused largely on the antecedents of these factors. This approach tends to treat the trainee as a passive rather than active player with regard to transfer-related behavior. In other words, the approach assumes that if the right antecedent conditions are in place, the trainee should have adequate motivation or intent to demonstrate the appropriate transfer behaviors. The problem with this approach is that it has left us with a far better understanding of the antecedents of motivation and intentions than with the antecedents of actual behavior. In fact, neither Ajzen's (1991) theory of planned behavior nor the theory of reasoned action (Sheppard et al., 1988) explains how an individual's intentions translate into behavior or why a person does not always behave in accordance with his or her intentions.

Because transferring new learning to job performance is a complex behavior (i.e., trainees have to carefully review their performance needs relative to required job tasks, make decisions about how to use new learning, and make specific plans regarding their actions), there is a clear value in understanding more fully the psychological processes and variables involved in the transition from transfer intention to transfer behavior. For example, Gollwitzer (1990) proposed the construct of implementation intentions that refers to a postintent phase in which an individual engages in specific planning (also known as action planning) about when, where, and how to execute goal-directed behaviors when a specific situation is encountered. Implementation intentions thus are likely to mediate the intention-behavior relationship. From a transfer perspective, this psychological process would furnish transfer intentions with specific

implementation plans and would increase the likelihood of effective transfer happening.

Baldwin et al. (2009) reviewed several studies that point to a number of potentially important factors that could moderate the intention–behavior relationship including procrastination (Van Hooft, Born, & Taris, 2005), decision avoidance, choice deferral, inaction inertia (Anderson, 2003), and others. In short, future research examining the psychological factors and processes involved as trainees do (or do not) move from transfer intention to transfer behavior appears to be a promising new area of transfer research and one that could lead to a greater understanding of the transfer process. Building on the preliminary findings of transfer intentions as a criterion variable (Holton & Bates, 2011), our study furthers this inquiry into examining trainee's disposition as predicting transfer outcomes.

Relative to practitioners, the importance of trainee motivation to transfer on training outcomes should not be overlooked. Efforts to influence motivation to transfer have included both intrinsic and extrinsic techniques related to worker evaluation and rewards. For example, Kontoghiorghes (2002) found that intrinsic variables such as a sense of recognition were found to be more influential on the retention of training ( $r = .34$ ) compared to extrinsic factors such as pay ( $r = .07$ ) and promotions ( $r = .05$ ). In their meta-analysis on behavioral modeling training studies, Taylor et al. (2005) found that transfer outcomes were greatest when extrinsic components (i.e., transfer performance being tracked in performance appraisals offering rewards and sanctions for performance) were instituted in the trainees' work environment. In an integrative review of motivation to transfer, Gegenfurtner (2011) described motivation to transfer as being influenced by pretraining attitudes (toward training, self-efficacy, personality traits), training-related cognitions (learning, framing), and support and consequences experienced in the posttraining environment, thus practitioners can accomplish a great deal toward supporting transfer by influencing trainee motivational aspects and conditions.

Second, although the use of a more proximal outcome measure of transfer intent minimizes the challenge of two data collection times, it also introduces response bias related to self-report data as previously discussed. If organizational constraints prohibit seeking outcome data from other sources (non-self-report), practitioners should consider including a measure of untrained knowledge (e.g., items tapping behaviors not addressed by training) to mitigate response bias (Taylor et al., 2010). In their comprehensive review of training literature, Aguinis and Kraiger (2009) noted that several studies (cf. Aguinis & Branstetter, 2007; Frese et al., 2003) included an untrained knowledge measure to enhance the rigor of their performance assessment, and more recent work (cf. Chiaburu et al., 2010) demonstrated the use

of an untrained knowledge measure as a successful method to identify, and thus control for, response bias relative to self-report data. Finally, recent validation work on the LTSI (Bates et al., 2012) resulted in a shorter version (48 items) that may provide a more attractive diagnostic tool for use in organizational settings.

### 5.3. Summary

As research on training transfer continues to proliferate, researchers and practitioners will need to consider the multifaceted influence of individual and organizational factors on trainee application of learning, the complexities of collecting and assessing transfer of learning outcomes, and addressing issues of response bias relative to self-reports of transfer scores. Our study adds to the growing body of research examining the LTSI as both a diagnostic and a predictive measure of transfer of learning. We also offer several important implications to researchers and practitioners seeking to explicate the factors influencing how and why participants successfully transfer new learning to the job.

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