Development and Validation of the Learning Transfer System Inventory in Taiwan

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Due to globalization in recent years, organizations and the government in Taiwan take developing human expertise more seriously than ever before. However, human resource development evaluation practices in Taiwan have somewhat overlooked connecting training to transfer and organizational results. To help close the gap, organizations in Taiwan need a valid and reliable instrument to assess transfer issues. This study validated a research-based instrument in the United States, the Learning Transfer System Inventory (LTSI), for use in Taiwan. A heterogeneous sample containing 583 responses from twenty organizations was collected. Through a rigorous translation process with qualitatively subjective, quantitatively objective, and pilot evaluations of the translation as well as common factor analyses, a Taiwan version of the LTSI (TLTSI), which contained fifteen statistically reliable factors, was validated. This study also extended the LTSI's generalizability and provided comparable measures of transfer systems between Taiwan and the United States. Translation issues, suggestions for improving the LTSI, implications for HRD, and future research directions are discussed.

Human resource development (HRD) is a relatively new profession but not a new concept in Taiwan. A review of the history of HRD in Taiwan vividly illustrates that it has been embedded in the government's human resource policy and linked to economic growth since 1953. The Taiwanese government has long perceived that developing highly competent human resources will lead to economic growth (Kuo & McLean, 1999).

HRD has been instrumental in Taiwan's economic miracle in Asia since the 1960s. According to the global competitiveness report of the World Economic Forum, published by the Center for International Development at Harvard University, Taiwan, among over one hundred economies, was ranked third in economic growth in 2002 (Cornelius, 2003) and fifth in 2003 (Schwab, 2004).

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Taiwan was also top-ranked in the Asian region for both years. Yuen (1994) asserted that Taiwan's government has created technical training and vocational schools that have dramatically enhanced workers' skills, knowledge, and abilities. The government's emphasis on developing human resources has led Taiwan to become one of the most powerful economies in the world. Although other factors, such as government financial policies and market forces, have influenced Taiwan's economic growth, the government policies that highly value human capital point to the contribution of HRD to this growth. Indeed, in a country such as Taiwan with limited natural resources, human capital is a more vital concept than in countries with abundant natural resources, such as the United States and China.

Due to the new era of globalization, organizations in Taiwan have been facing more rigorous competition than ever before. As a result, HRD has received additional attention in both the public and private sectors. In the public sector, Taiwan's government has embedded the concept of HRD in the government transformation process. One of the most dramatic government policies putting the HRD concept into action has been the legislation referred to as the Civil Servant Life-Long Learning Act (LY 01765)(2002). The vision of this legislation is to build an integrated human resource system by promoting innovation, continual learning, and self-management learning to improve the quality of civil services to citizens in a more effective and efficient fashion, with an ultimate goal of building a learning government.

In the private sector, training has been a prevalent concern for organization decision makers. A major industrial and business magazine, *Common Wealth,* conducted a nationwide study ranking the top one thousand companies in Taiwan and surveyed their business priorities (Chuang, 1998). The top two priorities of those companies were training and development and research and development; indeed, 47.8 percent of these top organizations perceived that training and development was the highest priority they needed to address.

Research Problem

Despite the fact that organizations in Taiwan highly value HRD, training evaluation practices there still fall short in measuring transfer and organizational results (Lin & Chiu, 1997). Because training is one way to develop human resources and facilitating transfer of learning is an approach to help unleash human expertise, it seems clear that both should be equally important to HRD in Taiwan. In order to demonstrate HRD's effectiveness, organizations in Taiwan need valid tools to assess transfer interventions and performance results. However, assessing the effectiveness of coherent transfer interventions requires a valid instrument. Unfortunately, although some research has been done on assessing transfer issues in Taiwan (Chuo, 1997; Chen, 1997), none of it has focused on developing a generalizable instrument to assess factors affecting transfer of training. In addition, these studies have been limited

because only a few factors were investigated and the generalizability of these studies is weak because of the small sample sizes. Therefore, developing a comprehensive, generalizable, valid instrument of learning transfer will help organizations in Taiwan effectively and efficiently manage transfer interventions by diagnosing the strengths and weaknesses of their learning transfer systems.

Models or reviews identifying factors affecting transfer of training or training effectiveness have been abundant (Baldwin & Ford, 1988; Ford & Weissbein, 1997; Kabanoff & Bottger, 1991; Kraiger, Ford, & Salas, 1993; Holton, 1996; Noe, 1986; Noe & Schmitt, 1986; Steiner, Dobbins, & Trahan, 1991). However, most of the models do not provide psychometrically sound measurement scales. A search of the literature related to transfer of training turned up the Learning Transfer System Inventory (LTSI) as the only research-based instrument for assessing factors affecting transfer of learning (Holton, Bates, & Ruona, 2000). The LTSI appears to be comprehensive because it covers sixteen factors related to transfer of training. It has also exhibited evidence of generalizability due to heterogeneous sample that was used. Holton et al. (2000) collected data from 1,616 subjects who attended nine different training programs from government, public for-profit, private, and nonprofit organizations. The training programs included in the study were either knowledge based (for example, customer service and professional training) or skill based (for example, clerical and technical skills). However, none of the subjects was collected from affective-related training.

Cross-cultural research to compare similarities and differences across cultures or nations has been abundant in some areas (Hendriks et al., 2003; Hofstede, 2001; Jackson, 2001). However, research in comparing transfer of learning across cultures or nations is still in its infancy. Because cross-cultural studies have found that some psychological constructs vary across different cultures (Hofstede, 2001), there is a need to validate the LTSI through translation, so practitioners and researchers will have access to sound psychometric quality scales to compare transfer of learning factors and their relationship to performance-related measures across cultures.

Thus, the purpose of this study was to conduct a rigorous translation of the LTSI, validate the LTSI in Taiwan's organizations, and develop an instrument of transfer of learning that is statistically reliable and valid for use in Taiwan in order to address the research problems just described. The research questions were as follows:

1. Through a series of translation, evaluation processes, and factor analysis, how many factors from the original LTSI are valid for use in Taiwan's organizations?
2. Twenty-one new items, designed by the original LTSI authors were added to current LTSI for the purpose of improving the reliabilities of the five problematic factors. When including these items in another factor analysis with the data, will more valid factors be found and the reliabilities of these factors be improved?

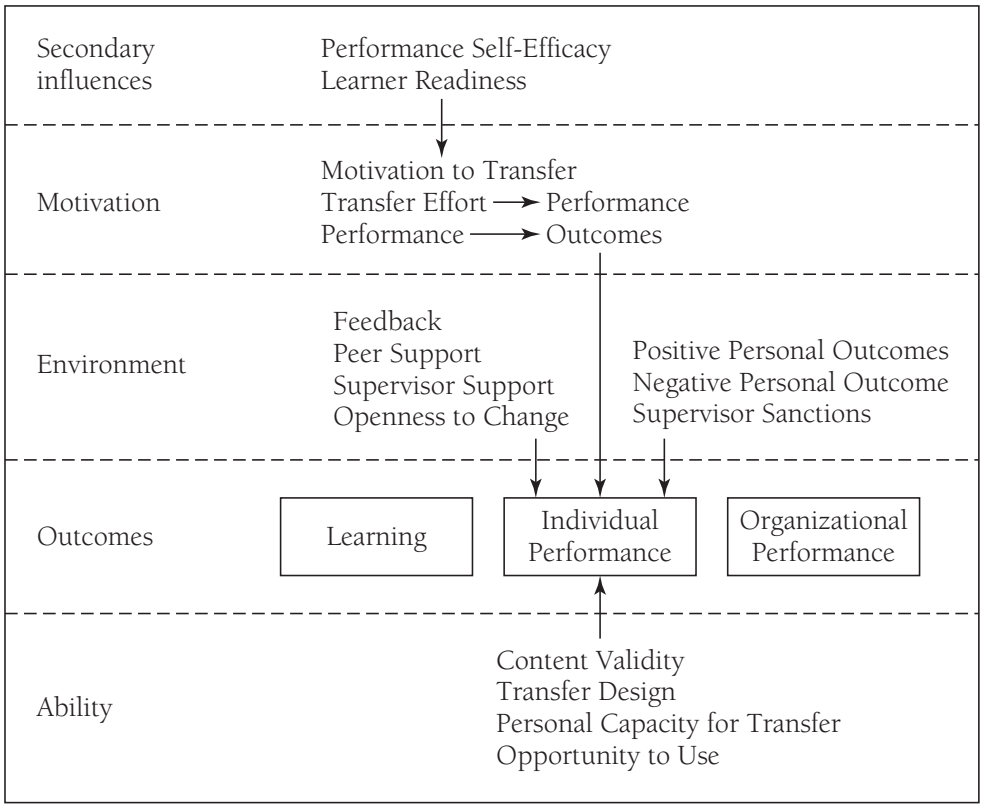
3. If affective-related data are collected, will the data suggest that the LTSI can be used to measure transfer issues for affective-related training?
4. Will this study be able to provide comparable transfer factors for a cross-culture study between Taiwan and the United States?

Review of Literature

This section introduces the LTSI theoretical framework, reviews studies related to previous LTSI development and validity, and reviews approaches for cross-cultural instrument translation.

Theoretical Framework of the LTSI. The LTSI has four sets of factors: motivation, work environment, ability, and secondary influences (also known as trainee characteristics). The motivation, work environment, and ability factors directly influence individual performance, whereas the secondary influences are perceived to affect motivation and then further to affect individual performance. The conceptual framework is shown in Figure 1. The definitions, reliabilities of the factors, and sample items for the LTSI are provided in Table 1.

Figure 1. Learning Transfer System Inventory: Conceptual Model of Instrument Constructs



Source: Holton, Bates, & Ruona (2000, p. 239).

Table 1. English LTSI Scale Definitions and Sample Items

Factor	*Definition*	*Sample Item*	*Number of Items*	α
TRAINING SPECIFIC SCALES				
Learner Readiness	The 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	.73
Motivation to Transfer	The 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 new learning on my job.	4	.83
Positive Personal Outcomes	The degree to which applying training on the job leads to outcomes that are positive for the individual.	Employees in this organization receive various "perks" when they utilize newly learned skills on the job.	3	.69
Negative Personal Outcomes	The extent to which individuals believe that *not* applying skills and knowledge learned in training will lead to outcomes that are negative.	If I do not utilize my training I will be cautioned about it.	4	.76
Personal Capacity for Transfer	The extent to which individuals have the time, energy and mental space in their work lives to make changes required to transfer learning to the job.	My workload allows me time to try the new things I have learned.	4	.68
Peer Support	The extent to which peers reinforce and support use of learning on the job.	My colleagues encourage me to use the skills I have learned in training.	4	.83
Supervisor Support	The extent to which supervisors-managers support and reinforce use of training on the job.	My supervisor sets goals for me, which encourage me to apply my training on the job.	6	.91
Supervisor Sanctions	The extent to which individuals perceive negative responses from supervisors-managers when applying skills learned in training.	My supervisor opposes the use of the techniques I learned in training.	3	.63
Perceived Content Validity	The extent to which trainees judge training content to accurately reflect job requirements.	What is taught in training closely matches my job requirements.	5	.84

(*Continued*)

Table 1. English LTSI Scale Definitions and Sample Items (*Continued*)

Factor	*Definition*	*Sample Item*	*Number of Items*	α
Transfer Design	Degree to which (1) training has been designed and delivered to give trainees the ability to transfer learning to the job, and (2) training instructions match job requirements.	The activities and exercises the trainers used helped me know how to apply my learning on the job.	4	.85
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.	The resources I need to use what I learned will be available to me after training.	4	.70
GENERAL SCALES				
Transfer Effort–Performance Expectations	The expectation that effort devoted to transferring learning will lead to changes in job performance.	My job performance improves when I use new things that I have learned.	4	.81
Performance-Outcomes Expectations	The expectation that changes in job performance will lead to valued outcomes.	When I do things to improve my performance, good things happen to me.	5	.83
Resistance/ 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.	People in my group are open to changing the way they do things.	6	.85
Performance Self-Efficacy	An individual's general belief that they are able to change their performance when they want to.	I am confident in my ability to use newly learned skills on the job.	4	.76
Performance Coaching	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.	4	.70

Source: Holton, Bates, & Ruona (2000, pp. 344–346).

Sixty-eight items measuring sixteen factors represent two construct domains: Training in Specific and Training in General in the LTSI. The Training in Specific domain contains forty-five items measuring eleven constructs. The Training in General domain consists of twenty-three items measuring five constructs.

Development and Validity of the LTSI. A number of studies (Holton, Chen, & Naquin, 2003; Bates & Holton, 2004) have used the LTSI in different settings. This section does not look at all of the studies using LTSI as the instrument. Rather, the focus is on studies that demonstrate the psychometric qualities of the LTSI.

In early development of the LTSI, Holton, Bates, Seyler, and Carvalho (1997) factor-analyzed nine constructs for transfer climate. The factors assessed in the study were essentially related to environmental factors. Holton et al. (2000) expanded the instrument by fitting the factors to an evaluation model (Holton, 1996) and included motivational-related (for example, expectancy and motivation to transfer), ability-related (for example, personal capacity for transfer), and trainee-characteristics-related factors (for example, learner readiness and performance self-efficacy) to the previous version of the instrument. With a heterogeneous sample, the results suggested that sixteen LTSI factors were validated. Yamnill (2001) conducted a construct validation study of the LTSI in Thailand and found that it was valid for use there. Bookter (1999) conducted a divergent and convergent validity of the LTSI, suggesting that it contains unique constructs and concluded that it is divergent to other known constructs relating to transfer of learning.

In addition, three studies that focused on criterion validity of the LTSI suggested that environmental factors, especially for interpersonal supports, are the most powerful predictors of individual performance (Bates, Holton, & Seyler, 1997; Bates, Holton, Seyler, & Carvalho, 2000) and motivation to transfer (Seyler, Holton, Bates, Burnett, & Carvalho, 1998). Another criterion validity study of the LTSI (Ruona, Leimbach, Holton, & Bates, 2002) suggested that reaction utility might be indirectly related to performance but directly related to motivation to transfer.

Translation Approaches for Cross-Cultural Studies. There are three types of development strategies for cross-cultural instruments: one-shot translation, forward-back translation, and simultaneous instrument development (Bullinger, Anderson, Cella, & Aronson, 1993; Brislin, 1970; Hui & Triandis, 1985). The one-shot translation, also known as forward-only translation, is the least rigorous and least valid approach. It refers to direct literal translation from an original language to a target language without any evaluation of the translation.

The forward-back translation approaches start with the forward translation, and the instrument is then back-translated to the original language for an evaluation of the translation in the native language. The forward-back-translation approaches have two subtypes: sequential and parallel. Direct translation and

evaluation process are involved, and no change is made to the original instrument in the sequential forward-back translation. For the parallel forward-back approach, the original instrument can be adjusted in order to reduce language limitations as well as to make the original and the translated instrument as comparable as possible. Finally, the simultaneous approach generally does not involve questionnaire translation but identification of appropriate factors that are perceived to be cross-culturally valid. Based on the predetermined factors, the instruments are then developed separately in local languages.

Method

This section describes the version of the LTSI used in this study and the translation process conducted in this study. It then addresses research design, population, sample, and implementation.

Instrumentation. The version of the LTSI used in this study contained sixty-eight validated items plus twenty-one research items that the authors tested to improve lower reliabilities of five constructs: Positive Personal Outcomes, alpha = .69; Personal Capacity for Transfer, alpha = .68; Supervisor Sanction, alpha = .63; Opportunity to Use Learning, alpha = .70; and Performance Coaching, alpha = .70). All of the items used a Likert-type scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Because the quality of translation is the key to ensuring the functional equivalence between the two versions of the LTSI, a forward-back translation with subjective, objective, and pilot evaluations was used to create the Taiwan version of the LTSI.

Chen (2003) distinguished two concepts in the translation process: identical translation and functional equivalence translation. Identical translation refers to translation that produces an instrument as close to the original as possible. It focuses on identical word-by-word translation and maintains the original sentence structure (such as subject-verb structure), so it has a potential threat to validity in that the meaning may be distorted in the translation process. The functional equivalence translation focuses on two criteria: equivalence of meaning and use of commonly used words in the target language. The equivalence of meaning will ensure that sentences are not misinterpreted, and the commonly used words in the target language assist in readability and functionality of the translated instrument in the target language.

Sequential Forward-Back Translation. Because the English version of the LTSI had been previously validated, any changes to the original may alter the factor structure. Therefore, sequential forward-back translation strategy was appropriate and adopted in this study. Two bilingual translators (one was the first author of this article) separately translated the English version of the LTSI to Mandarin Chinese. (Both translators had received graduate HRD degrees in the United States.) They attempted to retain the form and the meaning of the items as close to the original as possible, and they agreed to use common language in the translation. When they completed the translation, they

compared their translated instruments item by item to assess the consistency of the translation. Items with disagreement or errors were further discussed and revised until both translators reached a consensus.

A first draft version of Taiwan's LTSI (TLTSI) was then finalized and labeled the TLTSI draft. A bilingual translator, who had never seen the LTSI before and had strong language skills in both English and Mandarin Chinese, then translated the TLTSI draft back to English. (The back translator is a faculty member in a social science–related field in a major university in the United States.)

Subjective Evaluation. The back translation was then reviewed by one of the original LTSI authors to evaluate the English LTSI to the English back-translated version of the TLTSI draft. The primary focus in this step was to make sure that the meanings of the LTSI items were equivalent in both English versions. Problematic items were sent back through entire process; they were retranslated, back-translated, and reviewed by the LTSI author again. This process continued until no items exhibited substantial differences that could be found by the LTSI author. This version was then labeled the *TLTSI back*.

Objective Evaluation. According to Sperber, Devellis, and Boehlecke (1994), the success of translation in most cross-cultural studies is based on the translator's satisfaction; relatively few have been done through an objective evaluation. As a check on the possible individual bias of the LTSI author, a quantitative approach of evaluation through an objective lens was also conducted in this study. The purpose of this evaluation was to test the quality of the transition by again evaluating the two English versions: the original LTSI and the TLTSI back.

Two measures, comparability of language and similarity of interpretability, were assessed. The former assesses the similarity of words, phrases, and sentences, while the latter assesses the similarity of an item's meaning. An instrument using a Likert-type scale ranging from 1 (Extremely Comparable/Similar) to 7 (Not at All Comparable/Similar) was developed for this step. A survey instrument was developed that contained the two English versions of the items (original wording and TLTSI back wording) along with the rating scales. This survey was distributed to a group of HRD graduate students and experienced trainers. All of them were English monolingual raters. Eighteen individuals received the instrument, and fifteen of the responses were returned; thirteen were useable. A 3.0 criterion was set to determine the effect of the two measures. Scores above 3.0 indicated potential problematic items.

In terms of the comparability of language measure, the results showed that fifteen items had mean values greater than 3.0, indicating that the wordings of these items were not comparable. However, on the similarity of interpretability measure, the results showed that only eight items had mean values greater than 3.0. The similarity of interpretability measure became the primary focus of the translation because it assesses equivalence of meaning and the Mandarin language forces some sentence forms that appear awkward to English readers when back-translated. The eight items with mean values of

similarity of interpretability measure greater than 3.0 were examined further. None of them had a mean value grater than 4.0. A closer examination of these items suggested that problems with these items were due to differences between the two different languages, so no further revision was possible.

Pilot Test. The TLTSI was sent to nine HRD practitioners in Taiwan to collect feedback on whether the instrument and its instructions were understandable and the technical terms in the instrument were interpretable in Taiwan. All of the selected practitioners had HRD work experience of more than five years and were trainers, human resource consultants, or HR managers. The pilot test was a checkpoint for the readability and functionality of the translated instrument. The comments provided by these HRD practitioners indicated that the instrument seemed appropriate for use in Taiwan except for some concerns about the length and similar items in the instrument. However, the similar items were the research items intended to improve the reliability of the lower reliability scales. The length of the instrument was not changed due to multiple purposes of this study. Therefore, all eighty-nine items were retained and distributed.

Research Design, Population, Sample, and Implementation. This study was a nonexperimental survey design. The target population was employees who attended training programs within or outside their organization and provided by trainers in Taiwan. In terms of sampling techniques, probability sampling would exhibit stronger validity than nonprobability sampling (Ary, Jacobs, & Razavieh, 1996). Probability included four types—simple random, stratified, cluster, and systematic sampling—while the nonprobability sampling contains accidental, purposive, and quota samplings. These sampling techniques were deliberately considered. However, because a roster of all trainees in Taiwan does not exist, the simple random and systematic sampling techniques could not be done. Although stratified or cluster samplings could be done by selecting a sample from a list of organizations in Taiwan, these approaches did not fit the purposes of this study. This is because there would be no control on availability of training and types of training provided by the selected organizations. Therefore, nonprobability sampling was used, and a combination of purposive and accidental samplings was appropriate because the quota sampling also did not fit the research purposes.

The first author attended two international HRD-related conferences in 2002 to solicit Taiwan's HRD practitioners to participate in this study. More than sixty practitioners from Taiwan attended the conferences in 2002. In addition, the researcher visited Taiwan to obtain additional participants. The sampling frame included employees who received training from these HRD practitioners' affiliated organizations. Predetermined criteria for subject selection were to collect data in the sampling frame that would represent different organizations, organizational types, and training types as possible.

Thirteen HRD practitioners agreed to serve as instrument administrators and helped distribute the instrument in their organizations. Each practitioner received

an administration guide and thirty to one hundred instruments. The guide contained information about the research purpose, contents of the instrument, target respondents, distribution timing, and issues about confidentiality. The number of instruments disseminated in an organization depended on its size, trainee accessibility, variety of training programs conducted, and organizational type. The first author also scheduled a one-month trip in Taiwan to deal with administration issues. Participation was on a voluntary and anonymous basis.

Some instrument administrators who served in public training institutes were able to distribute instruments to participants from more than one organization. The data were collected from trainees either immediately after the training or no later than two weeks after training. Due to anonymous participation, no follow-up was conducted with trainees.

There were 712 instruments distributed and 583 responses collected from twenty organizations, for an 82 percent response rate. These organizations represented public sector ($N = 77$, 13.3 percent), private sector ($N = 267$, 46.3 percent), educational institutes ($N = 59$, 10.2 percent), public for-profit ($N = 63$, 0.9 percent), and nonprofit ($N = 100$, 17.3 percent) organizations. There were 577 usable responses. A sample description can be found in Table 2.

Analysis. Two major factor analysis techniques were considered: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The CFA is more appropriate when a study is supported by strong theory. CFA would have been an adequate technique to use if it was known that there were no variations among psychological constructs across countries, but that would be a weak assumption in this study. Because the theoretical framework of the LTSI had not been tested in Taiwan, EFA seemed more appropriate than CFA. Therefore, the exploratory common factor analysis with oblique rotation was used in this study. Oblique rotation was appropriate because interfactor relationship is assumed (Tabachnick & Fidell, 1996).

Before the EFA was conducted, visual normality and suitability for factor analysis were examined using procedures from Hair, Anderson, Tatham, and Black (1998). Following the English-language validation procedure, two separate exploratory factor analyses were run for the Training in Specific and Training in General domains (Holton et al., 2000). The number of factors to extract was based on a combination of an eigenvalue greater than one criterion and examination of scree plot. A .40 cutoff was the criterion to determine the number of items to retain in a factor for each of the EFA analyses.

Results

No serious violation was found in the visual normality examination. The overall Kaiser's measure of sampling adequacy was .932, which means the data were appropriate for an exploratory common factor analysis. Responses to items ratios for all of the EFAs described in later in this section ranged from 7.9 to 1 to 22.1 to 1.

Table 2. Sample Information by Organization and by Training by Organization

	Frequency	*Percentage*	*Cumulative Percentage*
By Organization			
Organization not identified	22	3.8	3.8
Civil service[a]	57	9.9	13.7
Education[b]	58	10.1	23.8
Electronic	63	10.9	34.7
Insurance[c]	76	13.2	47.9
Petroleum	62	10.7	58.6
Retail	48	8.3	66.9
Social work	100	17.3	84.2
Telecommunication	60	10.4	94.6
Transportation	16	2.8	97.4
Others[d]	14	2.4	99.8
Total	577	99.8	
By training			
Training type not identified	98	17.0	17.0
Computer skill training	19	3.3	20.3
Curriculum development	30	5.2	25.5
Customer service	17	2.9	28.4
Middle-level managerial training	12	2.1	30.5
New employee training	52	9.0	39.5
Machine maintenance, merchandise introduction, and customer satisfaction	48	8.3	47.8
Quality management	12	2.1	49.9
Safety training	38	6.6	56.5
Spiritual inspiration	99	17.2	73.7
System operation and accounting management	27	4.7	78.4
Train the trainer	10	1.7	80.1
Others[e]	115	19.9	100.0
Total	577	100.0	

[a]Data collected from three civil service agencies.

[b]Data collected from three educational institutes.

[c]Data collected from two insurance companies.

[d]Six organizations with fewer than ten respondents are classified as "others."

[e]A variety of training programs with fewer than ten respondents classified as "others."

Research Question 1. Initial analyses were conducted using only the sixty-eight previously validated items. The results of the EFA showed that eleven of the sixteen LTSI factors were validated, and six were in need of further investigation (five for Training in Specific and one for Training in General domains). The six factors included two that did not emerge at all (Personal Capacity for Transfer and Performance Coaching), two that merged to a new factor

(Perceived Content Validity and Transfer Design), one that contained only two items (Supervisor Sanction; alpha = .66), and one with only one item (Opportunity to Use Learning). Due to space limitation, the result of this analysis was incorporated with other research questions (see Table 6).

Research Question 2. Cross-cultural instrument validation such as was done in this study is involved not only in cultural issues, but also in translation, implementation, and reliability issues. Each issue should be carefully examined before decisions are made about construct validity. Before concluding that the six factors were not valid in Taiwan, we decided to conduct additional analyses, including the twenty-one research items (eight-nine items in total) even though they had not been validated in the United States. We developed the following reasons for this addition.

First, as the analysis of research question 1 indicated, four of the six factors (Personal Capacity for Transfer, Supervisor Sanction, Opportunity to Use Learning, and Performance Coaching) that did not show initial construct validity in Taiwan matched the low reliability factors in the original LTSI. This raised our suspicion that items in the previously problematic factors might have affected the results. It would be premature to conclude that factors such as Personal Capacity for Transfer and Performance Coaching did not exist without careful further examination, especially since the weaknesses in these scales might have been magnified by the translation process. In addition, one of the purposes of this study was to develop an instrument of transfer of learning that is statistically reliable and valid for use in Taiwan. Thus, it made more sense to develop the best possible instrument for use in Taiwan, which meant examining the research items to see if the troublesome factors could be strengthened. If the troublesome factors remained problematic, then the conclusion that certain constructs do not exist in Taiwan can be made more confidently. But if problem factors were strengthened or reemerged when the research items were included, then it seems likely that the problems may have occurred due to translation or other artifacts but not true cultural differences. This is especially true when one considers that four of the six problem factors had been identified as having some weakness in the English language version also.

The procedures and criteria for the extended analysis were the same as those conducted in research question 1 except for having the research items included. In the Training in Specific domain, sixty-three items were used. These items included forty-five validated items and eighteen research items. Although the ratio of respondents to items in this analysis dropped to 9.2 to 1, it was still an acceptable ratio for factor analysis (Hair et al., 1998). Kaiser's measure of sampling adequacy in this analysis was .938. Using a .40 cutoff, the result initially showed an eleven-factor structure that is the same as the English version. These eleven factors explained 65 percent of total variance. However, one of the factors had only two items with loading greater than .40, which was too weak to be considered as a factor, so it was dropped. A new factor emerged that merged items associated with the Transfer Design and

Opportunity to Use Learning constructs in the original LTSI. The new factor was labeled Transferability and defined as the extent to which trainees perceive that training is designed to facilitate opportunity to apply what they learn to the job. Twelve items were deleted in terms of problems with low loadings, serious cross-loadings, and noninterpretable factors: items 1, 17, 25, 27, 44, 50, 51, 52, 60, 61, 62, and 63. The factor analysis results are in Table 3.

In the Training in General domain, twenty-six items were used. These items included twenty-three validated items and three research items. The ratio of respondents to items in this analysis was 22.2 to 1. Kaiser's measure of sampling adequacy in this analysis was .933. The results showed a five-factor structure and were consistent with the original LTSI factors. The five factors explained 61.4 percent of the total variance. All items were retained with exception of the item 64, which was eliminated because of low loading. The factor analysis results are in Table 4.

Overall, in the eighty-nine-item factor analysis, either the six problematic factors reemerged or had reliabilities improved. The exceptions were the Opportunity to Use Learning and Transfer Design factors, which combined into the Transferability scale in Taiwan's settings. Seventy-six items were retained. In terms of the result of this research question, the scale definitions of the LTSI were redefined to fit Taiwan's settings. The TLTSI scale definitions, sample items, number of items and reliability for each scale are in Table 5.

Research Question 3. Additional factor analyses were conducted to compare the factor structures with and without the respondents who attended affective-related training, which was the spiritual inspiration training course. Ninety-nine responses were collected from the training. Because an appropriate sample size for a factor analysis is to have responses to items ratios from 5 to 1 to 10 to 1 (Hair et al., 1998), ideally we would like to have had more data from the affective training so the responses could be factor-analyzed separately. However, this was not possible in this data set. An alternative was to exclude the responses from the affective training in factor analyses. If the responses of the affective-related training did not fit the instrument, the factor structures between the data set with and without the affective training should show substantial differences. The result is shown in Table 6. In comparing the result of this research question to research questions 1 and 2, the factor structures do not differ substantially between the data sets with and without the affective-related training.

Research Question 4. Analyses for research questions 1 and 2 indicated that this study was able to validate comparable transfer factors for a cross-cultural study between Taiwan and the United States. In terms of the results of the research question 1, eleven transfer factors are comparable. The results of research question 2 suggested that fourteen of the validated factors in this study were identical to the original LTSI. It is possible that an updated validation study of the English version of the LTSI with the research items will

Table 3. Rotated Factor Loadings for Training in Specific Domain of the Sixty-Three-Item Analysis

	Factor											
Item	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*Communality* (R^2)
Q58	.62								.22			.74
Q55	.56											.66
Q59	.52								.21			.61
Q54	.50								.23			.63
Q56	.48											.62
Q53	.45								.24			.58
Q57	.40											.65
Q60	.37											.51
Q35		.84										.71
Q34		.82										.68
Q36		.77										.72
Q38		.75										.57
Q41		.72										.67
Q42		.69										.57
Q45		.64										.60
Q46		.58										.44
Q8			−.87									.72
Q6			−.83									.74
Q7			−.79									.69
Q22			−.76									.70
Q16			−.72									.67
Q18		−.20	−.48									.51
Q17			−.45	−.36								.57
Q15			−.41									.45

(*Continued*)

Table 3. Rotated Factor Loadings for Training in Specific Domain of the Sixty-Three-Item Analysis (*Continued*)

	Factor											
Item	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*Communality* (R^2)
Q23				−.80								.65
Q21				−.73								.63
Q14				−.57								.50
Q24				−.55								.50
Q39					−.79							.69
Q40					−.74							.68
Q33					−.73							.74
Q37					−.72							.65
Q43					−.67							.60
Q32					−.66							.69
Q44					−.39							.28
Q62	.23				−.26	.23						.32
Q30						.84						.78
Q29						.79						.75
Q28						.69						.62
Q31						.60						.58
Q4							−.67					.63
Q5							−.63					.55
Q3							−.61					.58
Q2							−.55					.52
Q1							−.37			.33		.41

Q20								.63				.51
Q11								.61				.56
Q12								.56				.48
Q26								.46				.37
Q19								−.44				.44
Q61								.33				.24
Q25					−.21			−.25				.35
Q48									.80			.78
Q47									.75			.65
Q49	.30								.47			.67
Q50	.32								.32		.30	.69
Q10										.63		.45
Q13										.55		.33
Q9							−.26			.41		.50
Q63								.23		.24		.26
Q52	.34								.27		.41	.71
Q51	.21								.33		.41	.71
Q27											.29	.24
Eigenvalues	17.82	6.92	3.73	2.18	2.03	1.77	1.65	1.52	1.21	1.09	1.04	
Percentage of variance	28.29	10.98	5.93	3.46	3.22	2.81	2.61	2.41	1.92	1.73	1.66	

Note: Cross-loadings less than .20 are not listed.

Table 4. Rotated Factor Loadings for Training in General Domain of the Twenty-Six-Item Analysis

	Factor					
Item	*1*	*2*	*3*	*4*	*5*	*Communality (R^2)*
Q68	.67					.63
Q67	.65					.39
Q70	.59					.50
Q72	.49					.44
Q79	.45			.25		.41
Q64	−.23	.23				.18
Q77		.78				.60
Q76		.72				.57
Q74		.65				.43
Q73		.62				.37
Q75		−.42				.35
Q78	.29	−.40				.43
Q84			−.82			.67
Q85			−.77			.64
Q83			−.77			.57
Q82			−.62			.64
Q86				.80		.69
Q81				.80		.67
Q80				.79		.68
Q88	.25			.60		.65
Q89			−.26	.45		.36
Q87				.43		.46
Q66					−.67	.65
Q71					−.60	.63
Q69	.28				−.58	.66
Q65			−.24		−.46	.50
Eigenvalues	9.35	2.37	1.76	1.49	1.00	
Percentage of variance	36.00	9.11	6.75	5.71	3.86	

Note: Cross-loadings less than .20 are not listed.

provide more factors that are comparable, statistically reliable, and valid between these two countries. It is important to note that although the items retained in the validated factors in research questions 1 and 2 were not completely identical to the items in the original LTSI, one way to provide coherent comparisons is to select items that are valid in both the original LTSI and TLTSI. However, this must be justified by acceptable reliabilities and adjustments in definition of the factors. A comparison table between the LTSI and the TLTSI can be found in Table 6.

Table 5. TLTSI Scale Definitions and Sample Items

Factor	*Definition*	*Sample Item*	*Number of Item*	α
Trainee characteristics factors				
Learner Readiness	The extent to which an individual knows expected outcomes of the training and understands how the training are prepared for them prior to participating in training.	Before the training I had a good understanding of how it would fit my job-related development.	3	.65
Performance Self-Efficacy	The extent to which an individual's belief in self on overcoming obstacles to change his or her performance.	I am confident in my ability to use newly learned skills on the job.	4	.86
Motivation factors				
Motivation to Transfer	The extent to which an individual's willingness and excitement to try out new learning to the job and belief in new skills will help him or her improve job performance.	I get excited when I think about trying to use my new learning on the job.	4	.83
Transfer Effort–Performance Expectations	The extent to which an individual's belief and expectation in effort will lead to performance improvement.	My job performance improves when I use new things that I have learned.	4	.85
Performance-Outcomes Expectations	The extent to which an individual expect that changes in job performance will lead to valued outcomes.	For the most part, the people who get rewarded around here are the ones that do something to deserve it.	5	.80
Work environment factors				
Positive Personal Outcomes	The extent to which applying training on the job leads to outcomes, which are positive for the individual. The positive outcomes may include pay raise, incentives, non-momentary rewards, and public recognition.	If I use this training I am more likely to be rewarded.	7	.91

(*Continued*)

Table 5. TLTSI Scale Definitions and Sample Items (*Continued*)

Factor	*Definition*	*Sample Item*	*Number of Item*	α
Negative Personal Outcomes	The extent to which an individual believe that *not* applying skills and knowledge learned in training will lead to outcomes that are negative. The negative outcomes may be oral warning, tangible penalty, notification, and some type of punishment.	If I do not utilize my training I will be cautioned about it.	4	.79
Peer Support	The extent to which an individual's peers reinforce and support use of learning on the job. The reinforcement and support may include a peer's appreciation, encouragement, expectation, and patience to the individual's efforts in transferring learned knowledge and skills to his or her job.	My colleagues encourage me to use the skills I have learned in training.	4	.89
Supervisor Support	The extent to which an individual's supervisors or managers reinforce and support use of training on the job. The reinforcement and support may include supervisor or manager accessibility, addressing concerns on a regular basis, demonstration of interest about work problems, and facilitation of achievable goal setting for the individual in relation to transfer issues.	My supervisor helps me set realistic goals for job performance based on my training.	6	.92

Supervisor Sanctions	The extent to which an individual perceives negative responses and actions from his or her supervisors or managers as applying skills and knowledge learned in training. Negative responses and actions may include objection, negatively tacit cues, lack of interests, and critiques in relation to transfer issues.	My supervisor thinks I am being less effective when I use the techniques taught in this training.	8	.92
Openness to Change (reversal code)	The extent to which an individual perceives that group norms are to resist or discourage the application of skills and knowledge learned in training.	Experienced employees in my group ridicule others when they use techniques they learn in training.	6	.80
Transferability	The extent to which an individual perceives that training is designed to facilitate opportunities to apply what they learn to the job. Opportunities may include resource availability in the job and case examples and participation in the training.	The way the trainer(s) taught the material made me feel more confident I could apply it.	7	.92
Ability factors				
Personal Capacity for Transfer	The extent to which an individual has the time, energy and mental space in their job to transfer learned skills and knowledge to the job.	My workload allows me time to try the new things I have learned.	5	.78
Perceived Content Validity	The extent to which an individual judges the match between training content and job requirements.	The methods used in training are very similar to how we do it on the job.	3	.84
Performance Coaching	Formal and informal indicators from an organization about an individual's job performance. The indicators may include advice, suggestions, feedback, and conversation from others.	After training, I get feedback from people about how well I am applying what I learned.	6	.88

Table 6. Factors, Reliabilities, and Items Comparisons of the Extended Analyses Between LTSI and TLTSI

			Results of Research Question 1	*Results of Research Question 2*	*Results of Research Question 3*		*Results of Research Question 4*
Training in Specific	*LTSI (eleven factors)*		*TLTSI (seven factors)*	*TLTSI (ten factors)*	*Forty-Five-Item Analysis (seven factors)*	*Sixty-Three-Item Analysis (nine factors)*	
	Validated Items	Research Items	Items	Items	Items	Items	
Learner Readiness	1, 9. 10, 13 (.73)		1, 9, 10, 13 (.73)	9, 10, 13 (.65)	9, 10, 13	1, 2, 3, 4, 9, 10, 13	C
Motivation to Transfer	2, 3, 4, 5 (.83)		2, 3, 4, 5 (.83)	2, 3, 4, 5 (.83)	2, 3, 4, 5		C
Positive Personal Outcomes	6, 16, 17 (.69)	7, 8, 15, 18, 22	6, 16, 17 (.69)	6, 7, 8, 15, 16, 18, 22 (.91)	6, 16, 17	6, 7, 8, 15, 16, 17, 22	C
Negative Personal Outcomes	14, 21, 23, 24 (.76)		14, 21, 23, 24 (.79)	14, 21, 23, 24 (.79)	14, 21, 23, 24	14, 21, 23, 24	C
Personal Capacity for Transfer	19, 25, **26, 27** (.68)	11, 12, 20		**11, 12,** 19, **20, 26** (.78)		**11, 12, 20, 26**	PC
Peer Support	28, 29, 30, 31 (.83)		28, 29, 30, 31 (.89)	28, 29, 30, 31 (.89)	28, 29, 30, 31	28, 29, 30, 31	C
Supervisor Support	32, 33, 37, 39, 40, 43 (.91)		32, 33, 37, 39, 40, 43, 44 (.89)	32, 33, 37, 39, 40, 43 (.92)	32, 33, 37, 39, 40, 43, 44	32, 33, 37, 39, 40, 43	C
Supervisor Sanction	38, 44, 45 (.63)	34, 35, 36, 41, 42, 46	38. 45 (.69)[a]	34, 35, 36, 38, 41, 42, 45, 46 (.92)	38, 45	34, 35, 36, 38, 41, 42, 45	PC

Perceived Content Validity	47, 48, 49, 58, 59 (.84)		47, 48, 49, 52, 53, 54, 55, 56, 58, 59, 60 (.93)	47, 48, 49 (.84)	47, 48, 49, 52, 53, 54, 55, 56, 58, 59, 60	47, 48, 49	C
Transfer Design	52, 53, 54, 55 (.85)			53, 54, 55, 56, 57, 58, 59 (.92)-labeled as Transferability		50, 51, 52, 54, 55, 56, 57	
Opportunity to Use Learning	56, 60, **61, 63** (.7)	50, 51, 57, 62	61 (n/a)		61, 63[a]		

Training in General	*LTSI (five factors)*	*TLTSI (four factors)*	*TLTSI (five factors)*		*Twenty-Three-Item Analysis (four factors)*	*Twenty-Six-Item Analysis (five factors)*	
Transfer Effort-Performance Expectation	65, 66, 69, 71 (.81)		66, 69, 71 (.83)	65, 66, 69, 71 (.85)	66, 69, 71	65, 66, 69, 71	C
Performance-Outcome Expectation	**64,** 67, 68, 70, 72 (.83)		67, 68, 70, 72, 79 (.80)	67, 68, 70, 72, 79 (.80)	67, 68, 70, 72, 79	67, 68, 70, 72, 79	C
Openness to Change	73, 74, **75,** 76, 77, **78** (.85)		**73, 74,** 75, **76, 77,** 78 (.80)	**73, 74,** 75, **76, 77,** 78 (.80)	**73, 74,** 75, **76, 77**	**74,** 75, **76, 77,** 78	C
Performance Self-Efficacy	82, 83, 84, 85 (.76)		82, 83, 84, 85, 89 (.84)	82, 83, 84, 85 (.86)	82, 83, 84, 85, 89	82, 83, 84, 85	C
Performance Coaching	79, 86, 87, 89 (.7)	80, 81, 88		80, 81, 86, 87, 88, 89 (.88)		80, 81, 86, 87, 88, 89	PC

Note: The numbers in the parentheses represent reliability. Factor extraction was based on a .40 cutoff criterion for all analyses. Bold numbers represent reverse-scored items.

[a]A valid factor has more than two items. C = comparable factor; PC = potentially comparable factor.

Conclusion and Discussion

Most of the cross-cultural research that translates instruments from one language to another has been based on direct translation methods, and many of the translation processes are completed based solely on a researcher's satisfaction (Sperber et al., 1994). This study undertook a more rigorous translation process by using the forward-back translation approach with subjective, objective, and pilot evaluations of the translation that goes beyond what many cross-cultural studies do and what most of the cross-cultural research in HRD has done. The rigorous translation process has enhanced the quality of this research endeavor and reduced the biases that likely would have occurred in the translation process.

Through the rigorous translation and evaluation process, the result of research question 1 suggested that eleven factors of the LTSI are validated in Taiwan's organizations. When the research items were included in another analysis, the result of research question 2 indicated that the valid factors grew to fifteen and the reliabilities of the problematic factors were all improved with only one exception, Opportunity to Use Learning, which was factor-analyzed as part of the new factor, Transferability. The finding of research question 2 indicated that the seventy-six factor-analyzed items are more appropriate for use in Taiwan than items in research question 1 because they provide stronger validity and reliability in Taiwanese organizations. The results of research question 3 indicated that LTSI can be used for affective-related training. In terms of analysis of research question 4, eleven validated factors in research question 1 appear to be comparable between the LTSI and TLTSI. However, the result also implies that a validation study in U.S. organizations including the research items may provide more comparable factors between the LTSI and TLTSI. Such a study is being conducted by the LTSI authors.

The differences in the instrument items and factor structures between Taiwan and the United States can be looked at from four perspectives: cultural, instrument design, translation, and implementation. First, the five factors of the original LTSI—Personal Capacity for Transfer, Supervisor Sanction, Transfer Design, Opportunity to Use Learning, and Performance Coaching—that were not validated in research question 1 could be due to cultural variation. However, the results of research question 2 suggested that three of these LTSI factors (Personal Capacity for Transfer, Supervisor Sanction, and Performance Coaching) were different in initial analyses due to issues of instrument design. Specifically, the low reliabilities in these three factors in the original LTSI suggested problematic items in English, which were magnified when translated into Chinese. The fact that including the stronger research items from the original LTSI eliminated the differences demonstrates that cultural differences were not the explanation.

Thus, the only difference that occurs between Taiwan and the United States is the merger of two original LTSI factors, Transfer Design and Opportunity to

Use Learning. This cultural variation could be explained by variations in training delivery method. The predominant training delivery method in Taiwan is more lecture oriented. Relatively few training courses are designed in ways to encourage participation and involvement. In this sense, the concept of Transfer Design in the United States, which encourages participation and involvement, might not be perceived as a unique factor in Taiwan's culture. Instead, trainees in Taiwan may perceive Transfer Design and Opportunity to Use Learning as a single construct of Transferability. Specifically, trainees in Taiwan may perceive training that they will have an opportunity to use as constituting a good transfer design.

However, there was one important difference in the implementation of this study that could also have caused the factor structure to vary in this way. Specifically, the data were collected at the end of one or two weeks after training in this study. In contrast, the data for the original LTSI were all collected at the end (Holton et al., 2000). The differences in implementation between these two studies could have influenced the factor structures. For example, respondents who returned the instruments two weeks after training may have perceived Opportunity to Use Learning and Transfer Design as one concept, because at the two-week point, they would know whether they had been able to use their training. Those who completed the instrument at the end of training may have been able to differentiate between the two constructs. These people would have reflected on the concept of Opportunity to Use Learning based on their perceptions of what they believed would happen in their work settings, while the latter respondents would have actually experienced whether they could apply the training to their jobs. Thus, it is possible that the concepts of Transfer Design and Opportunity to Use Learning may be indistinguishable to participants two weeks after training. In addition, their recall of course activities would be biased by their experience on the job. The first author attempted to separate these two groups and examine the factor structure for each group. Unfortunately, records were not kept of which surveys were returned after two weeks after training, so the analysis could not be completed. However, it is believed that enough were returned after training to possibly have altered the factor structure.

The differences in the factor structures could also be due to translation errors. However, it is reasonable to think that the translation errors had been controlled because of the extensive translation procedures conducted. The subjective evaluation that was examined by the original author enhanced the precision of the translation because the author is the most qualified individual to know what the factors were intended to be measured in the instrument. The third-party persons who objectively evaluated the translation helped minimize both the author's and the researcher's bias. In addition, the pilot test with a group of Taiwanese individuals also helped ensure that the translation used common language in Taiwan so the readability of the instrument was enhanced. All of these

efforts led to a reduction of translation errors and increased the functional equivalence between the instruments in two languages.

Implications for HRD Research and Practice. This study successfully validated a transfer instrument for use in Taiwan and provides opportunities to compare transfer systems between Taiwan and U.S. organizations. The validated instrument is also valuable to HRD research and practice. From a research perspective, the successful validation has increased the generalizability of the LTSI in two ways. First, using the Taiwanese sample in this study expands the application of the LTSI to Taiwan and extends the cross-cultural validity of the LTSI. Second, the findings of research question 3 also suggest that the LTSI could be used in affective-related training.

Moreover, synthesizing findings of research questions 1, 2, and 4, the results point to some possible revisions in the original LTSI (the instrument authors are working on a revised version). This study found that the five low-reliability factors in the original LTSI are somewhat associated with the factors that did not emerge or continued to have reliability problems. The same evidence can be found in Yamnill (2001). This implied that the twenty-one research items are well-developed items that would improve the reliability of the instrument, and further investigation of the twenty-one research items needs to be done in English to test this assumption.

With regard to implications for practice, Taiwan's government and organizations highly value the importance of training but have not be able to respond appropriately to transfer issues. This study makes a timely contribution to HRD practice in Taiwan because it provides a valid, statistically reliable, culturally appropriate, and comprehensive instrument to organizations in Taiwan for diagnosing the strengths and weaknesses of the transfer systems. Accurate diagnosis of problems of transfer systems also creates opportunities for performance improvement. Organizations in Taiwan should shift the focus of training evaluation to higher levels (to transfer and results, for example) so training budgets can be effectively deployed. In an aggregated view, improvement of individual performance will lead to improved organizational performance and ultimately contribute to the nation's economic growth. In addition, for cross-cultural HRD practice, as globalization evolves, international business will require more and more cross-cultural training for employees. This study provides comparable measures of transfer systems that will enable organizations to cross-culturally assess transfer issues for performance improvement and avoid an ethnocentric focus.

Limitations. We acknowledge that an assumption of fully translatable languages is the major limitation of this study even if the evaluations of translation were conducted. Indeed, this assumption highlights the limitation of the forward-back translation process. Since the two languages are so different, some translation dilemmas occurred. For example, the word *perk* used in the original LTSI was translated as "nonmonetary reward." However, some problems with word choice could only be minimized and were not completely solved. For example, the words *punishment, penalty,* and *reprimand* in the

original LTSI represent three different degrees of negative consequences in English. However, to differentiate these three words clearly in Mandarin would have required more than one sentence of explanation, which was not suitable for a questionnaire. The dilemma was that if the author did not completely capture the differences among the three words in translation, then the participants' responses on the TLTSI might differ from those of the original LTSI. If the author fully captured the differences of the three words, then the items in the TLTSI might be awkward in reading because of the long sentences. Other examples such as language structure (for example, Mandarin has no tense or plural form) could also have affected the results.

One alternative in cross-cultural instrument development is to use a simultaneous instrument development approach. That is, researchers can first generate constructs of interests from both cultures. Once the constructs are identified and determined, they can then develop instruments for each language so that language limitations are eliminated. Although this approach has great potential to eliminate language issues, it also raises issues of cross-cultural comparability of results.

Self-report data, nonrandom sampling, and other types of training and organizations that were not included in this study are other limitations. However, through the purposive sampling technique, we believe that the sample collected from this study reached a level of heterogeneity that its generalizability is vastly improved over construct validation studies collecting data from a single organization, school, or training. This is supported by the characteristics of subjects collected from five different organizational types (public, private, educational, nonprofit, and public-for-profit organizations) and various training types (skill-based, knowledge-based, and affective-related training) in this study.

Future Research Directions. This study has provided an initial attempt to develop a valid transfer instrument in Taiwan by validating the LTSI. However, the development of such an instrument is not complete yet. Future research should focus on investigating the relatively low reliability scales (Learner Readiness) and the possible effect of the time delay in collecting some data, which may have led to identifying the new factor (Transferability) in the validated TLTSI. Additional factors such as personality (Tziner, Haccoun, & Kadish, 1991), relapse prevention (Burke, 1997), and culturally specific factors in Taiwan's literature and practice that have not been included in the TLTSI should also be reviewed and examined.

Additional data should be collected from affective-related training. Although the approach used in this study provides reasonable evidence that the TLTSI fits affective-related training, further research to confirm this finding with a larger sample including other affective-related training, such as emotional intelligence, would seem to be important.

Other research directions include attempting to confirm the factor structure by using confirmatory factor analysis with different samples, reducing the size

of the instrument to keep it parsimonious while retaining the factor structure and its psychometric quality, and using the TLTSI to examine transfer systems across organizations in Taiwan. A parsimonious transfer instrument will benefit Taiwan's HRD practice in two ways. It will be even more culturally appropriate because individuals tend to be reluctant to complete a long survey due to the effect of overused subjects in Taiwan. It is also more desirable for HRD professionals because the time used by the employees to complete the questionnaire is an opportunity cost of training budgets in many organizations. A more parsimonious instrument would also facilitate studies to compare transfer systems across organizations in Taiwan and establish the criterion validity of the TLTSI.

Future research in validation of the LTSI to other countries should use both validated and research items so the factors that may exist would not be inappropriately eliminated. Finally, since this study has established some comparable transfer factors, future research should conduct comparative studies between transfer systems in Taiwan and the United States.

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