Exploring Differential Effects of 
Supervisor Support on Transfer of Training

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Introduction

Positive transfer of training concerns the effective and continuing application, by trainees to their jobs, of the knowledge and skills gained in training (Broad & Newstrom, 1992). Transfer of training should thus be considered essential for training programmes to be effective and efficient, and intended return on investments in training programmes will only be achieved to the extent that training is transferred. Research on the actual extent of transfer of training programmes is still relatively scarce, but, despite its importance, the little available results in general indicate transfer to be slight and below expectations (e.g. Brinkerhoff and Gill, 1994). Employees only seem to use knowledge, skills and attitudes from corporate training programmes to a very limited extent at their workplaces. It has often been argued that the workplace itself could be a major force in hindering or enhancing transfer (e.g. Rouiller & Goldstein, 1993), and especially managers and supervisors might play a crucial role in the achievement of transfer of training. Support from supervisors has therefore been suggested to be one of the most powerful tools of enhancing transfer of training (e.g. Baldwin and Ford 1988; Elangovan and Karakowsky 1999). This supposed importance stems both from notions of the effects of social support in general and from the works of industrial and organisational psychologists, who indicated supervisors to be among the most significant sources of feedback for employees on their performance (Van der Klink et al., 2001). Feedback is indeed often considered a part of supervisor support, in addition to, for example, the encouragement of trainees, assisting trainees in identifying suitable situations in which to use new knowledge, skills and attitudes, and guiding trainees in applying these (Elangovan & Karakowsky, 1999). The supervisor is mostly believed to affect transfer outcomes directly, or indirectly by means of the trainees’ motivation to transfer or different factors in the transfer climate (e.g. Cromwell & Kolb, 2002).

In contrast to the small amount of studies on the levels of transfer of training, several studies have been conducted on the relationship between supervisor support and transfer of training. A lot of their results indicate a positive relationship. Xiao (1996), for example, conducted a quantitative survey among women working in production groups in electronics manufacturing companies. Transfer outcomes consisted of a decrease in scrap rates after taking part in a training programme, and the results of the study show that the extent of supervision is the most important positive predictor of these transfer outcomes. Brinkerhoff and Montesino (1995) examined the transfer outcomes of some training programmes on behavioural skills, differing between trainees who received experimentally-controlled support from supervisors and trainees who did not receive specific supervisor support. Trainees in the experimental group not only achieved higher transfer outcomes, but also mentioned fewer transfer-inhibiting and more transfer-facilitating factors in their work environment. The results of a qualitative study by Lim and Johnson (2002) indicate that the most important work environment factors affecting transfer of training are considered to be a discussion with the supervisor on the use of new learning, the supervisor’s involvement or familiarity with the training and positive feedback from the supervisor. These findings, as well as similar positive

direct effects described by other researchers (e.g. Cromwell and Kolb 2004; Gumuseli and Ergin 2002; Kontoghiorghes 1998) have led to a widespread agreement on the positive effects of supervisor support on transfer of training. However, empirical research does not unambiguously confirm this positive relationship (Van der Klink et al. 2001). Branderhorst (1994), for example, carried out an experimental study among trainees in an oil company. While trainees in the experimental group received guided support from their supervisors before, during and after training, the results of her study show no difference in transfer outcomes between the experimental and the control group. Hastings et al. (1995) examined transfer outcomes of a training programme for interviewers in a state agency, by using questionnaires. No separate direct effect of supervisor support was found, although they did find a positive effect of supervisor support when controlling for trainees’ age. A study by Fitzgerald (2002; Fitzgerald and Kehrhahn 2003) points at a rather large but non-significant negative correlation between supervisor support and transfer outcomes, which Fitzgerald relates to the autonomous and less cohesive work environment of the trainees. These results thus indicate that the supposed positive direct relationship between supervisor support and transfer outcomes is not simply confirmed. Empirical results of research on the relationship between supervisor support and transfer outcomes provide no clear picture of this relationship, with some results even being contradictory.

An interesting point with regard to the effects of supervisor support on transfer outcomes is demonstrated by results of a study by Facteau et al. (1995). Including trainees’ pre-training motivation and trainees’ transfer outcomes as dependent variables, the results show a positive correlation between supervisor support and transfer outcomes, but the regression analysis indicates supervisor support to lead to a decrease in transfer outcomes. While supervisor support does have a positive effect on motivation to learn, it is suggested that its positive effect on transfer outcomes is merely indirect, by means of motivation to learn. In other words, the relationship between supervisor support and transfer outcomes in this study depends at least partly on trainees’ motivation to learn. This implies that the effects of supervisor support on transfer outcomes might not only be direct, thus irrespective of other transfer-influencing factors, but also indirect, in which case supervisor support affects transfer outcomes by means of its effect on one or more other variables (Nijman 2004). Whereas research so far has focussed mainly on the direct effects of supervisor support the studies by, some studies thus stress the importance of examining transfer and transfer-influencing factors from a larger and more comprehensive systemic point of view. Such a systemic point of view has recently been referred to as the transfer system, defined as “all factors in the person, training, and organization that influence transfer of learning to job performance” (Holton et al. 2000: 335). A transfer system reflects all factors that are related to trainees’ transfer of training, and provides insight into the possible interrelatedness and interaction between these factors, and into their specific constellation. Several researchers emphasise the importance of approaching transfer from a systemic point of view, instead of examining separate relationships without taking other factors into account (e.g. Fitzgerald & Kehrhahn, 2003; Salas & Cannon-Bowers, 2001). Thus, in order to examine the effects of possible transfer-influencing factors, such as supervisor support, it is believed necessary to take into account the influence and possible interdependence of other work environment, trainee and training characteristics (see Baldwin and Ford 1988).

**Purpose of the Study**

The study described in this article was part of a larger research project on the relationship between supervisor support and transfer of training. This first study focussed on examining the
relationship between general supervisor support and transfer outcomes, whereas a second study aimed at examining effects of different types and times of supervisor support. The purpose of the study described here was to gain more insight into the relationship between general supervisor support and transfer outcomes, by examining this relationship within a larger systemic framework of the transfer process. The research question that guided this study was therefore formulated as:

*What is the effect of supervisor support on trainees’ transfer outcomes, when taking into account the influence of other factors within a systemic model of the transfer process?*

**Methodology of the Study**

*Developing a systemic approach of the Transfer Process*

Although recent research is limited in providing a holistic and systemic approach of the transfer process, a significant amount of research has been carried out on the separate factors that promote and/or inhibit transfer. Results of these studies provide insight into the different components that will most probably also affect transfer when examining it in a larger transfer system. A review of research on transfer was therefore conducted to identify factors that have been empirically shown to affect transfer outcomes, or for which influence strong indications exist. The complete review has been described in Nijman (2004), this article only discusses the factors that have been selected and included in the final (general) model. In compliance with a general distinction made by Baldwin and Ford (1988) and others, this discussion will respectively focus on characteristics of trainees, characteristics of the training programme, and characteristics of the work environment.

*Trainee Characteristics*

It has been argued that characteristics of trainees actually account for most of the variability in training transfer (Van der Klink et al., 2001). The extent to which these characteristics are believed to inhibit or enhance transfer has been referred to as trainees’ trainability (Noe, 1986), consisting of trainees’ ability, their motivation and their perceptions of the work environment. Trainability thus implies that transfer will only take place to the extent that trainees are able and willing to use new knowledge and skills on the job (see also Van der Klink et al., 2001), and to the extent that the work environment is perceived to favour transfer. Trainee characteristics are separated from work environment characteristics in this study, however, thus considering ability, motivation and personality possible important categories of trainee characteristics regarding training effectiveness in general (e.g. Baldwin & Ford, 1988; Colquitt et al., 2000). The review with regard to factors affecting specifically transfer led to the inclusion of trainees’ motivation to transfer and their perception of intervention fulfilment. With regard to training effectiveness, motivation is assumed to affect trainees’ enthusiasm for training (energising), the direction of participants to learn and master training (directing), and the use of knowledge and skills on the job (maintenance) (Noe, 1986). *Motivation to transfer* can be described as the trainee’s desire to use on the job the knowledge and skills that have been learned in a training programme (e.g. Axtell et al., 1997; Noe, 1986). Motivation to transfer is believed to be affected by, for example, trainees’ perceptions of the relevance of training and their perceptions of opportunities to use learning on the job (Foxon, 1997). Research on the effects of motivation to transfer on transfer is limited (Naquin & Holton, 2001), but a study by Axtell et al. (1997) indicates motivation to transfer to be a key variable
in predicting the levels of transfer that trainees felt they had achieved after training participation.

**Intervention fulfilment** refers to the extent to which training has met trainees’ expectations and job-related needs, and is expected to relate positively to training effectiveness (Holton, 1996). Trainees who perceive training to be relevant and important are more likely (motivated) to transfer new knowledge and skills than others (Elangovan & Karakowsky, 1999). A study of recruits in a military socialisation training programme shows training fulfilment to be a strong predictor of general training motivation (Tannenbaum et al., 1991). In their study, Axtell et al. (1997) show no relation between the perceived (post-training) relevance of training and trainees’ motivation to transfer, but their results do indicate that both have a significant direct effect on transfer of training. The results of research by Seyler, Holton, Bates, Burnett and Carvalho (1998) point to possible mediating effects of trainees’ attitudes and reactions to training, in the relationship between trainees’ organisational commitment and their motivation to transfer.

**Training Design Characteristics**

The specific design and delivery of training programmes are believed to have significant influence on trainees’ learning and transfer outcomes, and several specific training characteristics have been proposed as affecting training effectiveness. Examples of such characteristics are providing attentional advice and metacognitive instruction to trainees (e.g. Cannon-Bowers, Rhodenizer, Salas, & Bowers, 1998; Foster & Hoff Macan, 2002) and incorporating error-based learning in training (e.g. Heimbeck, Frese, Sonnentag, & Keith, 2003; Russ-Eft, 2002), but empirical evidence is mostly lacking. Describing them as transfer-enhancing activities, Machin and Fogarty (2003) indicate the presence of empirical evidence, however, for the influence of identical elements, general principles, varied practice, overlearning, relapse prevention, goal-setting, self-management cues and management support. Management support was considered part of the work environment in this study, while self-management cues overlap with both relapse prevention and goal-setting. This study therefore includes identical elements, general principles, varied practice, overlearning, relapse prevention and goal-setting as training characteristics that are believed to affect transfer of training.

The concept of **identical elements** refers to the notion of the effects of the correspondence between a training and an application setting (e.g. Baldwin & Ford, 1988; Tuomi-Gröhn & Engeström, 2003), assuming that the presence of (perceived) similar stimulus and response elements in both settings maximises positive transfer of training (Wexley & Baldwin, 1986). Baldwin and Ford (1988, p. 66) indicate that empirical results support the use of identical elements with regard to transfer, while Machin and Fogarty (2003) indicate a positive relationship between the perceived similarity of training and job setting on one hand, and trainees’ intention to transfer on the other.

The extent to which trainees are being taught **general principles**, instead of - or along with - the acquisition of applicable skills, is a second training characteristic that is believed to enhance transfer (Baldwin & Ford, 1988). The notion of the importance of general underlying principles stems from the idea that trainees’ ability to use new knowledge, skills and attitudes in a work setting is improved by teaching them the general rules and theoretical principles that underlie the training content (see e.g. Tuomi-Gröhn & Engeström, 2003). It is assumed that such abstract rules or schemata facilitate transfer, especially when the learning and transfer situation is superficially dissimilar (Gick & Holyoak, 1987). Empirical results have shown that trainees who perceive to have learned general principles regarding the content of training also perceive to have attained better learning outcomes, as well as that they show greater intentions to transfer what has been learned (Machin & Fogarty, 2003).
**Varied Practice** refers to learning new knowledge or skills under a variety of conditions and using a variety of examples during training (Machin & Fogarty, 2003). Related to the learning of general underlying principles and consequent schema development, it is believed that varying tasks during practice in training may be more useful for enhancing transfer and generalisation than mere repetition of the same task (Foster & Hoff Macan, 2002). In contrast to massed practice, an example of varying practice in training is to insert periods of rest or no practice for trainees, which is referred to as spaced practice (e.g. Russ-Eft, 2002). A meta-analysis of the effects of spaced vs. massed practice indicates that spaced practice leads to better post-training performance than massed practice (Donovan & Radosevich, 1999).

**Overlearning** refers to “deliberate training and practice beyond a set criterion performance” (Russ-Eft, 2002, p. 54), and consists of continuing practice beyond a first successful attempt of mastering training content (Machin & Fogarty, 2003). Learning and practising beyond this point will lead to a greater amount of information being learned and retained, next to possibilities to provide further feedback on the correctness of the response (Driskell, Willis, & Copper, 1992). The meta-analysis by Driskell et al. (1992) indicates overlearning to lead to a moderate improvement in training retention, in which the retention interval refers to the number of days after training. Their results also indicate that the greater the degree of overlearning, the greater its effect on retention.

**Relapse prevention** reflects a self-management technique for individuals to become aware of environmental and intrapersonal threats to skill maintenance, in order to anticipate and recover from possible lapses into ‘old’ behaviour and prevent these in the future (Burke & Baldwin, 1999). Research shows relapse prevention to correlate with learning outcomes and motivation (intention) to transfer (Machin & Fogarty, 2003), and increased use of transfer strategies (Tziner et al., 1991).

**Goal-setting**, finally, refers to the setting of goals with regard to the implementation of new knowledge, skills and attitudes on the job (Werner, O'Leary-Kelly, Baldwin, & Wexley, 1994). Werner et al. (1994) show that the setting of goals by undergraduate university students taking part in a training programme on assertiveness skills led to a better retention of learning outcomes, as well as to partially better transfer. Wexley and Baldwin (1986) differentiate between assigned and participatory goal-setting, but show that both lead to higher levels of self-reported maintenance of behaviour after training.

**Work Environment Characteristics**

Regarding the connection between the work environment and training effectiveness, Richey (1992) distinguishes three levels of related (work) environmental factors: general environmental factors, factors generally related to training and factors specifically related to training. These are assumed to be interrelated, as the general environment to a certain extent controls and determines the factors generally related to training, while these factors, in their turn, affect the factors specifically related to training. Comparably, Holton et al. (2000) argue that the transfer climate is to be seen as a mediating variable in the relationship between the organisational context and an individual’s job attitudes and work behaviour. Following Holton et al. (2000), it was assumed in this study that the influence of the work environment on transfer can be conceptually divided into general characteristics of the work environment which are relatively consistent, and characteristics of the work environment which have specific importance with regard to transfer of training and which are referred to as the transfer climate. Supervisor support was considered a third separate component of the work environment in this study, next to the general work environment and the transfer climate.
**General Work Environment**

Several characteristics of the workplace have been suggested to affect transfer, such as, for example, budget restrictions and a lack of coordination between different organisational departments (Lim & Johnson, 2002). Most of these variables have barely been studied, however. Empirical evidence does provide indications of the importance of trainees’ *job autonomy*, which refers to the degree to which the job provides substantial freedom, independence and discretion to the employee in scheduling his or her work and in determining the procedures to be used in carrying it out (Robbins, 2001). Axtell et al. (1997) note that trainees who have more control over their work are more capable of avoiding and overcoming obstacles to transfer. Consequently, trainees who work in more autonomous work environments are expected to attain better training outcomes. Results indeed indicate the extent of job autonomy to enhance long-term transfer (Axtell et al., 1997), as well as that trainees in an autonomous job context have been shown to rely less on climate factors - such as supervisor support - in their decision to transfer training, and might thus be expected to be more motivated to do so (Fitzgerald & Kehrhahn, 2003). Job autonomy was included as the only variable reflecting the general work environment in this study.

**Transfer Climate**

The transfer climate refers to (perceived) characteristics of the work environment that may facilitate or inhibit the use of trained skills (Burke & Baldwin, 1999), differing from the general work environment in that it is specifically and intentionally directed at the transfer of training. Research on different components of the transfer climate has roughly resulted in seven constructs: supervisor support, opportunity to use, peer support, supervisor sanctions, personal outcomes-positive, personal outcomes-negative, and resistance to change (Rouiller & Goldstein, 1993; Holton, Bates, Seyler & Carvalho, 1997; Holton et al., 2000). These are more or less included in most studies on the transfer climate (e.g. Colquitt, LePine, & Noe, 2000; Donovan, Hannigan, & Crowe, 2001), and have therefore also been included in this study. Supervisor support will be discussed separately in the next section.

The extent to which trainees have (and perceive to have) sufficient time and resources available determines the extent to which training content will be used or constrained on the job (Noe, 1986; Russ-Eft, 2002). These *opportunities to use* training on the job have been defined as “the extent to which a trainee is provided with or actively obtains work experiences relevant to the tasks for which he or she was trained” (Ford et al., 1992, p. 512). Ford et al. (1992) note that the concept of opportunities to use can be regarded as a multidimensional one, suggesting a differentiation between the breadth of the tasks to be performed, the activity level of performance - i.e. the number of tasks - and the type of tasks to be performed. Results of a qualitative study among Korean HRD professionals indicate perceived opportunities to use of great importance to transfer (Lim & Johnson, 2002), and Hoekstra (1998), for example, found the use of new meeting skills after training to depend significantly on the number of meetings attended. Seyler et al (1998) show that the perceived opportunities to use enhance trainees’ motivation to transfer, while Mathieu, Tannenbaum and Salas (1992) point out that situational constraints at the workplace have a marginally negative effect on trainees’ training motivation.

In this study, *peer support* reflects the extent to which peers behave in a way that optimises the trainees’ use of learning on the job. Peer support is believed to affect transfer of training as well as trainees’ motivation for training and transfer (Noe, 1986), and, in addition, peer support might also affect other characteristics of the transfer climate and work environment (Russ-Eft, 2002). Indeed, research has shown support from peers to positively predict perceived transfer (Facteau et al., 1995) and trainees’ motivation to transfer (Seyler, Holton, Bates, Burnett and Carvalho, 1998). Perceived workgroup support, in terms of a supportive
atmosphere and assistance from co-workers, has also been shown to predict the perceived opportunities to use new knowledge, skills and attitudes (Quiñones, Ford, Sego and Smith, 1995).

The (expected) consequences of the use of training on the job are believed to have a major effect on this transfer, if only by means of trainee motivation (e.g. Noe, 1986). Holton et al. (1997) label the positive consequences of training transfer as **Personal Outcomes-Positive** and define these as “the degree to which application of training on the job leads to positive outcomes or payoffs for the individual” (p. 110). Examples of such positive outcomes include rises in salary and career development (Holton et al., 1997) and higher performance evaluations (Facteau et al., 1995). Results of a Chinese study show verbal praise and promotion chances to moderately increase transfer outcomes (Xiao, 1996), while a study of transfer by MBA graduates indicates that transfer rewards enhance the trainees’ motivation to learn (Cheng, 2000). Cohen (1990) notes that trainees who perceive their supervisors to be supportive also believe that knowledge and skills from training will help them perform on the job and obtain salary increases, thus suggesting a positive connection between supervisor support, the positive outcomes of training, and transfer.

Another factor that possibly enhances transfer concerns the negative consequences that trainees might experience when not using new knowledge, skills and attitudes on the job after training, previously described as **personal outcomes-negative** (Holton et al., 2000; 1997). Examples of such negative consequences include being overlooked for rises or promotion and being reprimanded when not using new knowledge or skills on the job. Research on the negative consequences of falling back into or maintaining pre-training behaviour is limited, but perceived negative outcomes of not transferring training have been shown to lead to increased trainee motivation to transfer training (Ruona, Leimbach, Holton, & Bates, 2002).

A possible negative influence on transfer concerns the extent of punishment trainees receive when transferring training to the job (Rouiller & Goldstein, 1993). In line with Holton et al. (2000, 1997) this category is defined as the **sanctioning of transfer**, which concerns the extent to which individuals perceive negative responses from others when transferring training. Examples consist of being ridiculed by others when transferring training, and supervisors’ indifference and active opposition to the use of new skills (Russ-Eft, 2002). Results of research show that supervisor sanctions lead to reduced trainee motivation to transfer (Seyler et al., 1998), while comparable situational constraints were also found to be negatively related to support from others at the workplace (Facteau et al., 1995).

A last component of the transfer climate concerns the **resistance to change** at the workplace, which has been defined as the extent to which prevailing group norms are perceived by individuals to resist or discourage the use of skills and knowledge acquired in training (Holton et al., 2000). Considering the opposite as well, this factor relates to general feelings of resistance or openness to the use of new knowledge, skills and attitudes at the workplace. Perceived openness to change has been shown to result in increased trainee motivation to transfer (Ruona et al., 2002), while Cheng (2000) indicates that a continuous learning culture, which seems closely related to openness to learning and transfer, positively predicts transfer outcomes.

**Supervisor Support**

With regard to transfer of training, **supervisor support** has been defined as the extent to which supervisors behave in a way that optimises employees’ use on the job of the knowledge, skills and attitudes gained in training (Nijman, 2004). It has been suggested to possibly consist of different types of support, such as emotional and instrumental support, as well as of different possible times of support: before, during and after training (Nijman, 2004). Results of several studies indicate a direct positive relationship between general supervisor support and transfer
outcomes (e.g. Brinkerhoff & Montesino, 1995; Cromwell & Kolb, 2002), while studies have, for example, also indicated positive relationships between supervisor support and trainee motivation (Facteau et al., 1995) and opportunities to use training on the job (Ford, Quiñones, Sego and Speer Sorra, 1992).

*Modelling the Transfer Process*

In order to be able to combine the above constructs, learning outcomes, and transfer outcomes, into one systemic representation of the transfer process, Holton’s (1996: 17) ‘HRD Evaluation Research and Measurement Model’ was taken as a starting point. By incorporating learning, individual performance and (organisational) results as well as influencing factors, this model places the transfer system or subsystem within a larger system of human performance and relates it to organisational results. It thus provides a comprehensive and systemic view of transfer of training and its influencing factors, however, remaining unclear as to the specific content and relationships of several of the elements included. The model is subsequently limited in its direct applicability within empirical research. The HRD Evaluation Research and Measurement Model (Holton, 1996) thus provides an extensive but rather normative and global conceptualisation of “the holistic approach to determining the effective-ness of training programmes” (Seyler et al., 1998, p. 3).

By incorporating the reviewed work environment, trainee and training characteristics, however, a research model for transfer of training was created. The extent of identical elements between training and transfer setting, the teaching of general principles, the variation in both extent and variability of practice conditions, the extent of overlearning included in the training programme, and both relapse prevention and goal-setting procedures were all expected to have a positive direct effect on transfer of training. In line with Holton (1996), these together are referred to as the transfer design of training. The experienced extent of training fulfilment is believed to relate strongly to trainees’ motivation to transfer, while this motivation is positively related to transfer directly. Both the general work environment and the transfer climate are believed to affect transfer outcomes directly, or by means of the trainees’ motivation to transfer. The general work environment is also believed to affect the more specific transfer climate (e.g. Richey, 1992). Since the focus of this study is on supervisor support, it has been included separately here. All suggested causal relationships are believed to be positive, while the resulting transfer model can be seen in Figure 1.
Design.
The examination of relationships implied the study to focus on a quantitative research design, intended to gather data on several training programmes. Due to both time restrictions and organisational demands it was not possible to conduct a longitudinal study, for which reason it was decided to construct and administer post-training questionnaires. Analogous questionnaires were constructed for trainees and their supervisors, in order to be able to compare responses. Depending on organisational preference, these questionnaires were distributed as either a paper version or as a URL to an internet version.

Measures.
Questionnaire scales were developed for each of the variables from the Transfer Model, based on existing scales wherever possible, and otherwise based on the review of literature. The questionnaires were composed of propositions, in combination with a five-point Likert-type response scale. An example of a proposition in the trainee questionnaire reflecting experienced supervisor support after training is “Since I completed this training programme, my supervisor has provided me with opportunities to apply what I have learned”. The scales measuring learning and transfer outcomes were based on the objectives of each different training programme. An example of a proposition for supervisors measuring learning outcomes is “Since this employee completed this training programme, the relationship between coaching and various leadership styles has been much clearer to him/her than before the training programme”. An example of a proposition for trainees measuring transfer outcomes is “Since I completed this training programme, I have motivated subordinate employees considerably better than before the programme”.

All scales were pilot tested and adjusted until a minimal internal consistency of $\alpha = .60$ for trainee scales was achieved. The final number of propositions ranged from three for intervention fulfilment to 42 for general supervisor support, with scales measuring supervisor support, the transfer climate and the transfer design consisting of subscales reflecting their respective different components. Final reliability estimates ($\alpha$) of the scales for trainees ranged from .63 (intervention fulfilment) to .97 (supervisor support).
Elements of the Transfer Model: Trainee (T) and Supervisor (S) Scales, Number of items (#), α-coefficients of Scales

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>T #</th>
<th>S #</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Outcomes</td>
<td>10/13/7/8</td>
<td>10/13/7/8</td>
<td>.70/.90/.78/.82</td>
</tr>
<tr>
<td>Transfer outcomes</td>
<td>8/13/7/8</td>
<td>8/13/7/8</td>
<td>.64/.80/.92/.84</td>
</tr>
<tr>
<td>Intervention Fulfilment</td>
<td>3</td>
<td>3</td>
<td>.63</td>
</tr>
<tr>
<td>Motivation to Transfer</td>
<td>4</td>
<td>4</td>
<td>.82</td>
</tr>
<tr>
<td>Supervisor Support</td>
<td>42</td>
<td>42</td>
<td>.96</td>
</tr>
<tr>
<td>Transfer Climate</td>
<td>23</td>
<td>23</td>
<td>.87</td>
</tr>
<tr>
<td>General Work Environment (Job Autonomy)</td>
<td>4</td>
<td>4</td>
<td>.64</td>
</tr>
<tr>
<td>Transfer Design</td>
<td>5</td>
<td>5</td>
<td>.70</td>
</tr>
</tbody>
</table>

N Trainees ≥ 168
N Supervisors ≥ 32
* One supervisor responded, no reliability estimate could be determined

Sample.
Three organisations participated, offering a final response of 179 trainees and 32 supervisors on four different training programmes. All three organisations provide products and services in the fields of advanced technology, while the selected training programmes all concerned comparable off-the-job programmes on the development of social and/or managerial skills. Trainees had finished training participation between 3 months to 2 years earlier. Over 90% of the respondents were male, while most held relatively autonomous positions. Although it was attempted to gather responses from trainees and supervisors who were functionally connected, the final data indicated only 22 matching couples.

Analyses.
The Transfer Model indicates that motivation to transfer and the transfer climate act as both dependent and independent variable at the same time. An appropriate way of examining such complex relationships is by structural equation modelling, in which a model can be tested statistically in a simultaneous analysis of the entire system of variables, to determine the extent to which it corresponds with the data (Gielen, 1995). Initial attempts to use structural equation modelling by means of LISREL (LInear Structural RELations) indicated the sample size of the main data to be insufficient, however, as a consequence of which it was decided to carry out the analyses by means of separate multiple regression analyses. As there were no specific expectations on the relative importance of separate factors in the Transfer Model, STEPWISE regression analyses were conducted on the data, following the relationships as depicted. Due to the small number of matching trainee-supervisor couples their responses could not be statistically compared, for which reason separate regression analyses have been conducted on trainee and supervisor data.
Results

Trainee Data. Table 1 presents the results of the regression analyses performed on trainee data, including transfer outcomes, motivation to transfer and the transfer climate as dependent variables. The independent variables included in the analyses are as depicted in the Transfer Model, while only significant regression weights are shown in the table.

Table 1. Trainee Questionnaires: Significant Regression Weights (p < .05) of Regression Analyses Predicting Transfer Outcomes, Motivation to Transfer and Transfer Climate

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>(R^2)</th>
<th>Independent Variable(s)</th>
<th>(B)</th>
<th>(SE) (B)</th>
<th>(\beta)</th>
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<tr>
<td>Transfer Outcomes (N=153)</td>
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<td>Learning Outcomes</td>
<td>0.74</td>
<td>0.06</td>
<td>.65</td>
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<tr>
<td></td>
<td></td>
<td>Motivation to Transfer</td>
<td>0.24</td>
<td>0.05</td>
<td>.25</td>
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<td></td>
<td></td>
<td>Transfer Climate</td>
<td>0.14</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Motivation to Transfer (N=154)</td>
<td>.62</td>
<td>Learning Outcomes</td>
<td>0.46</td>
<td>0.08</td>
<td>.40</td>
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<td>Transfer Design</td>
<td>0.49</td>
<td>0.09</td>
<td>.41</td>
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<td>Transfer Climate</td>
<td>0.33</td>
<td>0.09</td>
<td>.24</td>
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<td></td>
<td></td>
<td>Supervisor Support</td>
<td>-0.19</td>
<td>0.05</td>
<td>-0.20</td>
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<tr>
<td></td>
<td></td>
<td>Intervention Fulfilment</td>
<td>-0.11</td>
<td>0.05</td>
<td>-0.13</td>
</tr>
<tr>
<td>Transfer Climate (N = 161)</td>
<td>.19</td>
<td>Supervisor Support</td>
<td>0.29</td>
<td>0.05</td>
<td>.43</td>
</tr>
</tbody>
</table>

Neither supervisor support, the general work environment nor the transfer design of the training programme significantly augments the explained variance in transfer results, and these have therefore been omitted from the table. Secondary reflection on the standardised beta-weights of supervisor support on transfer shows that supervisor support produces only a significant direct effect on transfer outcomes (\(\beta = .33, p < .05, R^2 = .11\)) when none of the other independent variables is included. This suggests the existence of an indirect relationship between perceived supervisor support and transfer outcomes, in which supervisor support shares at least part of the variance in transfer outcomes explained by these other variables.

With regard to the direct effects of other dependent variables, learning outcomes (74%), motivation to transfer (4%), and the transfer climate (1%) together significantly explain a substantial 79% of the variance in transfer outcomes. A positive effect of the transfer design of training falls out of the regression equation after including trainees’ motivation to transfer, indicating that a possible positive relationship between transfer design and transfer of training is mediated by trainees’ motivation to transfer in this study. The transfer design has therefore also been hypothesised to predict trainees’ motivation to transfer in the analyses. A post-hoc Sobel test (Preacher and Hayes 2004) confirms the significance of the indirect effect of transfer design on transfer outcomes via trainees’ motivation to transfer (test value = 3.60, \(p = .00\)).

As opposed to what was expected, the results show both supervisor support (1%) and intervention fulfilment (4%) to have a negative effect on motivation to transfer. Learning outcomes (46%), the transfer design (9%) and the transfer climate (2%) all positively predict motivation to transfer, whereas no effect of the general work environment is found. While
supervisor support has a negative direct effect on motivation to transfer, the table also shows it to improve the perceived transfer climate, explaining 19% of its variance. A post-hoc regression analysis leaving the transfer climate out of the equation reveals that the direct negative effects of supervisor support on motivation to transfer become smaller and non-significant ($\beta = -.08$, $p = .22$). In addition, a second post-hoc regression analysis leaving supervisor support out of the equation show the influence of the transfer climate on motivation to transfer to diminish, yet remain positive and significant ($\beta = .25$, $p < .05$). A post-hoc Sobel test (see Preacher and Hayes 2004) indicates that the positive influence of supervisor support on motivation to transfer as mediated by transfer climate is significant (test value = 3.10, $p = .00$). Thus, these results indicate that supervisor support reduces motivation to transfer in a direct way, but at the same time improves motivation to transfer indirectly - through improvement in the transfer climate. The influence of supervisor support on motivation to transfer is therefore partially mediated by the prevailing transfer climate. As the zero-order correlation between supervisor support and motivation to transfer is positive, the overall effect of supervisor support on motivation to transfer is also believed to be positive.

Similarly, the original positive correlation of intervention fulfilment becomes a significant negative regression weight after the inclusion of the transfer design in the regression equation, indicating that they possibly explain part of the same variance in trainee’s motivation to transfer. Moreover, the inclusion of intervention fulfilment in the equation results in an increased standardised regression weight of the transfer design ($\Delta \beta = .04$), thus suggesting that intervention fulfilment and transfer design are related in their influence on motivation to transfer.

Finally, further examination of the regression weights also shows that the positive regression weight of learning outcomes on transfer outcomes decreases ($\Delta \beta = .19$) when including motivation to transfer in the equation. This suggests that part of the positive relationship between learning outcomes and transfer outcomes is mediated by motivation to transfer, which’ significance is also confirmed by a Sobel test (test value = 3.68, $p = .00$).

**Supervisor Data.** The results of the regression analyses carried out on responses from supervisors are presented in Table 2.

Table 2. **Supervisor Questionnaires: Significant Regression Weights (p < .05) of Regression Analyses Predicting Transfer Outcomes, Motivation to Transfer and Transfer Climate**

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>$R^2$</th>
<th>Independent</th>
<th>$B$</th>
<th>SE $B$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer Outcomes</td>
<td>.60</td>
<td>Learning Outcomes</td>
<td>0.70</td>
<td>0.12</td>
<td>.77*</td>
</tr>
<tr>
<td>(N=27)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motivation to</td>
<td>.59</td>
<td>Learning Outcomes</td>
<td>0.65</td>
<td>0.11</td>
<td>.77*</td>
</tr>
<tr>
<td>Transfer (N=27)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transfer Climate</td>
<td>.25</td>
<td>Supervisor Support</td>
<td>0.44</td>
<td>0.15</td>
<td>.50*</td>
</tr>
</tbody>
</table>

The table shows only three of the relationships from the Transfer Model to be confirmed, when based on supervisor perceptions. First of these, learning outcomes are shown to be the only predictor of transfer outcomes, although explaining a substantial 60% of its variance. Supervisor support nor any of the other independent variables significantly adds to this
explained variance. Learning outcomes also positively predict trainees’ motivation to transfer, explaining a considerable 59% of its variance. Again, learning outcomes are the only significant predictor.

Finally, the results of the regression analysis indicate that supervisors who felt that they had provided trainees with support also felt that these trainees worked in a more favourable transfer climate, explaining 25% of its variance.

A comparison of Trainee and Supervisor Data. Both trainees and supervisors were included in the study in order to provide for different views of the actual training processes, offering the opportunity to compare these views. As the similarity of these regression weights can be interpreted as an indication of their reliability such comparison will provide further indications of both the reliability and validity of the relationships, taking the regression weights based on trainee responses as decisive. Table 3 therefore presents an overview of the standardised regression weights ($\beta$) for all relationships depicted in the Transfer Model.

Table 3. Comparison of Trainee and Supervisor Standardised Regression Weights ($\beta$) reflecting Relationships in the Transfer Model

<table>
<thead>
<tr>
<th>Influence of Independent Variable on Dependent Variable</th>
<th>$\beta$-weight</th>
<th>trainees</th>
<th>supervisors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Outcomes on Transfer Outcomes</td>
<td>.65*</td>
<td>.77*</td>
<td></td>
</tr>
<tr>
<td>Learning Outcomes on Motivation to Transfer</td>
<td>.40*</td>
<td>.77*</td>
<td></td>
</tr>
<tr>
<td>Supervisor Support on Transfer Climate</td>
<td>.44*</td>
<td>.50*</td>
<td></td>
</tr>
<tr>
<td>Motivation to Transfer on Transfer Outcomes</td>
<td>.25*</td>
<td>.18</td>
<td></td>
</tr>
<tr>
<td>Transfer Climate on Transfer Outcomes</td>
<td>.09*</td>
<td>.10</td>
<td></td>
</tr>
<tr>
<td>Transfer Climate on Motivation to Transfer</td>
<td>.24*</td>
<td>.09</td>
<td></td>
</tr>
<tr>
<td>Intervention Fulfilment on Motivation to Transfer</td>
<td>-.13*</td>
<td>-.11</td>
<td></td>
</tr>
<tr>
<td>Supervisor Support on Transfer Outcomes</td>
<td>.05</td>
<td>.11</td>
<td></td>
</tr>
<tr>
<td>Supervisor Support on Motivation to Transfer</td>
<td>-.20*</td>
<td>.22</td>
<td></td>
</tr>
<tr>
<td>General Work Environment on Motivation to Transfer</td>
<td>.03</td>
<td>-.03</td>
<td></td>
</tr>
<tr>
<td>General Work Environment on Transfer Climate</td>
<td>.01</td>
<td>-.34</td>
<td></td>
</tr>
<tr>
<td>General Work Environment on Transfer Outcomes</td>
<td>.00</td>
<td>-.02</td>
<td></td>
</tr>
</tbody>
</table>

Note: *$p < .05$

Both trainee and supervisor data indicate learning outcomes to be the most important predictor of trainees’ transfer outcomes and their motivation to transfer, while the extent of supervisor support positively predicts a facilitative transfer climate.

Four of the expected relationships are confirmed by trainee responses, while supervisor responses provide quite similar but non-significant regression weights. First of these, the results indicate that trainees’ motivation to transfer moderately predicts their transfer outcomes. Secondly, a more positive transfer climate slightly leads to higher transfer outcomes. Third, the transfer climate positively predicts trainees’ motivation to transfer, although this relationship as based on trainee responses is somewhat stronger. And finally,
trainee and supervisor responses indicate a slight negative effect of intervention fulfilment on trainees’ motivation to transfer.

The most important distinction between trainee and supervisor data is found with regard to the suspected influence of supervisor support on trainees’ motivation to transfer. Whereas trainee responses indicate a significant negative relationship between supervisor support and motivation to transfer, supervisor responses point to a positive (though non-significant) relationship. Inspection of the regression weights of trainee responses revealed an initial positive regression weight to turn significantly negative after the inclusion of especially the transfer climate. As such, general supervisor support seems positively related to trainees’ motivation to transfer, but the way in which they are related differs. Regression analyses of supervisor responses do not provide any explanation of the relationship between supervisor support and motivation to transfer, as neither supervisor support itself nor the transfer climate significantly predicts perceived motivation to transfer. Trainee responses, on the other hand, indicate that supervisor support might enhance motivation to transfer by improving the transfer climate, but diminish motivation to transfer in a direct way.

Finally, neither trainee nor supervisor data confirm the expected direct relationship between supervisor support and transfer of training, as well as that none of the assumed effects of the general work environment have been confirmed.

Conclusions and Discussion

The objective of this study was to gain a better insight into the relationship between supervisor support and transfer of training, by examining this relationship within a more comprehensive systemic model of the transfer process. The results indicated that supervisor support indeed positively relates to transfer outcomes, but does not predict these outcomes directly. In accordance with other results (e.g. Xiao 1996), learning outcomes are found to have a strong direct positive effect on transfer outcomes. To a lesser extent, motivation to transfer and the transfer climate also directly positively predict transfer outcomes. It is therefore concluded from this study that supervisor support has no direct effect on trainees’ transfer outcomes, when taking into account the positive influence of trainees’ learning outcomes, their motivation to transfer and the prevailing transfer climate.

With regard to indirect effects, supervisor support does affect both trainees’ motivation to transfer and the transfer climate. The results show that supervisor support has a moderately positive effect on the transfer climate, and the transfer climate has a slight positive effect on trainees’ transfer outcomes. Thus, supervisor support leads to perceptions of a more positive transfer climate, which in turn enhances trainees’ transfer of training. It is concluded that supervisor support has a slight positive indirect effect on trainees’ transfer outcomes through its influence on the transfer climate. Supervisors might, for example, increase trainees’ opportunities to transfer, which will lead to increased transfer outcomes.

A remarkable finding concerns the relationship between supervisor support and trainees’ motivation to transfer. While these are positively related, the analyses indicated supervisor support to have a direct negative effect on trainees’ motivation to transfer. The results showed this negative effect to be related to the influence of achieved learning outcomes, the transfer design and the transfer climate. Most importantly, if the transfer climate is considered similar for all trainees, more supervisor support directly leads to a decrease in motivation to transfer. One possible explanation for this negative effect might be that trainees perceive supportive supervisors as coercive and/or redundant, evoking negative reactions, which may in some way decrease their motivation. In a similar way, Deelstra et al. (2003) found that employees reacted more negatively to imposed instrumental support at the workplace than to no support at all, although these negative reactions appeared to be moderated by the extent to which...
support was needed. They concluded that imposed instrumental support might restrict employees’ perceptions of freedom of choice to perform, also affecting trainees’ self-esteem. This relates to the belief that the timing and specific content of supervisor support are important, which is confirmed by studies of social support in different fields of research that indicate that support at the wrong time can have detrimental effects (Duffy and Wong 2000). At the same time, however, supervisor support indirectly enhances trainees’ motivation to transfer by improving the transfer climate. Trainees who perceive the transfer climate to be more facilitative and encouraging of transfer are more willing to apply new knowledge, skills and attitudes on the job. The conclusion therefore is that supervisor support positively affects trainees’ motivation to transfer, by improving the transfer climate, while at the same time decreasing motivation to transfer directly. However, as the overall relationship between supervisor support and trainees’ motivation to transfer is positive, on balance, the effect of supervisor support on motivation to transfer is also considered positive. It is therefore also concluded that supervisor support has positive effects on trainees’ transfer outcomes, by means of their motivation to transfer. Regarding the practice of supporting transfer outcomes, these results imply that supervisor support is best directed at improving the transfer climate, thus indirectly affecting transfer outcomes and trainees’ motivation to transfer. However, the fact that support might decrease trainees’ motivation to transfer also needs to be taken into account. With regard to research, these results stress the necessity of studies on the actual content of supervisor support. The kind of support improving the transfer climate might differ from supervisor behaviour that decreases motivation to transfer, suggesting that supervisors might best adjust their support to the specific trainee and transfer setting in order to optimise transfer outcomes.

Overall, this study does not confirm the often suggested strong effects of support (e.g. Baldwin and Ford 1988; Elangovan and Karakowsky 1999), but rather indicates that supervisor support has a slight positive indirect effect on transfer outcomes. This casts doubt on the strength of the effects of supervisor support on transfer outcomes, at least indicating that the assumed positive effects are not unequivocal between different studies. A possible explanation for these different findings might be found in the assumption that there is no single steady model of transfer, but rather that the configuration of a transfer model depends on the specific setting of the workplace (e.g. Fitzgerald and Kehrhahn 2003). The influence of, for example, supervisor support and the transfer climate on transfer outcomes might vary, depending on other factors relating to the transfer process, such as trainees’ the support they receive from peers. A second explanation for the differences in effect sizes of supervisor support might be found in the inclusion of different variables in the transfer models in separate studies. Trainees’ learning outcomes are seen to be the most important predictor of both their transfer outcomes and their motivation to transfer in this study, whereas not all studies might have included learning outcomes. Assumed direct effects of supervisor support on transfer outcomes could merely be an effect of the absence of certain - essential - other variables, whereas the actual effects might in fact be only slight and indirect. Differences in the design of models for transfer of training have therefore probably led to different estimations of relationships and their strengths, which advocates the continuing process of designing a valid and reliable model of transfer.

With regard to the effects of other factors, perceived learning outcomes have a strong positive effect on transfer outcomes and the motivation to transfer. Logically, trainees who achieve higher learning outcomes also transfer more. The positive effect on motivation to transfer is believed to relate to expectancy theory in that more successful learners would feel better able to perform, and thus be more motivated (Holton 1996). In addition, trainees who feel they have learned little probably have difficulties in determining what exactly to transfer to their
jobs, which, in turn, might also result in reduced motivation to transfer. Thus, trainees who have learned new knowledge, skills and attitudes not only have more to transfer than trainees who did not, but they are also more motivated to do so, which has an additional positive effect on transfer outcomes.

A remarkable finding concerns the negative effect of intervention fulfilment on motivation to transfer, after including the transfer design. Regarding their content, the transfer design reflects both practical preparation of transfer and the perceived relevancy of the training programme (content validity), whereas intervention fulfilment refers to the extent to which the training meets expectations and needs. A possible explanation of a negative relationship between intervention fulfilment and motivation to transfer might then be the undesirable expectations of the training being confirmed, which, in turn, will lead to reduced motivation to transfer. For example, trainees may have been obliged to take part in a training programme which they expected to interfere with their daily job performance. Even when this training programme is perceived to be relevant with regard to job performance (transfer design), and therefore considered necessary (intervention fulfilment), the confirmation of negative expectations might lead to a reduced motivation to transfer.

**Limitations**

Although the ensuring of validity has been a main priority throughout this study, some important remarks need to be made with regard to the methodology and design of the study. The first concerns the examination of relationships in the Transfer Model. Structural Equation Modelling techniques provide possibilities to test a model statistically in a simultaneous analysis of the entire system of variables, and regarding the relationships in the Transfer Model such techniques would have been preferable in this study. Due to an insufficient sample size the use of structural equation modelling was impossible, however, for which reason the relationships in the model were examined by means of separate regression analyses. Although this limited the possibility of examining the Transfer Model as one entity, in addition to the fact that no explorative examination of - possibly more suitable - causal connections had been carried out, it was assumed that these regression analyses would provide a valid reflection of the causal relationships as depicted in the Transfer Model.

A second point of attention refers to the objectivity of the measures in this study. The use of perceptional measures implies the risk of certain response tendencies, such as social desirability. Social desirability might especially occur with variables to which certain responses might be believed to be beneficial, for example, in the case of performance-related variables, such as trainees’ learning and transfer outcomes. Future research on the relationship between supervisor support and transfer outcomes should therefore also be conducted using more objective measures, such as performance indicators.

**References**


