

# The influence of social and organizational support on transfer of training: evidence from Thailand

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*This study focused on integrating social and organizational support as moderators into the main analysis model of the relationship between learning – specifically perceived knowledge retained – and its transfer as perceived by participants. We used hierarchical regression analysis in order to test our hypotheses. Results were generally supportive across knowledge retained and transfer. Findings further supported a hypothesized effect of knowledge retained and coworker support on transfer: higher levels of knowledge retained and coworker support increased the positive effects on higher transfer. Contrary to expectation, organizational and supervisory support did not show moderating effects. These results suggest that, in order to enhance transfer of training, organizations should focus more on creating environments that enhance coworker support, at least in the short term. However, for the longer term, organizations must improve the quality of other types of support as well in order to more effectively exploit the opportunities for training transfer.*

## Introduction

Many organizations are seriously concerned about whether they have wasted training investments because not all of the knowledge, skills and abilities (KSAs) taught in training courses transfer back to the workplace and can be put to use (Baldwin & Ford, 1988). This means that, following costly training programs, employees may not improve their behavior and performance to meet the requirements of the organization. To accomplish organizational tasks and improve employee performance, extended

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training programs including social and organizational support after training should be designed in such a way that acquired KSAs are transferred effectively to the workplace. Thus, researchers and training professionals have focused on the factors affecting the transfer of training to the workplace.

The review of Baldwin and Ford (1988) is a good starting point for an investigation of the relevant studies. They found three factors that affect transfer of training: training design, trainee characteristics and work environment. Although terminologies have varied to some extent across studies, Baldwin and Ford's classification methods continue to be utilized by recent review articles (Blume *et al.*, 2010; Burke & Hutchins, 2007).

Work environment factors are considered important for understanding the transfer process (e.g. Baldwin & Ford, 1988; Blume *et al.*, 2010; Cheng & Ho, 2001; Kirwan & Birchall, 2006; Pham *et al.*, 2012; Rouiller & Goldstein, 1993; Tracey *et al.*, 1995). Literature reviews reported inconsistent results among related studies. For instance, Cheng and Hampson (2008) noted that incoherent reasoning applied to such work environment variables as social support (e.g. supervisors, peers and subordinates) and opportunity to transfer. Cheng and Ho (2001) reviewed studies on the relationships between supports-in-organizations (including both social and organizational support in this study) and transfer outcomes and found conflicting results. Some empirical studies found that social support had an effect on transfer of training (e.g. Holton *et al.*, 2000; Olsen, 1998; Pham *et al.*, 2012; Xiao, 1996), whereas others found that a supportive environment did not have such an effect (e.g. Rouiller & Goldstein, 1993; Tziner *et al.*, 1991; Van der Klink *et al.*, 2001).

Therefore, a study of transfer of training from a more specific work environment perspective is expected to better our understanding of its process. Specifically, we will analyze the main effects of work environment variables as well as those of their interactions with learning. Blume *et al.* (2010) found main effects and compared the results for supervisor and peer support, transfer climate and organizational constraints through a meta-analysis; however, the number of studies and samples was limited. In addition, they did not investigate the interactions with learning.

Among others, social and organizational support factors have increasingly become the focus of attention within the research on transfer climate (Van den Bossche *et al.*, 2010). Several researchers have recently examined the role of supervisor and peer support in the transfer of training process (Chiaburu & Marinova, 2005; Hawley & Barnard, 2005; Lim & Morris, 2006; Nijman *et al.*, 2006; Russ-Eft, 2002). Moreover, this paper proposes to investigate the effect of another work environment factor, organizational support, on the transfer of training process.

Most research on training effectiveness in Thailand, like the present study, has focused on Kirkpatrick's levels of training, specifically levels one (reaction) and two (learning). Consequently, Thai human resources development professionals continue to make decisions based solely on reaction and learning. Little research has investigated behavior change (level three) through transfer of training, especially which factors affect it. Without understanding and measuring the effects of these factors on transfer of training, it is not possible to fully understand why transfer of training is or is not successful.

According to the arguments above, the main purpose of this study is to investigate the relationship between knowledge retained and consequent transfer in use and effectiveness with a focus on the moderating influences of social (supervisor and coworker) and organizational support. We pose the following research questions: How does trainees' learning, especially the level of knowledge retained, influence transfer of training? How do work environment factors such as social support affect the relationship between learning and transfer?

## Literature review

### Transfer of training

Kirkpatrick's four-level evaluation model has been supported for several decades as the primary conceptual framework for evaluating training effectiveness. In particular, the

distinction between learning (level two) and behavior (level three) has drawn increased attention to the importance of the learning transfer process in making training truly effective (Bates & Coyne, 2005). This study evaluated the effectiveness of the transfer of training in terms of Kirkpatrick's (1967) two levels of evaluation: learning and behavior. Level two, learning, refers to the KSAs acquired by trainees. Evaluation of learning aims at understanding trainees' comprehension of instruction, principles, ideas, knowledge and skills from training. This level of evaluation allows trainees to demonstrate their understanding of specific knowledge and/or skills within the learning program (Kirkpatrick, 1994). Level three, behavior change or transfer, refers to the extent to which a change in behavior has occurred because the trainees attended the program, and it is measured (assessed) in the workplace. This level attempts to determine whether trainees (who can apply the acquired specific knowledge and/or skills) use their new KSAs when returning to the work environment. If learned KSAs are not transferred to the job, the training effort cannot have an impact on employee or organizational effectiveness.

It is generally agreed that behavioral change will not occur without learning (Kirkpatrick, 1994). Velada *et al.* (2007) found that when trainees retain training content, they are more likely to perceive that they have transferred the training to the work context. Liebermann and Hoffmann (2008) also found learning to have a direct impact on transfer. According to Expectancy Theory (Vroom, 1964), if learners' individual motives are believed to lead to strengthened performance, they will be more motivated. Therefore, more successful learners feel that they can work better through utilizing acquired knowledge for their jobs. Based on the theoretical and literature reviews above, we hypothesized that:

*Hypothesis 1:* Learning from training has a positive relationship with transfer of training.

### **Work environment characteristics: social support**

Groups of variables affecting transfer of training were proposed by several review studies (e.g. Baldwin & Ford, 1988; Cheng & Hampson, 2008; Cheng & Ho, 2001; Colquitt *et al.*, 2000; Holton *et al.*, 2000). More specifically, trainees' perceptions of the work environment have been found to influence transfer of new KSAs to the job (e.g. Chiaburu & Marinova, 2005; Ford *et al.*, 1992; Hawley & Barnard, 2005; Lim & Morris, 2006; Nijman *et al.*, 2006; Rouiller & Goldstein, 1993; Russ-Eft, 2002; Tracey *et al.*, 1995; Tziner & Falbe, 1993). However, as Richman-Hirsch (2001) pointed out, previous studies examining the effectiveness of training transfer did not explore the potential moderating effect of work environment.

Work environment characteristics have often been referred to as the 'transfer climate', or as the factors that trainees perceive as encouraging or discouraging their use of KSAs learned in training and in the workplace (Cromwell & Kolb, 2004). Clarke (2002) indicated that, among others, social support is an important factor in the transfer climate influencing the use of training in the workplace. Many previous studies have been based on the perspective of support providers such as supervisors and coworkers, as discussed in detail below. Thus, this study investigated the effect of these two types of social support (supervisor and coworker or peer support).

#### *Supervisor support*

Supervisor support has been defined as the extent to which supervisors reinforce and support the use of learning on the job (Bates *et al.*, 1996). Examples of supervisor support include setting learning goals, helping and offering positive feedback. It has been found to be one of the work environment variables that affect the transfer process (e.g. Awoniyi *et al.*, 2002; Baldwin & Ford, 1988; Clarke, 2002; Cromwell & Kolb, 2004; Elangovan & Karakowsky, 1999; Gregoire *et al.*, 1998; Gumuseli & Ergin, 2002; Quinones *et al.*, 1995; Richman-Hirsch, 2001; Russ-Eft, 2002; Salas & Cannon-Bowers, 2001; Smith-Jentsch *et al.*, 2001; Taylor, 1992).

According to Huczynski and Lewis (1980), the majority of trainees indicated that supervisor support was a significant factor in transferring the skills they learned to the job. Campbell and Cheek (1989) maintained that, without supervisory support, the transfer of newly acquired behaviors to the worksite would be extremely difficult at best. Gregoire *et al.* (1998) also found that the supervisor's role in 'providing tangible help for workers to attend training and attempt new behaviors upon their return' (p. 12) was associated with a perceived increase in transfer of training. Frequent interaction between employees and their immediate supervisor (Zhang *et al.*, 2008) and the potential benefit in transferring tacit knowledge to employees (Collis & Winnips, 2002) are possible advantages derived from supervisor support, and may ensure effective utilization of the acquired knowledge and skill in the workplace. The process can be realized through the perception of the usefulness of supervisor support and training transfer.

As introduced above, prior research confirmed that supervisor support influences transfer of training. Yet, like other work environment variables, the potential moderating effect of supervisor support on the relationship between learning and training transfer has not been explored. Here, we would like to refer to Richman-Hirsch's (2001) study, although that study did not analyze exactly the moderation above. Richman-Hirsch indicated that perceptions of work environment moderated the effectiveness (but not the learning) of post-training interventions on transfer of training. The work environment construct she used consisted of social and organizational support aspects, whereas post-training interventions consisted of goal-setting and self-management activities. According to Richman-Hirsch's argument, trainees engaged in goal-setting are more affected by work environment than those engaged in self-management, because the former are likely to have more motivation than the latter. We will employ this reasoning to our investigation of the moderating effect of supervisor support on the relation between learning and training transfer.

Hence, we assume that trainees who learned more from a training program will display more behavior change if they received stronger supervisor support. Supervisor support will still positively affect behavior among trainees who learned less from the training program, but to a lesser degree. Therefore, we hypothesized that:

*Hypothesis 2:* Supervisor support has a positive relationship with transfer of training.

*Hypothesis 3:* Supervisor support interacts with learning so that the positive relationship with transfer is stronger for learners with high learning than those learners with low learning.

#### *Coworker support*

Empirical research on the importance of coworker support to transfer of training has increased since the mid-1990s (e.g. Bates *et al.*, 2000; Facticeau *et al.*, 1995; Holton *et al.*, 1997). Holton *et al.* (1997) and Russ-Eft (2002) define coworker support (in their term, 'peer support') in transfer climate as the extent to which coworkers support the use of learning on the job. This support could include setting learning goals, giving assistance or offering positive feedback (Hawley & Barnard, 2005).

Coworker support has been reported by several researchers as a factor that facilitates transfer. For instance, Holton *et al.* (1997) indicated that it was one of five factors with the highest correlation with transfer of training. Bates *et al.* (2000) found that coworker support was a significant predictor of learning transfer. Cromwell and Kolb (2004) also found that support of a trainee's peers is effective in the transfer process.

The knowledge transferred from peers may not be as accurate as other sources of learning (Mathis & Jackson, 2000). In addition, peers might be reluctant to share their knowledge. However, the possibility of asking for help at the time a problem occurs and its convenience (Twidale, 2005) make peer support potentially beneficial. Van der Klink *et al.* (2001) discuss the importance of peer support due to the increased use of self-directed teams in organizations. They suggest that, because of this increase, it is possible that team members in the workplace influence trainees' transfer more than supervisors do.

Although prior research confirmed the direct effect of coworker support on training transfer, no studies investigated coworker support as a moderating influence on training effectiveness by using learning and behavioral change. As with the case of supervisor support, based on our own justification and application of Richman-Hirsch's (2001) design in a similar context, we assume that trainees who learned more from training will exhibit stronger transfer of training if they received stronger coworker support. Coworker support will still positively affect transfer by trainees who learned less from the training program, but to a lesser degree. Therefore, we hypothesized that:

*Hypothesis 4:* Coworker support has a positive relationship to transfer of training.

*Hypothesis 5:* Coworker support interacts with learning so that the positive relationship with transfer is stronger for learners with high learning than those learners with low learning.

### **Work environment characteristics: organizational support**

Previous studies have remained ambiguous with regard to the influence of organizational support on training transfer, such that when employees perceive the organizational climate as supportive, they are more likely to apply their new knowledge and skills to the workplace (Baldwin & Ford, 1988; Rouiller & Goldstein, 1993; Tracey *et al.*, 1995). Organizational support theory argues that employees pay attention to treatment offered by the organization in an effort to determine the degree of their contributions to the organization. An important component of this argument is the notion that employees believe that treatment provided to them by the organization is representative of the organization's general orientation toward them (Eisenberger *et al.*, 1986). Thus, organizations provide material and socio-emotional benefits to employees in exchange for their commitment and work effort on behalf of the organization.

In terms of the moderating effect of organizational support on the relation between learning and training transfer, as with supervisor and coworker support, we would like to rely on our own justification and application of Richman-Hirsch (2001). Accordingly, we can imply that trainees who learned more from training are more likely to be affected by their organizational support level in their behavioral change. Therefore, our focus here is on organizational support as an important moderating variable on the relationship between learning and training transfer. We propose that:

*Hypothesis 6:* Organizational support has a positive relationship to transfer of training.

*Hypothesis 7:* Organizational support interacts with learning so that the positive relationship with transfer is stronger for learners with high learning than those learners with low learning.

As an extension of the main study, we provide an in-depth investigation of two types of work: blue-collar and white-collar. Because the training participants were of several occupations from different situations and organizations, we could not discount the possible confounding effect of such diversity on training transfer. Blue-collar work is typically considered to be mainly physical and routine, whereas any task that is either relatively more intellectual or creative can be defined as white-collar work (Hopp *et al.*, 2009). Consequently, this study defines blue-collar work as technical and production-related work, and white-collar work as engineering, managerial and teaching. The difference is significant, for example, in the source of the appreciation for the work done. Blue-collar workers evidently are highly self-aware of how well they do their jobs, whereas white-collar workers need outside confirmation of job worth. In this aspect, the former seem to be less influenced by social and organizational supports both in the main and moderation effects. Therefore, one might also expect that blue- and white-collar workers transfer learned knowledge and skills to the workplace differently because of their differing social and organizational supports.

**Research question:** How does social and organizational support moderate the relationship between learning and the transfer of training for white- and blue-collar workers?

## Methodology

### Conceptual framework

The conceptual framework for this study is shown in Figure 1. A focus of this study is testing transfer of training in terms of two of Kirkpatrick's (1967) levels of evaluation: learning (specifically knowledge retained) and behavior change (including both use and effectiveness of training transfer). Furthermore, we aimed to investigate social support – that is, supervisor, coworker and organizational support – as moderators in the main analysis model of the relationship between learning and training transfer. The specific hypotheses for each relationship are illustrated in Figure 1.

### Participants

The case of the present study, a skill certification system for the automotive industry in Thailand, was one of the subprograms under the Automotive Human Resource Development Program (AHRDP) and has been expected to be very significant because of its potential impact on the whole industry. AHRDP was implemented from 2006 to 2011 as the part of the Japanese Official Development Assistance program in cooperation with the Thai government and private sectors in both countries. Specifically for the skill certification system, Japanese experts from the automotive assembler Nissan initially supported knowledge transfer to local prospective examiners and trainers. They, in turn, taught the acquired skills and knowledge to employees in local firms through training and examination. Until 2011, 363 persons were certified in 16 subjects including theoretical and practical sessions. The questionnaire survey was implemented during November and December of 2012 through face-to-face interviews with 228 persons by 10 research assistants. All survey participants passed the skill certification exam after training in the subprogram; 217 provided valid responses, yielding a response rate of 59.78%.

Participants could attend multiple levels of a number of subjects of training. The subjects attended by trainees were electrical maintenance (10.2%), mechanical maintenance (9.5%) of both pneumatic circuits and apparatus device assembling and hydraulic system adjustment (8.6%), metal press work/stamping (7.9%) of both plastic injection and electronics device assembly (6.8%), ferrous casting (6.3%) of both sequence control and die/mold finishing (6.1%), milling with numerical control (5.2%), lathe with numerical control (4.8%), machining (lathe, milling) (4.3%), mechanical drawing by handwriting and mechanical assembly finishing (3.2%) and mechanical drawing by computer-aided design (2.3%). Among the sample, 98.6% were male. Regarding their age, 46.8% were between 31 and 40 years old, 47.7% were between 21

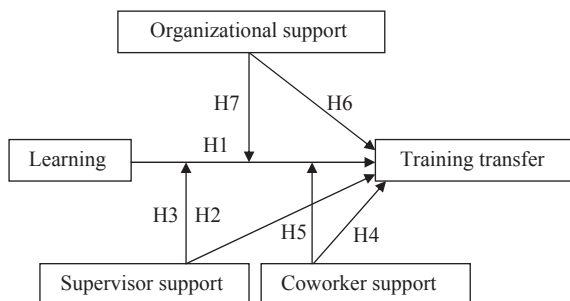


Figure 1: Conceptual framework.

and 30 years old and 11.5% were above 40 years old. As for education, 53.0% graduated from university, and 35.4% graduated from vocation school. Of the respondents, 55.5% worked for automotive assembly and automotive parts manufacturers whereas others were from universities and training intuitions such as vocational colleges; 55.3% held staff-level positions, 35.0% held supervisor-level positions and 7% held manager-level or higher positions. A total of 85 trainees were engaged in white-collar work and 132 trainees in blue-collar work.

### Procedure

A questionnaire survey was conducted by interview for training and examination participants. The questionnaire was developed for the more comprehensive study on training effectiveness. It contained questions on individual characteristics, training experiences, training effectiveness (reactions, knowledge retained, transfer, results), self-efficacy, learning motivation, motivation to transfer training and social and organizational support. Among those data, this study made use of knowledge retained, transfer, and social and organizational support.

The skill certification system for the automotive industry consists of three levels: Examiner, Trainer and Operator (that includes three levels: primary skilled, intermediate skilled and advanced skilled). We obtained the data from the participants who passed the skill certification exam after training was completed. Although some participants may attend multiple levels and subjects, this survey focuses only on the latest ones.

### Measures

Variables in this study, as well as their corresponding sources of information, are described below.

#### *Perceived knowledge retained*

This is based on the concept of learning in Kirkpatrick's model and refers to the KSAs acquired by trainees. Learning encapsulates trainees' comprehension of instruction, principles, ideas, knowledge and skills from training. It is measured in terms of retention perceived by trainees and observed sometime after immediate learning. The knowledge retained measure consisted of 16 items adopted from previous studies (e.g. Kirkpatrick & Kirkpatrick, 2006; Leach & Liu, 2003), such as 'my knowledge and skills increased as a result of this course' and 'I feel that newly learned knowledge and skills help me to do my current job better'.

#### *Perceived training transfer*

This refers to the extent to which a change in behavior has occurred in the workplace because the trainees attended the program and the ways in which it has been effective (Kirkpatrick, 1994). It consisted of 13 items adopted from previous studies (e.g. Kirkpatrick & Kirkpatrick, 2006; Leach & Liu, 2003; Velada *et al.*, 2007; Xiao, 1996), such as 'using the new knowledge and skills from training has helped me improve my work' and 'I make fewer mistakes in production when using new knowledge and skills from training'.

#### *Social and organizational support*

Social support includes supervisor and coworker support. Supervisor support has the critical task of providing reinforcement for knowledge retained on the job. Examples of supervisor support items are: 'my supervisor provides assistance when I have a problem trying out knowledge and skills' and 'my supervisor discusses how to apply knowledge and skills to job situation'. Coworker support focuses predominantly on supporting the use of knowledge retained on the job. Examples of coworker support items are 'my coworker cares about my applying new knowledge and skills on the job' and 'my coworker frequently shares work-related information/knowledge with me'.

Organizational support focuses on an organization's provision of material goods such as transportation, money, or physical assistance to employees for the purpose of supporting the transfer of training to the workplace as well as the organization's provision of training opportunities and training information for workers. Examples of organizational support items are 'my organization has a strategy plan and interest in personal and professional development of employees' and 'my organization has inefficient and inflexible workspace for teaching knowledge and skills from training to other employees'. The social and organizational support measures consisted of 25 items adopted from previous studies (e.g. Holton *et al.*, 2000; Kupritz, 2002; Xiao, 1996).

Responses for all measures were made on a five-point Likert scale (1 = disagree strongly to 5 = agree strongly).

To ensure the measures were appropriate, we performed a confirmatory factor analysis (CFA) via AMOS version 21 (IBM, Tokyo, Japan) using maximum likelihood estimation. The results from the CFA showed that all factor loadings and path coefficients were statistically insignificant, with all factor loadings above 0.50 (Hair *et al.*, 1998). The results revealed a good fit between model and data and thus support the unidimensionality of the scale. The construct reliability of all measures (knowledge retained: 0.893, transfer of training: 0.808, supervisor support: 0.783, coworker support: 0.791, organizational support: 0.663) were above 0.6, and the convergent validity of all measures (learning: 0.583, transfer of training: 0.639, supervisor support: 0.556, coworker support: 0.695, organizational support: 0.574) was above 0.5 (Zainudin, 2012). In sum, these results support the factorial validity and reliability of all measures. Therefore, we conclude that the items reliably measure the defined constructs and variables. As the measures of this study were self-reported, there is some concern about common-method variance (Podsakoff & Organ, 1986; Podsakoff *et al.*, 2003). Hence, Harman's one-factor test was implemented (Podsakoff & Organ, 1986). An un-rotated factor analysis yielded 11 factors, among which the first factor accounted for only 20.38% of the variance.

### *Analyses*

First, descriptive statistics were computed for all variables. Second, internal consistency reliability estimates and interscale correlations by Pearson product-moment were calculated. Finally, we used hierarchical regression procedures to support our hypotheses. These analyses were performed with SPSS 19.0 (IBM, Tokyo, Japan).

## **Results**

Means, standard deviations and correlations among all measurements are reported in Table 1. Hierarchical regression analyses were performed to examine the effects of each type of social support as a moderating variable on the relationship between knowledge retained and transfer of training. Control variables, age, education background and position were entered first, knowledge retained and each type of social support second, and interaction terms last. Collectively, only educational background as a control variable accounted for significant variance in transfer of training (see Table 2). Regression results in Table 2 illustrate that the effect of knowledge retained on transfer of training was positive and statistically significant, as predicted by Hypothesis 1.

We used Model 1 to test Hypotheses 2 and 3, which predicted the direct effect from supervisor support on transfer of training and its moderating effect on the relationship between knowledge retained and transfer of training. The results found that supervisor support was not a significant predictor of transfer of training and did not moderate the relationship between knowledge retained and transfer. Thus, Hypotheses 2 and 3 were not supported (see step 3 of Model 1 in Table 2).

Next, we found that coworker support had a significant and positive effect on transfer of training (see step 3 in Model 2). Therefore, Hypothesis 4 was supported. Furthermore, the results of the moderated regression analyses in step 3 of Model 2 also indicated that coworker support had a significant and positive effect on the relationship between knowledge retained and transfer (see Table 2). These interactive effects

Table 1: Means, standard deviations and intercorrelations of variables (N = 217)

| Variables                 | M      | SD    | 1        | 2        | 3      | 4       | 5       | 6       | 7     |
|---------------------------|--------|-------|----------|----------|--------|---------|---------|---------|-------|
| 1. Age                    | 34.250 | 6.066 |          |          |        |         |         |         |       |
| 2. Education background   | 14.673 | 2.219 | 0.283**  |          |        |         |         |         |       |
| 3. Position               | —      | —     | -0.330** | -0.325** |        |         |         |         |       |
| 4. Learning               | 4.100  | 0.319 | 0.086    | 0.036    | -0.014 |         |         |         |       |
| 5. Supervisor support     | 4.066  | 0.294 | 0.021    | 0.041    | 0.053  | 0.253** |         |         |       |
| 6. Coworker support       | 3.962  | 0.374 | 0.040    | 0.027    | -0.009 | 0.136*  | 0.244** |         |       |
| 7. Organizational support | 4.020  | 0.388 | 0.222**  | -0.025   | 0.090  | 0.150*  | 0.296** | 0.203** |       |
| 8. Training transfer      | 4.070  | 0.341 | -0.001   | 0.181**  | -0.079 | 0.344** | 0.198** | 0.165*  | 0.025 |

\*  $p < 0.05$ .

\*\*  $p < 0.01$ .

Note: Education background is the number of years of studies.

Table 2: Results of hierarchical regression analysis, examining the moderating effect of social and organizational support on the relationship between learning and transfer

| Predictors                        | Training transfer (N = 217) |           |           |
|-----------------------------------|-----------------------------|-----------|-----------|
|                                   | Step 1                      | Step 2    | Step 3    |
| <b>Model 1</b>                    |                             |           |           |
| Age                               | -0.067                      | -0.098    | -0.099    |
| Educational background            | 0.187*                      | 0.175*    | 0.174*    |
| Position                          | -0.041                      | -0.057    | -0.057    |
| Learning                          |                             | 0.317***  | 0.316***  |
| Supervisor support                |                             | 0.116     | 0.116     |
| Learning × supervisor support     |                             |           | 0.004     |
| R <sup>2</sup>                    | 0.037                       | 0.168     | 0.168     |
| Adjusted R <sup>2</sup>           | 0.024                       | 0.149     | 0.144     |
| R <sup>2</sup> change             | 0.037*                      | 0.131***  | 0.000     |
| F change                          | 2.748*                      | 16.615*** | 0.004     |
| <b>Model 2</b>                    |                             |           |           |
| Age                               | -0.067                      | -0.101    | -0.103    |
| Educational background            | 0.187*                      | 0.179**   | 0.149*    |
| Position                          | -0.041                      | -0.049    | -0.074    |
| Learning                          |                             | 0.330***  | 0.290***  |
| Coworker support                  |                             | 0.119     | 0.144*    |
| Learning × Coworker support       |                             |           | 0.254***  |
| R <sup>2</sup>                    | 0.037                       | 0.170     | 0.231     |
| Adjusted R <sup>2</sup>           | 0.024                       | 0.150     | 0.209     |
| R <sup>2</sup> change             | 0.037*                      | 0.132***  | 0.062***  |
| F change                          | 2.748*                      | 16.808*** | 16.833*** |
| <b>Model 3</b>                    |                             |           |           |
| Age                               | -0.067                      | -0.099    | -0.098    |
| Educational background            | 0.187*                      | 0.181**   | 0.175*    |
| Position                          | -0.041                      | -0.048    | -0.049    |
| Learning                          |                             | 0.345***  | 0.336***  |
| Organizational support            |                             | 0.004     | -0.006    |
| Learning × Organizational support |                             |           | 0.047     |
| R <sup>2</sup>                    | 0.037                       | 0.156     | 0.158     |
| Adjusted R <sup>2</sup>           | 0.024                       | 0.136     | 0.134     |
| R <sup>2</sup> change             | 0.037*                      | 0.119***  | 0.002     |
| F change                          | 2.748*                      | 14.811*** | 0.477     |

\*  $p < 0.05$ .

\*\*  $p < 0.01$ .

\*\*\*  $p < 0.001$ .

are displayed in Figure 2. The slopes (betas) for high and low coworker support cases were found to be different. Specifically, the former had a steeper slope than the latter, meaning that in the case of high coworker support, the difference in the level of training transfer between low and high learning is larger than in the case of low coworker support. Thus, the result supported Hypothesis 5.

Finally, Hypotheses 6 (that organizational support has a positive relationship with transfer of training) and 7 (that organizational support will moderate the relationship between knowledge retained and transfer) were not supported by our results (see Model 3 in Table 2).

The results of an in-depth investigation by hierarchical regression analyses showed similar results with aggregate analysis. For both blue- and white-collar workers,

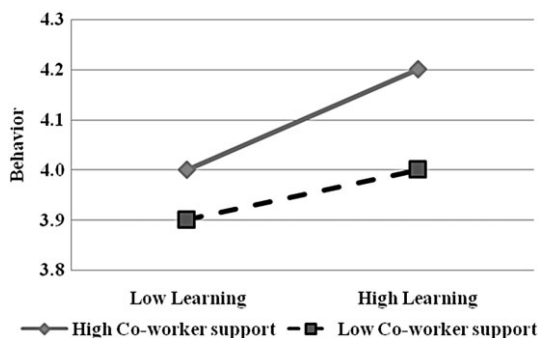


Figure 2: Moderating effect of coworker support on the relationship between learning and transfer.

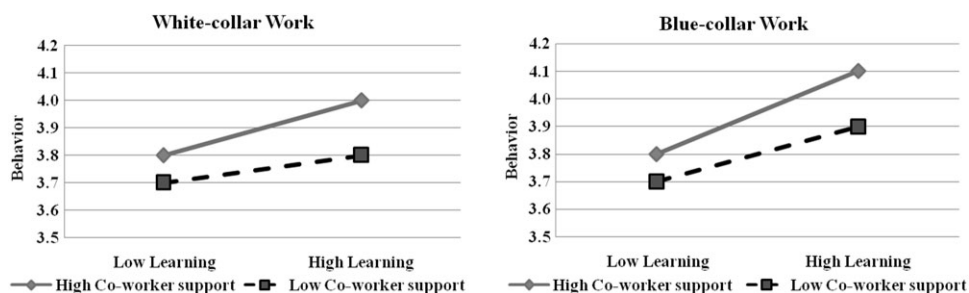


Figure 3: Moderating effect of coworker support on the relationship between learning and transfer by white-collar and blue-collar work.

knowledge retained was positively predictive of training transfer. Coworker support as a moderating variable had a positive effect on the relationship between knowledge retained and transfer (see Model 2 in Table 3 and Figure 3).

## Discussion

We now turn to a discussion of our results. First, the study found that knowledge retained from training had a positive relationship with training transfer. This is consistent with prior research on the evaluation of training transfer (Baldwin & Ford, 1988; Liebermann & Hoffmann, 2008; Lim & Johnson, 2002; Maister, 2008; Velada *et al.*, 2007) and supports Kirkpatrick's (1967) original suppositions that behavioral change will not occur without learning.

Second, only coworker support was significant positively related to transfer of training. This finding is consistent with prior research on the relative importance of coworker or peer support in transfer of training (e.g. Bates *et al.*, 2000; Facticeau *et al.*, 1995; Holton *et al.*, 1997). Additionally, a significant moderating effect of coworker support was found on the relationship between knowledge retained and transfer. Our results demonstrate that when trainees retained knowledge successfully and had high coworker support, they displayed more behavioral change on the job. In recent years, empirical research on the importance of coworker support regarding transfer of training has increased with further evidence provided by the findings of many studies. Coworker support is important because of organizations' increased use of self-directed teams. Van der Klink *et al.* (2001) suggest that, because of this increase, it is possible that team members in the workplace might influence trainees' transfer more than supervisors do. We may expect this result, because tasks in automotive industry firms are likely to be team-based and relatively discretionary on a daily basis.

Table 3: Results of hierarchical regression analysis, examining the moderating effect of social and organizational support on the relationship between learning and transfer by two types of work

| Predictors                        | Training transfer          |          |          |                            |           |           |
|-----------------------------------|----------------------------|----------|----------|----------------------------|-----------|-----------|
|                                   | White-collar work (N = 85) |          |          | Blue-collar work (N = 132) |           |           |
|                                   | Step 1                     | Step 2   | Step 3   | Step 1                     | Step 2    | Step 3    |
| <b>Model 1</b>                    |                            |          |          |                            |           |           |
| Age                               | -0.110                     | -0.175   | -0.176   | -0.014                     | -0.005    | -0.013    |
| Educational background            | 0.152                      | 0.180    | 0.182    | 0.247*                     | 0.208*    | 0.213*    |
| Position                          | -0.124                     | -0.131   | -0.127   | -0.086                     | 0.073     | 0.071     |
| Learning                          |                            | 0.329**  | 0.332**  |                            | 0.321***  | 0.304***  |
| Supervisor support                |                            | 0.177    | 0.174    |                            | 0.027     | 0.016     |
| Learning × supervisor support     |                            |          | -0.020   |                            |           | 0.072     |
| R <sup>2</sup>                    | 0.043                      | 0.222    | 0.222    | 0.049                      | 0.154     | 0.159     |
| Adjusted R <sup>2</sup>           | 0.008                      | 0.173    | 0.163    | 0.027                      | 0.121     | 0.119     |
| R <sup>2</sup> change             | 0.043                      | 0.179*** | 0.000    | 0.049                      | 0.105***  | 0.005     |
| F change                          | 1.221                      | 9.081*** | 0.037    | 2.206                      | 7.829***  | 0.695     |
| <b>Model 2</b>                    |                            |          |          |                            |           |           |
| Age                               | -0.110                     | -0.208   | -0.186   | -0.014                     | -0.018    | -0.050    |
| Educational background            | 0.152                      | 0.213    | 0.199    | 0.247*                     | 0.207*    | 0.185*    |
| Position                          | -0.124                     | -0.127   | -0.151   | -0.086                     | 0.048     | 0.033     |
| Learning                          |                            | 0.402*** | 0.371*** |                            | 0.310***  | 0.250***  |
| Coworker support                  |                            | 0.011    | 0.054    |                            | 0.178*    | 0.181*    |
| Learning × Coworker support       |                            |          | 0.208*   |                            |           | 0.289***  |
| R <sup>2</sup>                    | 0.043                      | 0.197    | 0.237    | 0.049                      | 0.184     | 0.263     |
| Adjusted R <sup>2</sup>           | 0.008                      | 0.146    | 0.178    | 0.027                      | 0.152     | 0.227     |
| R <sup>2</sup> change             | 0.043                      | 0.153*** | 0.040*   | 0.049                      | 0.135***  | 0.078***  |
| F change                          | 1.221                      | 7.541*** | 4.079*   | 2.206                      | 10.440*** | 13.307*** |
| <b>Model 3</b>                    |                            |          |          |                            |           |           |
| Age                               | -0.110                     | -0.219   | -0.219   | -0.014                     | 0.017     | 0.021     |
| Educational background            | 0.152                      | 0.209    | 0.209    | 0.247*                     | 0.206*    | 0.197*    |
| Position                          | -0.124                     | -0.147   | -0.148   | -0.086                     | 0.080     | 0.088     |
| Learning                          |                            | 0.393*** | 0.392*** |                            | 0.331***  | 0.302***  |
| Organizational support            |                            | 0.061    | 0.060    |                            | -0.052    | -0.081    |
| Learning × organizational support |                            |          | 0.005    |                            |           | 0.112     |
| R <sup>2</sup>                    | 0.043                      | 0.200    | 0.200    | 0.049                      | 0.156     | 0.166     |
| Adjusted R <sup>2</sup>           | 0.008                      | 0.149    | 0.138    | 0.027                      | 0.122     | 0.126     |
| R <sup>2</sup> change             | 0.043                      | 0.158*** | 0.000    | 0.049                      | 0.107***  | 0.010     |
| F change                          | 1.221                      | 7.723*** | 0.002    | 2.206                      | 7.973***  | 1.568     |

\*  $p < 0.05$ .

\*\*  $p < 0.01$ .

\*\*\*  $p < 0.001$ .

However, no significant relationships were found between (1) supervisor support and transfer of training, or (2) organizational support and transfer of training. These results are in contrast with previous research (Baldwin & Ford, 1988; Clarke, 2002; Cromwell & Kolb, 2004; Elangovan & Karakowsky, 1999; Gregoire *et al.*, 1998; Quinones *et al.*, 1995; Richman-Hirsch, 2001; Russ-Eft, 2002; Salas & Cannon-Bowers,

2001; Smith-Jentsch *et al.*, 2001; Taylor, 1992). Furthermore, supervisor and organizational support did not moderate the relationship between knowledge retained and transfer. Indeed, some studies found supervisor support was unrelated to skill transfer (Facteau *et al.*, 1995; Russell *et al.*, 1985; Van der Klink *et al.*, 2001). Holton *et al.* (2003) contended that the cultural variations across organizations may disturb the impact of different types of supports on transfer outcomes. They explained that an organization with a strong team culture made peer support a more significant predictor of learning transfer than supervisor support.

### Limitations and future research

This study has several limitations. First, we measured training transfer and other relevant variables only after course completion, from the single source and from the treatment group. To make the measurement reliable and valid, evaluations of behavioral change and its effectiveness require its systematic appraisal both before and after course completion. Further, where possible, these appraisals should be performed by multiple sources, including the individual receiving the training and his or her superior(s), subordinates and peers. In addition, where feasible, such evaluations should also include a control or comparison group that has not received the training (Ban & Faerman, 1990).

The second limitation is the different period over which transfer outcomes were measured. This is because our study investigated post-training transfers once after the end of the whole program (in 2012), while training in this program started at different times. In fact, participants were asked about knowledge retained and its use and effectiveness as well as social and organizational support by recalling the situation 6 months after training. Previous studies have measured transfer at different times such as 1, 3 and 6 months after training. Although it is not clear what the best period is for measuring transfer following training, a good strategy is probably to include both short- and long-term measures (Gaudine & Saks, 2004).

Third, this study relied on self-assessment measures, which may have caused some common-method variance problems that may inflate observed relationships between variables. Future studies may consider using a research design in which multiple sources of data collection are used, such as direct supervisors. Finally, regarding the gender representation of the sample, the small number of female participants may limit the generalizability of the findings for both genders.

Future studies should also examine the multidimensional factors including training design, trainee characteristics and work environment as they influence the transfer of training process. Researchers should identify when and why certain variables become converged or distinct under what transfer situation.

### Research and practical implications

Based on analytical results and interpretations, we were able to understand the relationship between knowledge retained and transfer. Additionally, as an academic contribution of the present study, we were able to understand the moderating influence of social support on the relationship between knowledge retained and transfer. Consequently, as research implications, we suggest that future research should focus more on moderating effects on training transfer process by other relevant factors, such as motivation to transfer and self-efficacy of transfer.

In terms of training transfer in the workplace, the results suggested that coworker rather than supervisor support should be emphasized to enhance transfer of learning under current conditions. HRD practitioners should be supporting infrastructures that can be used to further enhance coworker learning. For example, chat room discussions could be utilized to improve training transfer. These discussions could be used to share training ideas and training goals, to discuss barriers to transfer, and to provide positive reinforcement. Although the skill certification system is designed for the automotive industry, we have a variety of occupations for skill certification. If, following training,

trainees are able to develop a peer networking or learning system from different organizations for sharing knowledge and skills, it may be potentially beneficial to each organization.

However, for the longer term, organizations must improve the quality of other types of social supports as well to exploit the opportunities for transfer of training more effectively. In other words, trainees should feel that they will receive the support and feedback necessary regarding their performance from the organization and supervisor in order to effectively transfer the training. As implied by the analytical results, under the current conditions, we cannot expect that more provision of supervisor and organizational supports will affect training transfer both independently and in combination with more knowledge retained. Hence, efforts have to be made to improve the quality of those supports.

## Conclusions

This study contributes to our understanding of transfer of training, especially by investigating the moderating effect of social support. Results supported a hypothesized effect of knowledge retained and coworker support on transfer; higher levels of knowledge retained and coworker support increased training transfer. These results suggest that, in order to enhance training transfer, organizations should focus more on creating environments that enhance coworker support specifically than on supervisor and organizational support, at least in the short term. However, for the longer term, organizations must improve the quality of other types of social support as well to exploit the opportunities for transfer of training more effectively.

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