TRANSFER OF AND FOR LEARNING

A study on a new transfer component and its influencing factors

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Abstract

In this study the concept of transfer and its components are investigated. According to literature, transfer consists of generalization and maintenance. In this research an additional concept, called transfer for learning, is introduced and explored. Transfer of training is assumed to be influenced by elapsed time, factors from the Learning Transfer System Inventory (LTSI), and self-directed learning orientation (SDLO). A survey measuring these variables was distributed among employees of a large consultancy firm in the Netherlands who attended a training in structuring thoughts and communication. Factor analysis revealed a set of three higher order effects within the LTSI: Job Utility, Personal Orientation, and Environmental Interference. SDLO turned out to fit in the Personal Orientation factor. The higher order factors all have a significant effect on all components of transfer. Elapsed time had a significant negative effect on generalization and maintenance. Furthermore, factor analysis confirmed the existence of the new component of training transfer called transfer for learning.

Preface (Dutch)

Dit verslag is het eindresultaat van mijn afstudeeropdracht die ik heb uitgevoerd in het kader van mijn master Human Resource Development aan de Universiteit Twente. De afgelopen acht maanden heb ik me bij PwC in Amsterdam beziggehouden met mijn onderzoek naar de toepassing van het geleerde uit trainingen, en het effect van trainingen op leren. Ik ben er achter gekomen dat ik het erg leuk vind om onderzoek te doen, iets dat ik een aantal jaren geleden nooit had verwacht. Daarnaast heb ik dankzij mijn tijd bij PwC een goed beeld gekregen van wat onderwijskunde in de praktijk kan betekenen. Ik heb het als zeer waardevol ervaren om een tijdje te mogen meelopen in zo'n grote organisatie als PwC en ik heb er veel van geleerd.

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Contents

1. Introduction

In recent years, a lot has been written about the changing role of employees in organizations (Aalfs, 2005). Being able to learn, being entrepreneurial, and being productive in handling knowledge becomes more and more important. Talent and knowledge of employees is of growing importance for organizations. For most organizations, the development of people is essential. This applies even more to organizations that need to be knowledge productive (Harrison & Kessels, 2004). "The turbulence and pressures of continual change are raising the stakes for improved performance in all types of organizational settings (Broad, 1997, p. 7)." Therefore, it becomes more and more important to achieve effective performance (Broad, 1997). Holton, Bates, and Ruona (2000) state the importance of building intellectual capital in organizations in today's knowledge economy. Training is the most frequently used method for work improvement: by transferring knowledge and skills from training to the workplace, effective performance and knowledge productivity can be reached (Broad, 1997).

Organizations more and more realize the importance of lifelong learning for a sustaining competitive advantage. In recent years, more attention is paid to the relationship between learning and working, as well from a practice perspective, as from a research perspective (Bolhuis & Simons, 2011). Human Resource Development (HRD) departments started to not only focus on the formal curriculum, but also tried to stimulate people to take responsibility for their own development, for example on the job. An example of such an attempt is connecting formal training programs to the daily work of the trainees. A common question for HRD practitioners is: Does a training have an effect on trainee behaviour and organizational results? Organizations spend a lot of time and money in training (Cromwell & Kolb, 2004). However, do they have a clear view on the training results? Often, trainee reactions to the training are measured. But do trainees really put their learned knowledge and skills into practice: Do they transfer knowledge and skills? This question often remains unanswered.

According to Broad (1997) training has fallen short in ensuring high performance. The focus has been on achieving learning, instead of achieving transfer of training. A popular and well-known model for evaluating training programs is Kirkpatrick's four-level model (Alliger & Janak, 1989; Mankin, 2009; Swanson & Holton, 2009). The four levels he uses for evaluating training effectiveness are (Alliger & Janak, 1989):

1. Reactions: Trainees' attitudes toward the training.
2. Learning: Trainees' understanding of principles, facts, and techniques.
3. Behavior: Trainees' usage of learned principles and techniques on the job.
4. Results: The achievement organizational goals.

When measuring the transfer of training, the behavior level in Kirkpatrick's model is measured. The definition of transfer generally consists of two conditions: (1) generalization of material learned in training to the job context and (2) maintenance of the learned material over a period of time on the job (Baldwin & Ford, 1988). Bransford and Schwartz (1999) define transfer as the degree to which people can apply something they have learned to a new problem or situation, which corresponds to the generalization part. They also state that transfer comprises the degree of 'preparation for future learning', people's abilities to learn in knowledge-rich environments (Bransford & Schwartz, 1999).

A lot of research has been done on finding factors of influence on transfer (e.g. by Baldwin and Ford (1988) and Holton et al. (2000)). Baldwin and Ford (1988) categorized them in training design, trainee characteristics, and work environment. They also indicated the need for dynamic transfer research. Some authors since then have measured transfer and influences on transfer in longitudinal research (Cromwell & Kolb, 2004; Gaudine & Saks, 2004; Saks & Belcourt, 2006). However, they all explicate the need for more research measuring transfer of training over a longer time period. Saks and Belcourt (2006) also state the importance of investigating which factors influence the achieved transfer a while after the training. According to Merriam and Leahy (2005) there is a need for theory-building, regarding the influences on transfer and the measurement of transfer. According to Poell and Krogt (2011) attention is paid to work characteristics that influence learning, though training characteristics that influence work experiences and workplace learning are rarely examined. In investigating transfer problems, the relationship between training and on-the-job learning experiences should be considered (Poell & Krogt, 2011).

The needs for more research on transfer and factors influencing transfer have become clear. In this research, it will be tried to expand the definition of transfer. The concept of 'preparation for future

learning' will be explored and added to the existing concepts of maintenance and generalization. This part of transfer should gain more insight in how a training can influence future on-the-job learning and can expand transfer theory. Next to that, the influence of elapsed time on transfer is investigated, also in combination with training design, trainee characteristics, and work environment factors. In this way, the determining factors influencing transfer over longer periods of time can be found.

2. Transfer of training

Transfer of training, or simply transfer, is thus the degree to which people can apply something they have learned to a new problem or situation (Bransford & Schwartz, 1999). Transfer of training can be used as an indicator when evaluating training. Holton (1996) constructed a new training evaluation model, that explains the transfer of training to individual performance and organizational results better than Kirkpatrick's four-level model. Holton's model is shown in Figure 1.

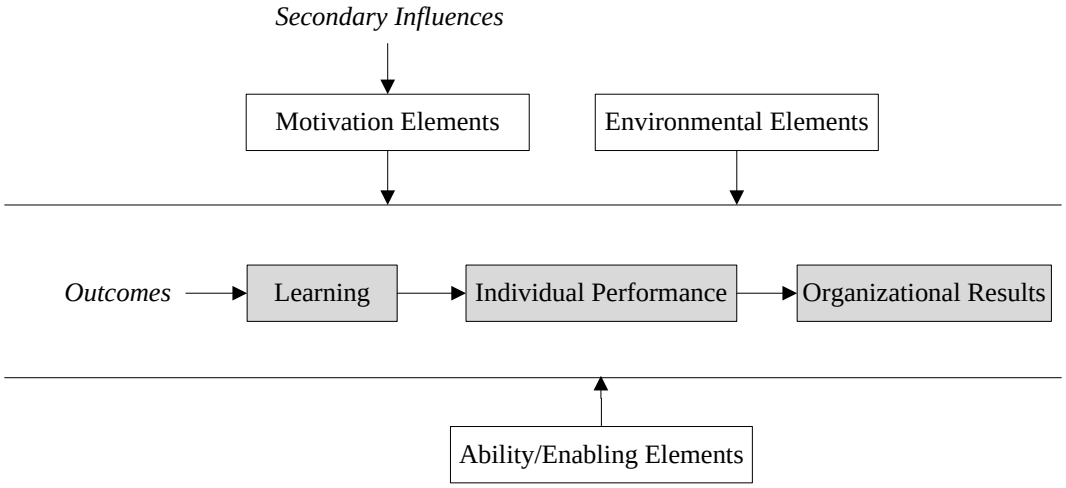

Figure 1. Training evaluation model (Holton, 1996).

According to Holton (1996), outcomes of a learning intervention should be consecutive: Learning, individual performance and organizational results. Learning behavior and performance are assumed to be a function of ability, motivation and environment. Learning, for example, is assumed to be influenced by trainee reactions, motivation to learn, and ability (Holton, 1996). Transfer of training, in this model, is the degree to which trainees can transfer learned knowledge to individual performance. In transferring learned knowledge and skills to the individual performance level, motivation, environmental, and ability influences also exist. Holton (1996) calls these motivation to transfer, transfer conditions, and transfer design.

Components of transfer. Transfer is generally assumed to consist of the components generalization and maintenance. Cheng and Hampson (2008) called these the key transfer outcomes. Generalization is the degree to which a trainee is able to generalize training content and skills to the job context or a variety of other situations (Baldwin & Ford, 1988; Cheng & Hampson, 2008). Maintenance means maintaining the learned material and continue using the learned methods over a period of time on the job (Baldwin & Ford, 1988; Cheng & Hampson, 2008).

In this research a new, third component of transfer is introduced, called 'transfer for learning'. Some authors, like Bransford and Schwartz (1999), have already slightly touched this concept. They called this component 'preparation for future learning'. Russ-Eft (2002) constructed a typology of elements that affect transfer, but also workplace learning. However, the concept *transfer for learning* has not yet been described in literature. This research explores *transfer for learning* by assuming that, next to generalization and maintenance, further (workplace) learning concerning the training subject can be a transfer outcome. According to Cheng and Hampson (2008) workplace learning is an important component of learning in general. Off-the-job training is losing popularity; therefore it is important to examine the effects of off-the-job training, on on-the-job learning activities.

This research explores the effect of a training on future (workplace) learning, transfer for learning, using the concept of self-directed learning (SDL). According to Raemdonck (2005), the responsibility for learning is increasingly distributed toward the individual employee. Therefore, there is an increasing demand for employees to self-direct their learning processes. SDL is a process in which the individual takes responsibility and initiative for planning, executing, and evaluating learning processes (Raemdonck, 2005). Ellinger (2004) also indicates SDL as self-learning in which learners have the primary responsibility for planning, carrying out, and evaluating their own learning experiences. The most common used definition for self-directed learning according to Raemdonck (2006) is a "process in which individuals take the initiative, with or without the help of others, in

diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies and evaluating learning outcomes (Knowles, 1975, p. 18)". SDL is often seen as a personal characteristic, although research has also shown links between being self-directed in learning and environmental conditions (Raemdonck, 2006). This research assumes that attending a training can influence SDL as a process. The definition of transfer for learning used in this research therefore is: *the degree to which a training contributes to self-directed learning after the training.* In this study, the component transfer for learning is examined as a complement to the concept transfer of training. The next two paragraphs explore the different factors that can influence transfer of training.

Elapsed time since training. Decreases in the use of the learned skills on the job over time (maintenance) can have different reasons. Baldwin and Ford (1988) pointed out the possibility to measure trainees' learning curves in order to examine the maintenance part of transfer. They give some example learning curves that generally show a decline in used skills. Gaudine and Saks (2004), Cromwell and Kolb (2004), and Saks and Belcourt (2006) also took elapsed time since a training in consideration in their research. Gaudine and Saks (2004) noted the importance of measuring transfer of training over a longer period. They measured the effect of two post-training interventions on transfer of training, using predictors for transfer before the training, two months after, and six months after the training. The dependent variables in their research showed improvement up to six months after the training. Cromwell and Kolb (2004) measured the perceived performance of a supervisory skills training program at one-month, six-months, and one year after joining the training. They examined whether work environment factors were of a significant influence on transfer at these points in time. The work environment factors appeared to have a significant effect at all different points in time. Cromwell and Kolb (2004) concluded that time elapsed since training is an important factor to consider when measuring transfer of training. In 2006, a research was conducted in order to find out to what degree trainees transfer skills from training to work immediately, six months, and one year after joining the training (Saks & Belcourt, 2006). The percentage of respondents reporting transfer consisted of respectively 62%, 44%, and 34%. These results show that transfer of training decreases over time. The researchers indicated the need for further research to investigate why many trainees do not transfer immediately after attending a training and why those who transfer do not continue to do so months later (Saks & Belcourt, 2006). This research tried to examine this, by including interaction terms of elapsed time and other factors. These interaction terms are further discussed in the next paragraph.

Influences on transfer. Baldwin and Ford (1988) conducted one of the first review studies on training transfer. They constructed a model containing three training inputs affecting transfer: trainee characteristics, training design and work environment. This distinction between the three sorts of training input is taken over by other authors and can be seen as the generally accepted factors of influence on training transfer (Blume, Ford, Baldwin, & Huang, 2010; Burke & Hutchins, 2007; Merriam & Leahy, 2005).

The three different categories of influences on transfer were filled in by a lot of authors. Baldwin and Ford (1988) identified personality and motivation as important *trainee characteristics* affecting training transfer. Burke and Hutchins (2007) and Blume et al. (2010) added self-efficacy and cognitive ability and Merriam and Leahy (2005) also stress the importance of self-efficacy. Trainee motivation can be divided into pre-training motivation, training motivation, motivation to learn and motivation to transfer (Burke & Hutchins, 2007). It is considered very important for transfer that a trainee is enthusiastic and motivated before the training, the trainee has to arrive at the training in the right mindset (Blume et al., 2010; Burke & Hutchins, 2007; Merriam & Leahy, 2005). Other factors that can influence the degree of transfer are trainee expectations, perceived utility/value, career/job variables, locus of control, voluntary participation, learning goal orientation and successfulness during the training (Baldwin & Ford, 1988; Blume et al., 2010; Burke & Hutchins, 2007; Merriam & Leahy, 2005).

Several learning principles and instructional strategies and methods used in *training design* are assumed to have an effect on transfer of training. These contain the use of multiple instructional technologies and advance organizers, feedback during the training, overlearning, considering cognitive load, presenting stimuli in different contexts, active learning, error-based examples, and teaching general rules (Baldwin & Ford, 1988; Burke & Hutchins, 2007; Merriam & Leahy, 2005). The use of

interactive activities can encourage participation (Burke & Hutchins, 2008). Other factors of training design that can influence training transfer are needs analysis, stating learning goals, content relevance, technological support, post-training relapse prevention and coaching after training (Burke & Hutchins, 2007, 2008; Merriam & Leahy, 2005).

Important *work environment* influences on training transfer are the transfer climate and the degree of support (Blume et al., 2010; Burke & Hutchins, 2007, 2008; Festner & Gruber, In press; Merriam & Leahy, 2005). Transfer climate and support are connected to each other, they should provide opportunities for the trainee to set goals before training and to use the learned knowledge or skills in their job after training (Baldwin & Ford, 1988; Festner & Gruber, In press). Manager support is deemed more important than peer support (Burke & Hutchins, 2007, 2008). A manager should support the trainee before, during, and after the training. Opportunities to practice learned skills should be provided, and post-training evaluation of skills is important (Burke & Hutchins, 2008). The changed behavior after training should be accepted and the manager should provide feedback. Management style is an important influence in the amount of support a trainee receives (Baldwin & Ford, 1988).

As was shown in Figure 1, Holton (1996) also distinguishes categories of influences on transfer. According to Kirwan and Birchall (2006, p. 257) this model of Holton "reflects more fully than the others the discussion in the literature concerning different factors that affect transfer". In transferring learned knowledge and skills to individual performance level, Holton distinguishes motivation to transfer, transfer conditions (environment), and transfer design (ability). Holton defines these influences as the 'learning transfer system'. Just as with the categories of Baldwin and Ford (1988), Holton et al. (2000) enumerate factors which are of influence on transfer, investigating those factors in their developed Learning Transfer System Inventory (LTSI). According to Holton, Bates, Seyler, and Carvalho (1997), the LTSI factors are comparable to the factors in the categorization of Baldwin and Ford (1988). The LTSI factors are shown in Table 1. The training specific scales reflect the respondents' opinions on the specific training program. The general scales reflect the respondents' opinions on training in general in their organization.

Table 1

Description of the LTSI Factors

	Factor	Definition
Training Specific Scales	Learner readiness[1]	The extent to which individuals are prepared to enter and participate in training.
	Motivation to transfer[1]	The direction, intensity, and persistence of effort toward utilizing in a work setting skills and knowledge learned.
	Positive personal outcomes[2]	The degree to which applying training on the job leads to outcomes that are positive for the individual.
	Negative personal outcomes[2]	The extent to which individuals believe that not applying skills and knowledge learned in training will lead to outcomes that are negative.
	Personal capacity for transfer[1]	The extent to which individuals have the time, energy, and mental space in their work lives to make changes required to transfer learning to the job.
	Peer support[1]	The extent to which peers reinforce and support use of learning on the job.
	Supervisor support[1,2]	The extent to which supervisors-managers support and reinforce use of training on the job.
	Supervisor opposition[1]	The extent to which individuals perceive negative responses from supervisors-managers when applying skills learned in training.
	Perceived content validity[1]	The extent to which trainees judge training content to reflect job requirements accurately.
	Transfer design[1]	The degree to which (1) training has been designed and delivered to give trainees the ability to transfer learning to the job, and (2) training instructions match job requirements.
	Opportunity to use[1]	The extent to which trainees are provided with or obtain resources and tasks on the job enabling them to use training on the job.
General scales	Transfer effort – performance expectations[3]	The expectation that effort devoted to transferring learning will lead to changes in job performance.
	Performance-outcomes expectations[3]	The expectation that changes in job performance will lead to valued outcomes.
	Resistance-openness to change[3]	The extent to which prevailing group norms are perceived by individuals to resist or discourage the use of skills and knowledge acquired in training.
	Performance self-efficacy[3]	An individual's general belief that he is able to change his performance when he wants to.
	Performance coaching[3]	Formal and informal indicators from an organization about an individual's job performance.

Note. [1] Job Utility, [2] Rewards, [3] Climate

In further factor analysis on the LTSI, Holton et al. (2000) discovered three second-order factors: Job utility, rewards, and climate (Table 1). The job utility factor consists of opportunity to use learning, transfer design, content validity, personal capacity for transfer, peer support, learner readiness, supervisor opposition, and motivation to transfer learning. The factor rewards consists of personal outcomes-positive and personal outcomes-negative. Supervisor support cross-loaded on both factors. The general scales appeared to load high on the third factor: Climate. Yaghi, Goodman, Holton, and Bates (2008) used the LTSI to measure and predict learning and training transfer. According to them, the instrument "is a comprehensive, valid, empirically based, cross-culturally tested, and diagnostic measure to assess learning transfer (Yaghi et al., 2008, p. 246)." They also state that validating the LTSI in foreign countries is important.

The LTSI only contains two factors of trainee characteristics (learner readiness, performance self-efficacy). Therefore there are likely other trainee characteristics that are relevant to transfer but are not assessed by the LTSI. According to Holton et al. (2000, p. 355) "Future research might combine the LTSI with other instruments to assess trainee characteristics more completely."

An influential trainee characteristic on the transfer for learning component of training transfer might be self-directed learning orientation. "Self-directed learning orientation (SDLO) is defined as a relatively stable tendency to take an active and self-starting approach to work-related learning activities and situations, and to persist in overcoming barriers and setbacks (Raemdonck, 2006)." Self-directed learning orientation appeared to be a significant predictor of work related learning in a study of Gijbels, Raemdonck, and Vervecken (2010). Self-directed learning orientation might be difficult to influence, because it is generally seen as a personal quality or characteristic (Gijbels et al., 2010). Raemdonck (2006) states that self-directedness is closely related, but conceptually different from constructs such as proactive personality, personal initiative, locus of control and breadth self-efficacy. For the LTSI pays less attention to trainee characteristics, SDLO might be a complementary concept to the LTSI. Transferring knowledge and skills is a personal process, thus taking an active and self-starting approach to training and transfer can be expected to lead to more achieved transfer.

Literature described a negative effect of elapsed time on transfer of training (Baldwin & Ford, 1988; Saks & Belcourt, 2006). This research argues that this might be partly explained by interaction effects of the abovementioned factors influencing transfer and elapsed time. When, for example, the work environment conditions are beneficial for transfer, it seems logical that transfer less declines than when work environment conditions are not beneficial for transfer. Therefore, in this research it is assumed that experiencing beneficial LTSI factors for transfer, weakens the relationship between elapsed time and transfer.

3. Research questions

The present research is a quantitative study. It existed of a survey among all ex-participants in a training Pyramid Thinking. It was a cross-sectional between-cases survey, measuring the independent and dependent variables at one time (Dooley, 2001; Schwab, 2005). The aim of this study is to examine if transfer of training consists of the components generalization, maintenance, and transfer for learning and to examine to what degree elapsed time, the LTSI factors, and self-directed learning orientation influence these components. The research model used in this study is shown in Figure 2.

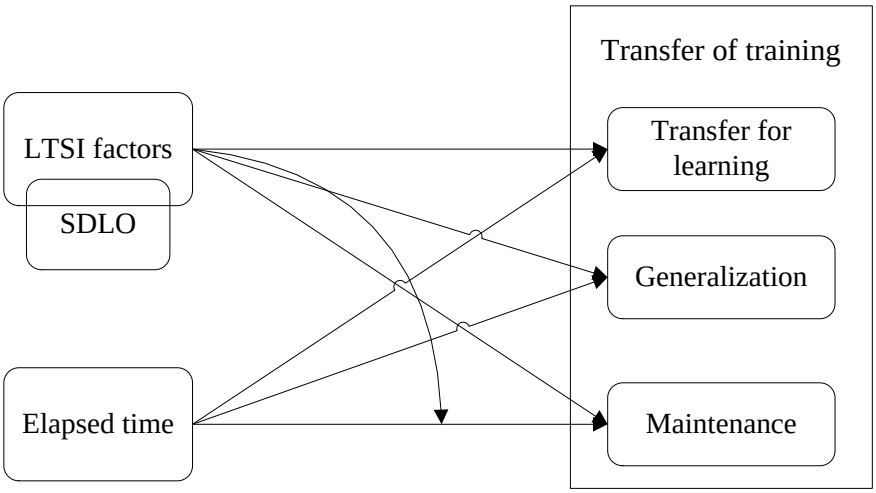

Figure 2. Research model.

The research questions investigated in this study are:

1. Does the concept transfer consist of the three components generalization, maintenance, and transfer for learning?
2. To what extent can self-directed learning be a complementary factor to the LTSI?
3. To what extent do the LTSI factors and SDLO influence the three components of transfer?
4. To what extent does the elapsed time since attending a training influence the three components of transfer?
5. To what extent do the LTSI factors moderate the relationships between elapsed time and the components of transfer?

4. Method

The method used is as follows.

Context. This research was carried out in the consultancy part of a Dutch office of a large international organization. The organization offers their employees a training curriculum of internal and external training programs and other learning solutions. Each function level has an amount of training days per year, varying from 12 days as a starter (analyst) to six days as a partner/director. Employees are free in deciding which training programs they want to follow, except for a few obliged programs in the beginning of your career. Starters in the organization should first attend some foundational training programs, like introduction programs, project management training, and training in consultancy skills. In higher function levels, the focus is more on technical, more specialized knowledge and skills. Leadership development also plays a bigger role as your function level rises. For each function level, there are training programs available. Employees can choose a training and, with permission of their supervisor, attend it.

The respondents participating in this research are the trainees of one of the important and obliged intern training programs from the curriculum: Pyramid Thinking. Pyramid Thinking is a two day training program, obligatory for all new employees in the organization. The training teaches a methodology to structure thoughts and communication. It consists of theory about Pyramid Thinking and a lot of exercises and application of the theory. In the evaluations of the training, trainees are positive. A number of 21 trainees in 2011 granted the training an average grade of 8,3 on a scale from one to ten. The training is generally experienced as a 'good practice' in the organization.

Sample. Purposive sampling was used to choose the group of possible respondents for the survey (Dooley, 2001; Swanson & Holton, 2005). The survey was sent to all Pyramid Thinking trainees since January 2007. Since this date the content and training methods have generally remained the same. Employees that left the organization between joining the training and the implementation of this study are excluded. Employees who attended part of the training but did not complete the program were also excluded. This led to a total number of 277 employees who were invited to fill in the survey.

The response rate in the survey research was 56%, with a number of 156 returned questionnaires. The age of the respondents varied from 24 to 50, the mean age was 30. 63.5% of the respondents were men, 36.5% were women. Most respondents finished a university master or a higher level of education (90.0%). The respondents are from two different competence groups. 97 respondents (62.2%) are from the 'Consulting' group (the group solving all kinds of problems for other organizations), 20 respondents (12.8%) are from the 'Deals' group (the group helping other organizations in mergers and acquisitions). The remaining 39 (25.0%) respondents are from other parts in the organization.

Instruments. The instrument used in this research is a survey. All variables from the research model were measured using a cross-sectional between-cases survey. We tried to use existing valid and reliable scales as much as possible, and if necessary developed them ourselves.

Transfer: Generalization and maintenance. In order to increase the validity of the survey, the advice of Cruz (1997) was taken into account. She questioned the validity of the use of self-report data for measuring training transfer. She advises that when due to practical considerations self-report is necessary, the measure should be aligned with instructional assessment. For measuring the generalization and maintenance part of transfer, survey items were developed to be instructionally aligned with the Pyramid Thinking training content. Training materials and the results on a questionnaire about application of Pyramid Thinking in 2008 were used for developing the items. Next to that, the trainer cooperated in the item development, to make sure that the entire training context was covered. The items aimed at measuring whether the respondent had, at some time in the past after attending the training, used the training content on the job. For measuring generalization, items measured the degree to which the respondents had used the training content in their jobs. For measuring maintenance, the respondents were asked to what degree they (still) used the training content at the measurement moment. The scales for generalization and maintenance each consisted of five items, using a five-point Likert scale. The items for generalization and maintenance are given in Appendix A.

Transfer: Transfer for learning. The scale measuring transfer for learning was based on research on the self-directed learning-scale developed by Raemdonck (2006). In her research, she

developed a questionnaire scale measuring self-directedness in learning processes: "A characteristic adaptation to influence work-related learning processes in order to cope for oneself on the labour market" (2006, p. 13). The developed scale turned out to be reliable and valid (Raemdonck, 2006). The scale of Raemdonck (2006) was rewritten to measure transfer for work-related learning about Pyramid Thinking or related subjects. The scale contained 14 items, using a five-point Likert scale. The items for transfer for learning are given in Appendix A.

Elapsed time. Elapsed time was measured by calculating the elapsed months since the respondent attended the training. In order to calculate the number of months, the end date of the training for each respondent was used, then the number of elapsed months was counted until May 2012, the month of the data collection.

Factors affecting transfer: LTSI. The factors affecting transfer discovered by Holton et al. (2000) were measured in the survey. A study of Holton, Bates, Bookter, and Yamkovenko (2007) gained evidence for the convergent and divergent validity of the LTSI scales. HRD practitioners should use a validated instrument, like the LTSI, to assess problems before conducting major learning interventions, according to Holton et al. (2000). Version four of the Dutch LTSI was adapted and used with permission of the authors.[1] This version exists of 48 items, and for this research items were partly rewritten in the past tense.

Factors affecting transfer: SDLO. For measuring SDLO, an existing scale developed by Raemdonck, Tillema, Grip, Valcke, and Segers (in press) was used. This scale contains 13 items, measuring three different aspects of SDLO: Active approach towards learning, intention to take learning initiative, and overcome barriers to learning. The mean score of the 13 items was calculated and used in the analysis. The reliability of this scale was good (Cronbach's alpha = .816).

Demographics. Demographics were measured as control variables. The demographic factors measured in this research were gender, age, highest achieved level of education, function level, and competence group in the organization. For education, the respondents could choose between the options: Vocational education, professional higher education, or university (bachelor or master). The function level in the organization where the research took place, varied from low to high: Analyst, advisor, senior advisor, principle manager, partner/director. The organization's Advisory department consists of the competence groups consultancy and deals. In these last three questions of the survey, respondents could also choose the category 'other'.

Procedure. To promote the survey, pyramids of liquorice were placed at the coffee machines in the office building, with a card that asked the respondents to fill in the survey. The survey was distributed online, using the evaluation system of the organization. All items obligatory had to be answered, in order to avoid missing data. After one week, a personal e-mail reminder was sent to the respondents that had not yet filled in the survey. A second personal reminder was sent four weeks after the first e-mail. The respondents who had not filled in the survey after that reminder were contacted by telephone.

Data analysis. The gathered data was analyzed using factor analyses and regression analyses. First, the definition of transfer was explored. Reliability analyses were carried out on the different component scales, followed by factor analysis on all items. In this way, the hypothesis that transfer consists of the three components generalization, maintenance, and transfer for learning, could be explored. All LTSI mean scale scores were computed and, together with the SDLO mean scale score, were subjected to factor analysis. Goal of this factor analysis was to obtain fewer components, similar to the second-order factors found by Holton et al. (2000), but also including SDLO. These component scores were saved and used in further analysis.

After conducting these preliminary analyses, the regression analyses were carried out. Each component of transfer served as a dependent variable in a multiple regression analysis. The higher-order LTSI factor scores, elapsed time, the interaction terms for the higher-order LTSI factor scores and elapsed time, and the demographics were inserted as independent variables in the analysis. Using the backward regression method an optimal model was tried to achieve, including only the relevant predictors of transfer. The results of the different regression analyses could then be compared.

[1] The authors of the LTSI were not involved in the creation of this thesis.

5. Results

Before looking at the results of the data analysis, the descriptive statistics were explored and reliability analyses were carried out. In Table 2, the descriptive statistics for the items on generalization and maintenance are given. A reliability analysis on the generalization scale led to a Cronbach's alpha of .686. When item three would be deleted, the Cronbach's alpha would rise to .709. Therefore, generalization item 3 was removed. The generalization scale mean then was 10.51 (SD = 3.186).

A reliability analysis on the maintenance scale led to a Cronbach's alpha of .690. In this scale, deletion of item three would also lead to a higher Cronbach's alpha of .704. Therefore, maintenance item 3 was also removed. The maintenance scale mean then was 10.71 (SD = 3.265).

Table 2

Descriptive Statistics for the Generalization and Maintenance Items

Item	Mean	SD
Generalization 1	3.16	1.069
Generalization 2	2.87	1.148
Generalization 3	3.84	.823
Generalization 4	2.10	.998
Generalization 5	2.38	1.138
Maintenance 1	3.22	1.057
Maintenance 2	2.88	1.155
Maintenance 3	3.83	.896
Maintenance 4	2.22	1.110
Maintenance 5	2.38	1.161

The descriptive statistics for the LTSI factors and SDLO are shown in Table 3. Some LTSI scales were recoded, so that all scales were expected to have a positive influence on transfer. Notable are the low scores on personal outcomes - negative, supervisor support, and personal outcomes - positive. The high score on supervisor opposition (R) indicates that the respondents experience very little opposition from their supervisor. The reliability of most scales is satisfactory, though the reliability of performance self-efficacy and transfer effort - performance expectations is slightly below .70.

Table 3

Descriptive Statistics for the LTSI Factors and SDLO

Scale	Mean	SD	Reliability
Peer support	3.128	.878	.83
Opportunity to use	3.607	.648	.71
Perceived content validity	3.120	.756	.75
Motivation to transfer	3.677	.663	.76
Transfer design	3.622	.713	.83
Personal capacity (R)	3.543	.721	.72
Learner readiness	3.028	.823	.83
Performance coaching	3.103	.797	.88
Performance self-efficacy	3.618	.607	.69
Performance - outcomes expectations	3.438	.578	.67
Transfer effort - performance expectations	3.795	.481	.68
SDLO	3,717	.419	.82
Supervisor opposition (R)	4.310	.772	.83
Personal outcomes - negative	1.818	.786	.87
Resistance to change (R)	3.833	.750	.71
Supervisor support	2.120	.856	.83
Personal outcomes - positive	2.261	.799	.83

Note. (R) = recoded scale

Elapsed time was measured in months since attending the training. The mean elapsed time was 31 months (SD = 20,3 months). The demographics were mostly ordinal and nominal variables, these are shown in Table 4. The mean age of the respondents was 30 years and four months (SD = 11 months). In the regression analysis, gender and competence group were entered as dummy variables. Age, function level, and education were standardized and entered as continuous variables, replacing the respondents in the category other with the mean standardized score. The values entered in SPSS are also shown in Table 4.

Table 4

Descriptive Statistics for the Demographic Variables

Variable	Frequency	Percentage	Entered in SPSS
Gender			
Male	99	63.5	Dummy coded
Female	57	36.5	Dummy coded
Function level			
Analyst	37	23.7	1
Advisor	53	34.0	2
Senior Advisor	20	12.8	3
Principle Manager	7	4.5	4
Partner/Director	1	.6	5
Other	38	24.4	Replaced with mean
Competence group			
Consulting	97	62.2	Dummy coded
Deals	20	12.8	Dummy coded
Other	39	25.0	Dummy coded
Education			
Professional bachelor	7	4.5	1
Bachelor	5	3.3	2
Master	141	90.4	3
Other	3	1.9	Replaced with mean

Components of transfer: Generalization, maintenance, and transfer for learning. In order to answer the first research question, addressing the existence of the three components of transfer, first a factor analysis was carried out. All items reflecting transfer of training (generalization, maintenance, transfer for learning), except the removed items 3 of generalization and maintenance, were subjected to principal components analysis (PCA) using SPSS Version 20. Prior to performing PCA the suitability of data for factor analysis was assessed. The Kaiser-Meyer-Oklin value was .820, exceeding the recommended value of .6 and the Barlett's Test of Sphericity reached statistical significance, supporting the factorability of the correlation matrix (Field, 2009; Pallant, 2002). Five components with an eigenvalue larger than one were obtained (Table 5).

Table 5

Eigenvalues for components of transfer

Component	Explained variance	Explained variance cumulative	Actual eigenvalue	Criterion value	Decision
1	34.6%	34.6%	7.608	1.746	Retain
2	10.3%	44.9%	2.259	1.607	Retain
3	7.0%	51.9%	1.543	1.506	Retain
4	6.7%	58.5%	1.463	1.421	Retain
5	4.8%	63.3%	1.060	1.350	Reject

Parallel analysis was used to help determine the number of components to retain, for in finite samples, some factors with eigenvalues greater than one may occur due to sampling error (Hayton, Allen, & Scarpello, 2004). Comparing the real eigenvalues with the generated average eigenvalues out of 100 random datasets led to a recommended number of four factors for retention. The rotated component matrix (Appendix B) showed that the transfer for learning items load high on the first and third component. Generalization and maintenance could not be distinguished as different components. Their items loaded on the second, fourth, and fifth component. For a better interpretability, a new factor analysis was carried out, using varimax rotation and fixing the number of components to two (Table 6). These components explained respectively 34.6 and 10.3 per cent, and thus together 44.9 per cent of the variance.

Table 6

Varimax Rotation of Two Factor Solution for Transfer

Item	Component 1 Transfer for learning	Component 2 Generalization and maintenance Transfer for practice
Transfer for learning 10	**.787**	.217
Transfer for learning 9	**.710**	.181
Transfer for learning 12	**.709**	.110
Transfer for learning 11	**.706**	.079
Transfer for learning 5	**.685**	.071
Transfer for learning 7	**.647**	.279
Transfer for learning 8	**.639**	.013
Transfer for learning 3	**.600**	.323
Transfer for learning 4	**.585**	**.464**
Transfer for learning 6	**.570**	.182
Transfer for learning 13	**.537**	.309
Transfer for learning 14	**.506**	.238
Transfer for learning 1	**.484**	.208
Transfer for learning 2	**.376**	.222
Generalization 4	.115	**.756**
Generalization 2	.207	**.755**
Maintenance 2	.223	**.754**
Maintenance 4	.148	**.722**
Maintenance 5	.203	**.650**
Generalization 5	.147	**.581**
Generalization 1	.159	**.515**
Maintenance 1	.134	**.490**

Field (2009) recommends for a sample of 100, to include loadings greater than .512, and for a sample of 200 loadings greater than .364 for interpretation. In this research, at least the value of .364 is thus necessary for interpretation. In Table 6 is shown that in this research the two components transfer for learning, and generalization and maintenance together can be distinguished from transfer for learning, though the transfer for learning item four cross loads on both components. Generalization and maintenance are indistinguishable from each other, and therefore were taken together for further analysis. Generalization and maintenance will from now on be called *transfer for practice*. In further analysis the mean score for transfer for practice, and the mean score for transfer for learning were used. The reliability of the transfer for practice scale was α = .836. The reliability of the transfer for learning scale was α = .893.

Factors influencing transfer: SDLO as a complement to the LTSI. The second research question concerned the possibility to use SDLO as a complement to the LTSI factors. Following Kirwan and Birchall (2006), first a factor analysis was carried out to confirm the 16 scales of the LTSI. The clusters of items were confirmed, and therefore the mean scores for the 16 scales were used in further analysis. In order to reduce the number of LTSI factors for the regression analysis, factor

analysis was carried out. All LTSI scale scores were subjected to PCA. The SDLO scale score was also added to this factor analysis in order to examine its possible complementarity to the LTSI. Prior to performing PCA the suitability of data for factor analysis was assessed. The Kaiser-Meyer-Oklin value was .79, exceeding the recommended value of .6 and the Barlett's Test of Sphericity reached statistical significance, supporting the factorability of the correlation matrix (Field, 2009; Pallant, 2002). Following that, factor analysis was executed. Four factors with an eigenvalue larger than one were found (Table 7). Parallel analysis was used to determine the number of components to retain (Hayton et al., 2004). Comparing the real eigenvalues with the generated average eigenvalues out of 100 random datasets led to retaining three components.

Table 7

Results of Parallel Analysis

Component	Explained variance	Explained variance cumulative	Actual eigenvalue	Criterion value	Decision
1	28.3%	28.3%	4.813	1.617	Retain
2	15.1%	43.4%	2.569	1.483	Retain
3	8.5%	51.9%	1.449	1.386	Retain
4	6.8%	58.8%	1.160	1.301	Reject

PCA was carried out again as an exploratory factor analysis looking for three higher order components, following previous research of Holton et al. (2000). The three components had eigenvalues exceeding 1 and explained respectively 28.3 per cent, 15.1 per cent, and 8.5 per cent of the variance. The total variance explained by the first three components was 51.9%. To facilitate interpretation, Varimax rotation was performed (Table 8). Most scales show loading higher than .400 on only one component. Performance coaching has a loading of .397 on the first component and also a loading of .328 on the second component. Personal outcomes - negative, supervisor support, and personal outcomes - positive load high on the third component but also moderately high on the first component. The first component roughly corresponds with the first component in the research of Holton et al. (2000). In these results, however, performance coaching is also included in the first component, and supervisor opposition is not present in the first, but in the third component. Though these small deviations, the first component can still be called Job Utility. The second component does not closely correspond with the Rewards component of Holton et al. (2000). It consists of the scales performance - self efficacy, performance - outcomes expectations, transfer effort - performance expectations, and SDLO. These scales are about a belief in being capable to transfer and change performance, and a belief that this will lead to valued outcomes. This component will be called 'Personal Orientation'. The third component consists of supervisor opposition, personal outcomes - negative, resistance - openness to change, supervisor support, and personal outcomes - positive. These are three scales of the Rewards factor of Holton et al. (2000): supervisor support, personal outcomes - positive, and personal outcomes - negative. However, the component also consists of personal outcomes - negative and resistance - openness to change, and therefore mainly seems to address the perceived support or resistance from the environment. Therefore this component will be called 'Environmental Interference'. Interesting are the negative factor loadings of supervisor opposition and resistance to change in the third component. Because these two scales were recoded, this indicates that more supervisor opposition and more resistance to change are related to more supervisor support, positive, and negative personal outcomes. Factor scores for the three components were saved for use in further analyses. A description of the three components is given in Table 9.

Table 8

Varimax Rotation of Three Factor Solution for Specific LTSI Scales

Scale	Component 1 Job Utility	Component 2 Personal Orientation	Component 3 Environmental Interference
Peer support	**.753**	.116	.179
Opportunity to use	**.738**	.265	-.167
Perceived content validity	**.679**	.120	.084
Motivation to transfer	**.658**	.154	.137
Transfer design	**.622**	.277	.005
Personal capacity (R)	**.515**	-.029	-.326
Learner readiness	**.425**	.109	.161
Performance coaching	**.397**	.328	.198
Performance - self efficacy	.218	**.780**	-.064
Performance - outcomes expectations	.047	**.756**	.078
Transfer effort - performance expectations	.311	**.728**	-.097
SDLO	.146	**.726**	-.099
Supervisor opposition (R)	.216	.080	**-.781**
Personal outcomes - negative	.364	-.090	**.709**
Resistance to change (R)	.096	.278	**-.643**
Supervisor support	.360	.183	**.611**
Personal outcomes - positive	**.381**	.238	**.528**

Note. (R) = recoded scale

Table 9

Description of the Higher Order Factors

Factor	Description
Job Utility	The degree to which the training is designed to allow the learners to apply their newly learned knowledge and skills on the job. Also important for this factor are the time, resources, and feedback available for practicing on the job.
Personal Orientation	The degree to which the learner takes an active approach to work-related learning and feels confident about his ability to practice learned skills, and the expectations about being able to change job performance and consequential valued outcomes.
Environmental interference	The degree of supervisor and group support or opposition and the rewards or penalties for whether or not to apply learned knowledge and skills on the job.

The influence of Job Utility, Personal Orientation, and Environmental Interference on transfer. By calculating the above-mentioned factor scores, the set of variables for the regression analyses was completed. The third research question required to measure the influence of the factors Job Utility, Personal Orientation, and Environmental Interference on transfer. First a correlation matrix was composed, in order to gain insight in the coherence between the variables (Table 10). There is a significant positive correlation between the two dependent variables transfer for practice and transfer for learning. The hypothesized predictors Job Utility, Personal Orientation, and Environmental Interference all correlate significantly with transfer for practice and transfer for learning. Elapsed time only negatively correlates significantly with transfer for learning. Other interesting correlations are those between Job Utility and education and competence group and education. The correlations between elapsed time, age, and function level can be explained by the fact that new employees in the organization are obliged to attend the Pyramid Thinking training in their first year. New employees are mostly young (under 25 years), thus the older employees become, the longer ago they attended the training. Next to that, the older you become, the higher you climb in the organization's hierarchy and thus the higher your function level is. In summary, the correlation matrix provides enough evidence to further investigate the hypotheses in regression analyses.

Table 10

Correlations Between All Variables

Variable		1	2	3	4	5	6	7	8	9	10
1	Transfer for practice										
2	Transfer for learning	.53*									
3	Elapsed Time	-.08	-.18**								
4	Job Utility	.45**	.38**	-.05							
5	Personal Orientation	.23**	.32**	-.05	.00						
6	Environmental Interference	.23**	.20*	-.11	.00	.00					
7	Age	.09	-.03	.45**	.05	-.14	-.18*				
8	Function level	.10	-.07	.59**	-.05	-.04	-.14	.68**			
9	Education	.10	.07	.07	.31**	-.01	.01	-.09	-.01		
10	Gender	-.09	-.01	-.15	-.08	-.08	-.04	-.13	-.17*	-.13	
11	Group	-.18*	-.17*	.17*	-.20*	-.11	-.03	.01	-.02	-.35**	-.01

Note. *p < .05, **p < .01

Before conducting the multiple regression analysis, all variable scores were standardized (Jaccard, Turrisi, & Wan, 1990). After that, first a multiple regression analysis was carried out with the dependent variable transfer for practice. All predictors were entered using the backward method. SPSS computed the optimal model, model number 9, in which the independent variables elapsed time, function level, Job Utility, Personal Orientation, and Environmental Interference were present. The model was statistically significant and explained 35.2 per cent of the variance in transfer for practice ($F(5,150) = 16.323$, $p < .01$). In Table 11, an overview of the model is given. Job Utility, Personal Orientation, and Environmental Interference are all significant predictors ($p < .01$). Function level also appeared to have a significant positive effect on transfer for practice, indicating that the higher the function level, the more generalization and maintenance occurs ($\beta = .266$, $p = .001$). The most influential higher order factor predictor is Job Utility, with a β of .455, followed by Environmental Interference ($\beta = .249$) and then Personal Orientation ($\beta = .227$).

Table 11

Summary of Backward Regression Analysis on Transfer for Practice

Independent variable	*B*	*SE B*	*β*	*t*	*p*
Elapsed time	-.173	.082	-.173	-2.124*	.035
Function level	.306	.094	.266	3.248**	.001
Job Utility	.455	.066	.455	6.918**	.000
Personal Orientation	.227	.066	.227	3.446**	.001
Environmental Interference	.249	.066	.249	3.754**	.000

Note. $R^2 = .352$; *$p < .05$, **$p < .01$

The second multiple regression analysis was conducted using the dependent variable transfer for learning and the same independent variables. Again using the backward method, SPSS computed an optimal model (model 10). The model was statistically significant and accounted for 30 per cent of the variance in transfer for learning ($F(4,151) = 16.201$, $p < .01$). Job Utility, Personal Orientation, and Environmental Interference all had a significant positive effect ($p < .01$) on transfer for learning. The most influential higher order factor predictor is again Job Utility ($\beta = .373$) followed by Personal Orientation ($\beta = .312$) and Environmental Interference ($\beta = .185$).

Table 12

Summary of Backward Regression Analysis on Transfer for Learning

Independent variable	*B*	*SE B*	*β*	*t*	*p*
Elapsed time	-.127	.069	-.127	-1.857	.065
Job Utility	.373	.068	.373	5.479**	.000
Personal Orientation	.312	.068	.312	4.573**	.000
Environmental Interference	.185	.068	.185	2.700**	.008

Note. $R^2 = .300$; $^{**}p < .01$

The influence of elapsed time on transfer. In Table 11 and Table 12, the influence of elapsed time was shown. This information is necessary to answer research question four. Elapsed time is of significant influence on transfer for practice ($\beta = -.173$, $p < .035$). The β-value is negative, indicating that the more months ago the training was attended, the less generalization and maintenance is achieved. On transfer for learning a nearly significant effect of elapsed time was found ($\beta = -.127$, $p = .065$). This is also a negative effect, indicating that the longer ago the training was attended, the less transfer for learning occurs.

Interaction effects of elapsed time and the LTSI. The last research question concerned the hypothesized interaction effects of elapsed time and the LTSI factors on transfer. In the regression analyses, the interaction terms Job Utility - elapsed time, Personal Orientation - elapsed time, and Environmental Interference - elapsed time were included. These terms were deleted by SPSS during the backward regression analysis. In the analysis on transfer for practice all interaction terms were deleted in the fifth model. In the analysis on transfer for learning all interaction terms were deleted in the ninth model. This indicates that there is no interaction effect of these higher order factors and elapsed time on transfer for practice and transfer for learning.

6. Discussion

One of the main goals of this research was to assess the existence of a third component of transfer: transfer for learning. Goal was to distinguish generalization, maintenance, and transfer for learning. Generalization and maintenance are the two components of which existence authors agree upon (Baldwin & Ford, 1988; Burke & Hutchins, 2007; Cheng & Hampson, 2008). In this research, however, generalization and maintenance did not appear as different concepts in the factor analysis. This is probably because the concepts were operationalized as the same set of items, only differing in tense. The concepts were measured at the same time, which possibly led to confusion with the respondents. As a result, they probably gave nearly the same answers on the items of generalization and maintenance. In future research, when the goal is to measure as well generalization as maintenance, the measurement could be carried out at different moments in time instead of at one moment asking about different moments in time. Transfer for learning did appear as a different component in the factor analysis, which builds evidence for the assumption that transfer for learning is part of the definition of transfer. A significant correlation between the mean score for transfer for practice and the mean score for transfer for learning of .53 was found, which is a large effect according to Field (2009). This indicates that transfer for practice and transfer for learning are interrelated.

One would expect influences on the three components of transfer to be similar, in order to speak of one overarching concept of transfer. The higher order factors Job Utility, Personal Orientation, and Environmental Interference are of influence on as well transfer for practice as transfer for learning, albeit in a different order of importance. Elapsed time has a negative effect on transfer for practice, and a nearly significant negative effect on transfer for learning. Only, on transfer for practice, the function level of the employee plays an important role. This seems to be a difference between the components of transfer. However, the great amount of similarities in the effects on the components indicate evidence for the existence of three components within the concept of transfer.

The survey items which were used for measuring the components of transfer were directed at perceived transfer by the respondent. The question remains whether the respondents rate their achieved transfer different than others. This could be examined in future research, by for example including ratings of colleagues or managers and comparing these scores with those of the cases (Raemdonck, 2005).

Influences on generalization, maintenance, and transfer for learning. In this research, a new factor, SDLO, was included in the LTSI. The factor analysis on the LTSI scales, including SDLO, led to a set of three higher order factors, different than those found by Holton et al. (2000). However, there are similarities between the factors found in this research and the proposed categorization of Holton (1996). The factor Job Utility from this research can be linked to the ability/enabling elements, which consist for an important part of the training design. Personal Orientation matches with motivation elements, although in this research this factor is more focused on expectations of positive outcomes and motivation to transfer is not present in the factor. Environmental Interference can be logically linked to the environmental elements. Holton (1996) speaks of 'transfer climate' in his third factor, which Cheng and Ho (2001) defined as the social supports from the organization. Holton et al. (2000) tried to link their factors Job Utility, Rewards, and Climate to the categorization of Baldwin and Ford (1988). However, they were not able to make a good match between the two models, for example because trainee characteristics were not explicitly present in the framework of Holton et al. (2000). With the factors from this research, the connection seems a little clearer. Job Utility, just as in the research of Holton et al. (2000), roughly corresponds to training design. Although there are also some work environment influences present in this factor. Personal Orientation can be linked to trainee characteristics, although the trainee characteristic learner readiness of Holton et al. (2000) is not present in this factor. Environmental Interference corresponds with the category work environment. Adding SDLO to the LTSI factor structure thus seems a good solution. However, Holton et al. (2003) already indicated the need of additional research yielding descriptive and comparative data about organizational transfer systems. "As work continues with the instrument, new insights on the dynamics of organizational transfer systems are expected to emerge (Holton et al., 2003, p. 480)". Future research should continue to examine and improve the set of factors included in the LTSI.

Kirwan and Birchall (2006) developed a model of learning transfer, based on Holton's model. It includes relationships between the different LTSI factors. The model shows in which order, and with which interactions between them, the LTSI factors affect transfer. For example, they place motivation to transfer in the center, and assume that that scale is affected by a lot of other LTSI scales. However, they did not examine to what degree the model predicted transfer. The present research showed that the LTSI scales can be captured in the three higher order factors Job Utility, Personal Orientation, and Environmental Interference, and that those factors all have a significant effect on the achieved transfer. The factors roughly correspond with the factors that Holton (1996) assumed, but there are some differences. Further research could focus on using structural equation modeling or path analysis exploring as well the relations within the LTSI as the effects on transfer. In this way, the differences between the higher order factors in this research and those in the research of Holton et al. (2000) might be explained.

The influence of the LTSI and SDLO. In both regression analyses on the dependent variables, the factors Job Utility, Personal Orientation, and Environmental Interference had a significant positive effect. It can thus be concluded that higher scores on the LTSI factors and SDLO lead to an increase in generalization, maintenance, and transfer for learning. Job Utility appears to be the most important factor influencing transfer. On transfer for practice, Environmental Interference is of greater influence than Personal Orientation. On transfer for learning, Personal Orientation is of greater influence than Environmental Interference. Trainee characteristics or personal characteristics might be the most important predictors for transfer for learning. According to Park (2008), self-directed learning, and thus transfer for learning, is sometimes even described as a personal attribute.

Notable in the factor Environmental Interference were two negative factor loadings of the reversed scales supervisor opposition and resistance to change. With the positive effect of Environmental Interference on transfer, it seems like supervisor opposition and resistance to change lead to more transfer. This might be explained by the idea that negative attention is better than no attention. It might not be that important that trainees are positively stimulated to transfer, as long as there is attention for training and transfer anyway. This is an interesting finding, suggesting that when an organization is very negative or critical about learning and development, this leads to more transfer than when an organization do not care.

There was a small difference in the amount of variance that was explained in the regression analyses. However, this might be explained by the theory mentioned by Park (2008) that transfer for learning is closely related to personality characteristics. Next to that, function level was of influence on transfer for practice. This might also contribute to the amount of variance that was explained by the model. The influence of function level can be explained from the fact that the higher the function level is, the more autonomy the employee receives. Therefore, factors like manager support and opposition, resistance to change, and opportunity to use, might be not that important anymore. An employee with a higher function level might have more freedom to try to transfer. Another possible reason for this effect of function level, might be the difference in work activities between employees with a high and a lower function level. Perhaps the employees with a high function level more often work on tasks in which the learned knowledge and skills of the training can be used.

Though the regression models in this research were significant, they only explained 35.2 per cent and 30 per cent of the variance in the components of transfer. This is an important amount of influence, though it also indicates that this set of predictors is not complete yet. Especially more trainee characteristics, for example cognitive ability, might complement the models. Holton et al. (2000) already indicated that they only had included a few trainee characteristics in the LTSI, in future research, the model might be improved by including those factors.

Awoniyi, Griego, and Morgan (2002) examined the person-environment fit effects on transfer of training. "Person-environment fit theories explain human behavior as a function of the fit in the interaction between the person and the environment (Awoniyi et al., 2002, p. 26)." They found that a fit on autonomy, workload pressure, availability of resources, and promoting creativity influence positive transfer of training. The conclusion of their research is that a fit between an individual and his or her environment contributes to predicting transfer of training. This indicates that the perceived degree of e.g. autonomy might be equal for two employees, but their achieved transfer can still differ because of different expectations. This might also be the case with the LTSI factors and their influence

on achieved transfer. There probably does not exist a transfer promoting climate with the perfect conditions for everyone. Organizations have to find a most optimal solution.

After conducting a review study, Grossman and Salas (2011) summarized a number of important factors that affect transfer of training, as is done in this research. They state that in the future, the specific factors need to be closer looked at. The same emanates from this research. A set of variables has proven to have an influence on transfer of training, now it is important to investigate these variables more closely. What are the priorities within the variables, and how can an organization implement the necessary conditions for transfer? When do the specific variables play a role: before, during, or after training (Saks & Belcourt, 2006)? Those are important questions in improving transfer of training in organizations.

The influence of elapsed time. Elapsed time appeared to have a negative effect on both transfer for practice and transfer for learning. An increase in elapsed time leads to a decrease in generalization, maintenance, and transfer for learning. Employees less apply the learned knowledge and skills on the job and are less interested in learning more about the subject after a period of time.

The effect of elapsed time on transfer thus appeared present, but was not large. Perhaps there are interaction effects in play. This research failed to demonstrate such effects, but future research might show interaction effects with new variables. Or the relatively small sample size might be the reason that interaction effects did not appear in this research. Another reason for the small effect of elapsed time might be that the relationship with transfer is not linear. Baldwin and Ford (1988) already showed some example learning curves, which had a different course than a linear curve. More research concerning the effect of elapsed time on transfer is needed to examine these hypotheses.

Interaction effects. Interaction effects of the LTSI higher-order factors and elapsed time were not found in the regression analyses. Higher scores on the LTSI factors do not significantly weaken the relationship between elapsed time and generalization, maintenance, and transfer for learning.

That there were no interaction effects found, might be due to the large set of variables that were used in the interaction terms. The higher-order LTSI factors were an aggregation of the LTSI scales. Perhaps interaction effects exist, but with specific LTSI scales. Those effects might not have become visible because of the aggregation of the scales. In future research with larger samples, interaction effects with specific LTSI scales could be researched.

Limitations. When reading the conclusion of this study it is important to keep the limited sample size in mind. A sample of 156 is small for the factor analyses and regression analyses carried out in this study. With a larger sample size, the results of the analyses might be different than those found in the present study. A second limitation concerns the training content. In case of this research among the training Pyramid Thinking, the training consists for a great part of 'soft skills' (intrapersonal and interpersonal skills). Laker and Powell (2011) state that transferring soft skills to the job is harder than transferring so called hard (technical) skills. Burke and Hutchins (2008) also indicate that different types of transfer interventions might be needed for training content that is highly skill-driven or experiential than for training content more focused on cognitive outcomes. In transfer research, the training content is often not included as a variable, which is also the case in this research. Repeating this research with a different type of training might therefore lead to different results. Moderating variables like the type of training content could play a role in future transfer research (Burke & Hutchins, 2008).

Conclusion. This study has produced the first indications for the existence of the component transfer for learning. In a knowledge economy, where the relationship between learning and working gains more and more popularity (Bolhuis & Simons, 2011), the effect of training on self-directed learning also becomes more important. According to Waals (2011), self-directed learning is a suitable concept for organizations that continuously have to adapt to a changing environment. For organizations that have to be knowledge productive, transfer for learning therefore is an important concept to keep in mind when developing HRD policy. In future research, this component of transfer could be further explored. Because (self-directed) on-the-job learning might also influence how employees enter and participate in a training, future research could also focus on this possible cyclical effect concerning training and learning on-the-job.

The results of this research show that the whole of LTSI factors and SDLO are important for achieving transfer of training. HRD practitioners and training designers should keep these factors in mind and also be aware of the negative effect of elapsed time since training. There are several possible

interventions available to counter these effects, e.g. goal setting and relapse prevention (Hutchins & Burke, 2006; Richman-Hirsch, 2001). HRD practice can explore these possibilities, and consider whether to use them or not.

In a focus group, the most important factors influencing transfer of training were designated (Appendix C). According to the focus group, manager support is a very important prerequisite for achieving transfer. It is important for organizations to realize that managers are important stakeholders in the learning process of their employees. Encouraging managers to help employees in defining learning goals and evaluating learning outcomes can lead to more transfer. Other important factors which L&D departments can promote are transfer design, learner readiness, opportunity to use, and resistance – openness to change.

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Appendix A - Survey items

Below, the in this research new developed survey items for the scales generalization, maintenance, and transfer for learning are shown. All items had a 5-point Likert scale, in which 1 = completely disagree and 5 = completely agree. Question 3 contains the generalization items, question 4 contains the maintenance items, and question 5 contains the transfer for learning items.

Vraag 3 en 4 gaan over de mate waarin je het geleerde uit de training Pyramid Thinking toepast in je werk. Let er op dat vraag 3 gaat over wat je in de periode (kort) na het volgen van de training gedaan hebt, en vraag 4 over wat je tegenwoordig doet.

3) IN DE PERIODE (KORT) NA HET VOLGEN VAN DE TRAINING Pyramid Thinking deed ik het volgende:

- Wanneer ik een document (rapport, presentatie, memo, etc.) opstelde, beschreef ik eerst mijn publiek, doel, de situatie, het probleem en de vraag, of stuurde ik hierop.
- Wanneer ik een document (rapport, presentatie, memo, etc.) opstelde, bouwde ik eerst een piramidestructuur met een hoofdboodschap en onderbouwing daarvan, of stuurde ik hierop aan.
- Wanneer ik een mail opstelde of een gesprek voerde, had ik voor wat ik wilde zeggen een kernboodschap en onderbouwing in mijn hoofd.
- Voordat ik een document concreet uitwerkte, controleerde ik eerst of de piramide klopte, of liet ik dit door de verantwoordelijke controleren.
- Bij een 'projectstart' stelde ik als mogelijk antwoord een hypothese op, die ik probeerde te falsifiëren.

4) TEGENWOORDIG doe ik in mijn werk het volgende:

- Wanneer ik een document (rapport, presentatie, memo, etc.) opstel, beschrijf ik eerst mijn publiek, doel, de situatie, het probleem en de vraag, of stuur ik hierop aan.
- Wanneer ik een document (rapport, presentatie, memo, etc.) opstel, bouw ik eerst een piramidestructuur met een hoofdboodschap en onderbouwing daarvan, of stuur ik hierop aan.
- Wanneer ik een mail opstel of een gesprek voer, heb ik voor wat ik wil zeggen een kernboodschap en onderbouwing in mijn hoofd.
- Voordat ik een document concreet uitwerk, controleer ik eerst of de piramide klopt, of laat ik dit door de verantwoordelijke controleren.
- Bij een 'projectstart' stel ik als mogelijk antwoord een hypothese op, die ik probeer te falsifiëren.

Pyramid Thinking is een methode om je communicatie te structureren. Misschien ben je na het volgen van de training nog verder gaan leren op dit gebied. Hier zijn de volgende vragen op gericht. Waar vermeld wordt 'op dit gebied' of 'over dit onderwerp', gaat het om Pyramid Thinking en/of andere methoden voor het structureren van communicatie. Houd dit in gedachten bij het beantwoorden van de volgende vragen.

5) Beantwoord de volgende vragen:

- Wanneer ik iets nieuws wil leren op dit gebied wat nuttig kan zijn voor mijn werk, onderneem ik initiatief.
- Ik voel zelf aan wanneer het tijd wordt om op dit gebied bij te leren voor mijn werk.
- Ik streef naar uitwisseling van ervaring met mensen die enthousiast zijn over dit onderwerp.

- Ik test mezelf om te weten of ik grondig geleerd heb op dit gebied.
- Wanneer ik leer over dit onderwerp, begrijp ik meer van de wereld om me heen.
- Sinds de training heb ik op dit gebied veel nieuwe dingen geleerd op eigen initiatief.
- Ik zoek vaak informatie op om meer te weten te komen over dit onderwerp.
- Ik zal nooit te oud zijn om voor mijn werk nieuwe dingen te leren over dit onderwerp.
- Ik wil graag betrokken zijn bij projecten op dit gebied, omdat deze mij kansen bieden tot leren.
- Ik onderneem graag zelfstandig leeractiviteiten op dit gebied.
- Leren over dit onderwerp vind ik een belangrijk aspect in mijn arbeidsleven.
- Ik geef niet op wanneer ik iets moeilijks aan het leren ben op dit gebied
- Ik vind altijd wel tijd als ik iets wil leren op dit gebied.
- Ik weet welke stappen ik moet ondernemen als ik op dit gebied iets nieuws wil leren.

Appendix B - Five Factor Solution for Transfer

Varimax Rotation of Five Factor Solution for Transfer

Item	Component 1	Component 2	Component 3	Component 4	Component 5
Transfer for learning 5	**.785**	.057	.139	.007	-.038
Transfer for learning 7	**.693**	.093	.189	.223	.178
Transfer for learning 10	**.689**	.208	**.407**	-.058	.132
Transfer for learning 6	**.672**	.066	.093	.102	.127
Transfer for learning 3	**.626**	.258	.204	.132	.075
Transfer for learning 4	**.603**	**.408**	.216	.255	-.009
Transfer for learning 9	**.568**	.126	**.434**	.068	.079
Transfer for learning 11	**.543**	.146	**.460**	-.049	-.079
Transfer for learning 13	**.395**	.217	**.373**	.066	.240
Generalization 4	.113	**.832**	.090	.222	-.021
Maintenance 2	.233	**.782**	.109	.008	.307
Maintenance 4	.256	**.769**	-.030	.237	-.026
Generalization 2	.101	**.765**	.239	.058	.308
Transfer for learning 12	.257	.090	**.796**	.043	.064
Transfer for learning 8	.202	.048	**.751**	.013	-.059
Transfer for learning 1	.138	-.001	**.582**	.325	.164
Transfer for learning 14	.220	.167	**.530**	.117	.135
Transfer for learning 2	.175	.029	**.374**	.283	.173
Generalization 5	.064	.202	.159	**.878**	.043
Maintenance 5	.175	.248	.117	**.878**	.106
Maintenance 1	.133	.115	.047	.076	**.903**
Generalization 1	.070	.177	.165	.093	**.841**

Appendix C - Focus group

In order to gain insight in how to improve important factors within the LTSI, a focus group was organized. Seven respondents participated in the focus group. One day before the focus group, they were sent an e-mail document with all LTSI factors and the SDLO and their definitions and descriptions. They were asked to read these through before participating in the focus group. In the focus group, first the results of the quantitative research part were briefly introduced to the respondents. After that, a poster with all LTSI factors and SDLO was hung up, categorized according to the components Job Utility, Personal Orientation, and Environmental Interference. The respondents received a hard copy of the document that they had already received by e-mail. The respondents were asked to carefully read through the document again, and then individually stick three post-its to the most important factors for applying learned knowledge and skills on the poster. After that, a discussion about how to enhance the most important factors according to the respondents started.

Job Utility factors were mentioned 11 times, Personal Orientation factors two times, and Environmental Interference factors 8 times in the focus group. These results support the quantitative result that Environmental Interference was of greater influence than Personal Orientation on transfer for practice.

The most mentioned factor in the focus group was supervisor support (five times), followed by transfer design (three times), learner readiness, opportunity to use, and resistance to change (two times). Content validity, personal capacity, performance coaching, peer support, performance - outcomes expectations, performance self-efficacy, and positive personal outcomes all were mentioned one time. Supervisor support, transfer design, learner readiness, opportunity to use, and resistance to change thus seem to be the most important factors for respondents in this organization. Supervisor support also received a low mean score of 2.120. HRD practitioners could thus especially take this factor into account.

In the discussion on the factor supervisor support, the respondents mentioned the importance of strategic alignment on the curriculum in the organization. A specific training program is not always supported by all stakeholders, which can have a negative effect on training outcomes. Next to that, the respondents mentioned the need for advice in developing. A manager should discuss and evaluate employees' learning goals on a regular base.

With regard to the training design, the respondents mentioned the commitment of the trainer. A quality training design can only be reached when the trainer has the time and materials for it. Organizations could thus support their trainers in this. The respondents, just as Laker and Powell (2011) and Burke and Hutchins (2008) mention that the difference between for example soft skills and hard skills training is important to consider when designing a training.

A last important point made by the respondents, concerning learner readiness, is the availability of work projects in which training skills can be practiced. Directly after a training, there is not always a project available for practicing the learned knowledge and skills. With this, the respondents state a need for just-in-time training, which more seamlessly links learning and working (Jones, 2001). HRD practitioners should bear this in mind, but this is also an interesting area for future research.