UNIVERSITY OF SOUTHERN QUEENSLAND

UNDERSTANDING THE PROCESS OF TRANSFER OF TRAINING IN THE WORKPLACE.

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This thesis is submitted as a requirement for the award of

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CERTIFICATION OF THESIS

I certify that the work contained in this thesis is original and that it contains no material written by another person, except where otherwise acknowledged. I also certify that the material has not been previously published, except where otherwise acknowledged, or submitted for any other award at any other higher education institution.

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ENDORSEMENT

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Gerard J. Fogarty (Supervisor) Date

LIST OF PUBLICATIONS AND CONFERENCE PRESENTATIONS

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ABSTRACT

This thesis aimed to describe the conditions under which transfer of training would occur and the processes that are involved in the transfer of training to the workplace. Two studies were conducted that assessed the individual, situational, and training design factors that impacted on the transfer of training to the workplace. Study 1 examined the influence of individual and situational factors on the achievement of trainees' transfer goals. Trainees' goals for transfer and their commitment to those transfer goals were found to act as mediators of the influence of self-efficacy, motivation, and situational constraints on transfer goal achievement. This result supported previous research that has shown that the impact of personal and situational factors on performance is mediated by the personal goal level and level of goal commitment (Wofford, Goodwin & Premack, 1992). Study 2 was based on a model of the determinants of training transfer proposed by Thayer and Teachout (1995). The model was modified to focus on the determinants of trainees' transfer implementation intentions and implementation activities. Climate for transfer was assessed prior to training commencing and was found to influence pre-training levels of self-efficacy. However, positive and negative affect also influenced pre-training levels of both self-efficacy and motivation, and the two climate for transfer factors (Positive and Negative Work Climate) were found to influence positive and negative affectivity, respectively. It was concluded that climate for transfer does impact direct and indirectly on pre-training levels of self-efficacy and motivation. A second structural model found that pre-training self-efficacy is a strong determinant of the learning that occurs during training, and the level of post-training self-efficacy. Post-

training self-efficacy is a strong determinant of transfer implementation intentions, which in turn were a strong determinant of implementation activities. Implementation activities were positively related to transfer success. Separate structural models were developed to assess the impact of in-training transfer enhancing activities on learning, post-training self-efficacy, transfer implementation intentions, and implementation activities. Self-control cues, relapse prevention activities, and goal setting (when assessed separately) were found to positively influence post-training self-efficacy and implementation intentions. Relapse prevention activities and goal setting (when assessed separately) were also found to positively influence implementation activities. The results strongly supported the modified model of training transfer that was presented. It was also concluded that situational factors do exert an indirect influence on the transfer process, apart from simply influencing what trainees are able to do after training has completed (Mathieu & Martineau, 1997, Quiñones, 1997).

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

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CHAPTER ONE: INTRODUCTION

Overview of the Field

The field of training research has recently undergone a major paradigm shift with the development of several integrative models designed to explain when, why, and for whom training is most effective (Ford, Kozlowski, Kraiger, Salas & Teachout, 1997; Quiñones & Ehrenstein, 1997; Tannenbaum & Yukl, 1992). The combination of a number of factors has been instrumental in bringing about this shift and contributing to the rapid development of both the quantity and quality of training research. These include: systematic research into the contextual factors that influence training effectiveness (Holton, 1996; Kozlowski & Salas, 1997; Quiñones, 1997); the application of theories of learning which incorporate cognitive, skill-based, and affective outcomes to the evaluation of training (Ford & Kraiger, 1995; Kraiger, Ford & Salas, 1993; Smith, Ford, & Kozlowski, 1997); advances in the development and the use of high-technology training methods (Carroll, 1997; Steele-Johnson & Hyde, 1997); and the development of closer linkages between training-related theories and techniques (Cannon-Bowers, Tannenbaum, Salas & Converse, 1991; Salas, Cannon-Bowers & Blickensderfer, 1997). While the field of training has previously been characterised as largely atheoretical by a number of reviewers (Campbell, 1971; Goldstein, 1980; Wexley, 1984), it now appears that the integration of research and practice is well advanced (Ford, et al., 1997; Ford & Kraiger, 1995; Quiñones & Ehrenstein, 1997; Salas & Cannon-Bowers, 1997).

The developments described above in the field of training research have coincided with enormous changes in the workplace. Hunt (1995) conducted an analysis of the

effects of technological changes on the cognitive demands made on workers and concluded that the cognitive complexity of work tasks is increasing with the result that greater demands are placed on the workforce. Workers are increasingly valued for their ability to learn new skills and rapidly adapt to changes in the nature of their work (Howard, 1995; Thayer, 1997). Therefore, training should aim to facilitate the acquisition of skills that are crucial to the attainment of individual and organisational objectives and thus ensure that workers are able to meet the challenges they are facing.

For training to be regarded as being effective, it must be possible to demonstrate that the objectives of the training have been achieved. This is accomplished in the "evaluation" phase of the instructional design process and is explicitly incorporated in models such as the Instructional Systems Design (ISD) model (Goldstein, 1993). Although evaluation occurs during and after training, it should be planned before training actually begins. Evaluation should first of all attempt to determine whether the trainees have improved, that is, whether they have acquired new knowledge, skills or attitudes. The second and third aims of evaluation are to determine whether the training programme was responsible for any improvements and, if so, whether the training programme proves to be effective for other trainees (Goldstein, 1993; Kraiger & Jung, 1997). In order to assess changes in the trainees, it is necessary to specify the criteria that will be used. These typically fall into two categories: "learning outcomes" and "performance outcomes". The processes by which the learning outcomes are translated into performance outcomes are the main areas of interest in the current research project.

Research that stems from the instructional design and educational psychology fields has often given greater emphasis to the evaluation of trainees' learning outcomes

and providing feedback to the trainer or curriculum designer (Kraiger, 1995/96). However, the research undertaken from the Industrial/Organisational (I/O) psychology perspective gives equal emphasis to the learning outcomes and the performance outcomes achieved. This reflects the focus of I/O psychology on the difference that training makes to trainees' actual job performance.

The transfer of training to the workplace is also one of the areas identified by Goldstein (1993) as a guide for evaluating the validity of training. Transfer validity involves assessing whether what was learned during training is transferred on-the-job as enhanced performance. The goal of assessing the determinants of transfer of training in the workplace was chosen as the major topic for research in the current series of studies.

Positive transfer of training has been defined as "the degree to which trainees effectively apply their knowledge, skills and attitudes gained in a training context to their job" (Baldwin & Ford, 1988, p. 63). This definition differs from the more traditional view in the field of instructional and cognitive psychology which has defined transfer as the extent to which previous learning will influence new learning in a different context (Patrick, 1992). In the traditional view, positive transfer refers to where new learning is made easier by previous learning while negative transfer refers to where previous learning interferes or hinders new learning (Misko, 1995). Where there is no influence exerted, then zero transfer occurs.

Baldwin and Ford's (1988) definition of transfer does not allow for negative transfer to occur. Transfer of training is only held to exert a positive influence on subsequent performance, even if that influence is not generalised to other areas or maintained over a period of time. Transfer failure is explained as the lack of a positive

relationship between learning outcomes and subsequent performance, rather than as a negative influence of learning outcomes on performance.

Various authors (Kraiger, 1995/96; Quiñones & Ehrenstein, 1997) have also described other fundamental differences between the I/O psychology and cognitive/instructional psychology transfer paradigms. In particular, Kraiger highlighted the different research designs that are typically used, the different measures of transfer used, and the different environments in which transfer occurs. The I/O psychology paradigm has typically used correlational research designs, which assess the impact of training outcomes on a measure of performance or proficiency in a non-training environment at a much later time. This is substantially different from the cognitive/instructional psychology paradigm which used experimental designs which varied only the quality or type of initial instruction and assessed the impact of transfer on indices of learning which differed from the original learning tasks only in terms of similarity or time. There have been a number of recent attempts to combine these different paradigms (e.g., Ivancic & Hesketh, 1995/96; Kraiger, 1995/96; Smith, Ford, & Kozlowski, 1997). However, there remains considerable confusion in the research literature about the conditions under which training provides trainees with skills and knowledge that transfer successfully to other settings, and the processes that allow these skills and this knowledge to transfer to other settings.

In order to specify the conditions that promote the transfer of training and the processes underlying transfer of training, a review of the literature will be undertaken to extend the review provided by Baldwin and Ford (1988) and subsequently updated by Ford and Weissbein (1997). This review will outline the existing models of transfer and

describe research that has examined the influence of training design factors, trainee characteristics, and contextual influences on transfer of training. It will also examine some of the processes associated with the way in which skills and knowledge are transferred by examining interventions that have been used to enhance the transfer of training, as well as some of the difficulties associated with the measurement of training and transfer outcomes. Finally, a set of specific propositions relating to the transfer of training in the workplace will be outlined. The next section will review the development of existing models of transfer of training.

Models of Transfer of Training

Noe (1986) proposed one of the first models that identified individual characteristics as an important determinant of learning and training effectiveness. Noe and Schmitt (1986) proposed that trainees' attitudes, interests, values, and expectations may attenuate or increase training effectiveness primarily through their influence on trainees' motivation to learn. In their model, motivation to learn was regarded as a direct antecedent to learning. The relationship between learning and behaviour change (i.e., training transfer) is hypothesised as being moderated by the trainees' motivation to transfer their newly learned skills to their workplace. Motivation to transfer was thought to depend upon trainees' perceptions of the task constraints and social support for the use of their new skills, both of which were aspects of environmental favourability. The outcome variables in their model included the four criteria for evaluating training effectiveness proposed by Kirkpatrick (1967). These were (a) trainees' reactions to training, (b) learning, (c) behaviour change, and (d) organisational results.

Baldwin and Ford (1988) proposed a framework for understanding the transfer process by suggesting that training transfer depended on training-input factors, training outcomes, and conditions of transfer. Training-input factors included the design of training, characteristics of the trainee, and work-environment characteristics. Training outcomes were defined as the amount of original learning that occurred during the training programme and the amount retained after the training programme was complete. Finally, the conditions of transfer included both the generalisation of what was learnt during training to the job context, as well as the maintenance of the new learning over time while on the job. All three training input factors were viewed as directly affecting the training outputs of learning and retention, which in turn influenced the conditions of transfer. The model also proposed a direct effect of trainee characteristics and work-environment characteristics on the conditions of transfer, regardless of how much was learned during training or retained after training.

Recently, a number of comprehensive models of the determinants of training effectiveness have been proposed. Tannenbaum, Mathieu, Salas, and Cannon-Bowers (1991) and Cannon-Bowers, Salas, Tannenbaum, and Mathieu (1995) developed a longitudinal, systems-oriented model of training effectiveness in which events that occur before, during, and after training are linked to a number of outcome variables. Individual characteristics such as trainee expectations, desires, and motivation are proposed as important determinants of the training outcomes and transfer of training. Organisational and situational variables were proposed as having both direct effects on the transfer of training and indirect effects through their influence on the trainees' expectations and motivation. Other characteristics of the individual that may also affect the outcomes of

training were cognitive ability, self-efficacy, locus of control, attitudes towards the organisation, and the expectations about the utility of the training.

Thayer and Teachout (1995) presented a simplified model that focused on two aspects of the training process that might impact on transfer: the climate for transfer of training, and the transfer-enhancing activities that occur during the training program. The climate for transfer construct has been the focus of recent research by Rouiller and Goldstein (1993), Tracey, Tannenbaum and Kavanagh (1995), and Quiñones (1995). Two types of transfer climate constructs were proposed: antecedents, such as goal cues, social cues, and task cues, and consequences, such as positive and negative reinforcement, punishment, and extinction. The in-training, transfer-enhancing activities included: overlearning, fidelity, varied practice, principles-meaningfulness-learning points, cues to monitor one's own performance, relapse prevention training, goal setting, and the support of top management.

Thayer and Teachout (1995) recognised that there were a number of other variables that also impacted on the effectiveness and outcomes of a training program. These included individually oriented variables such as trainee ability, trainee self-efficacy, previous knowledge and skill, reactions to training, and the level of understanding. Other variables that might impact on the learning process included locus of control, job involvement, and career attitudes. The relationships between the climate for transfer, the in-training, transfer-enhancing activities, the other influences on learning and the key outcomes of learning, transfer and results are presented in Figure 1.1.

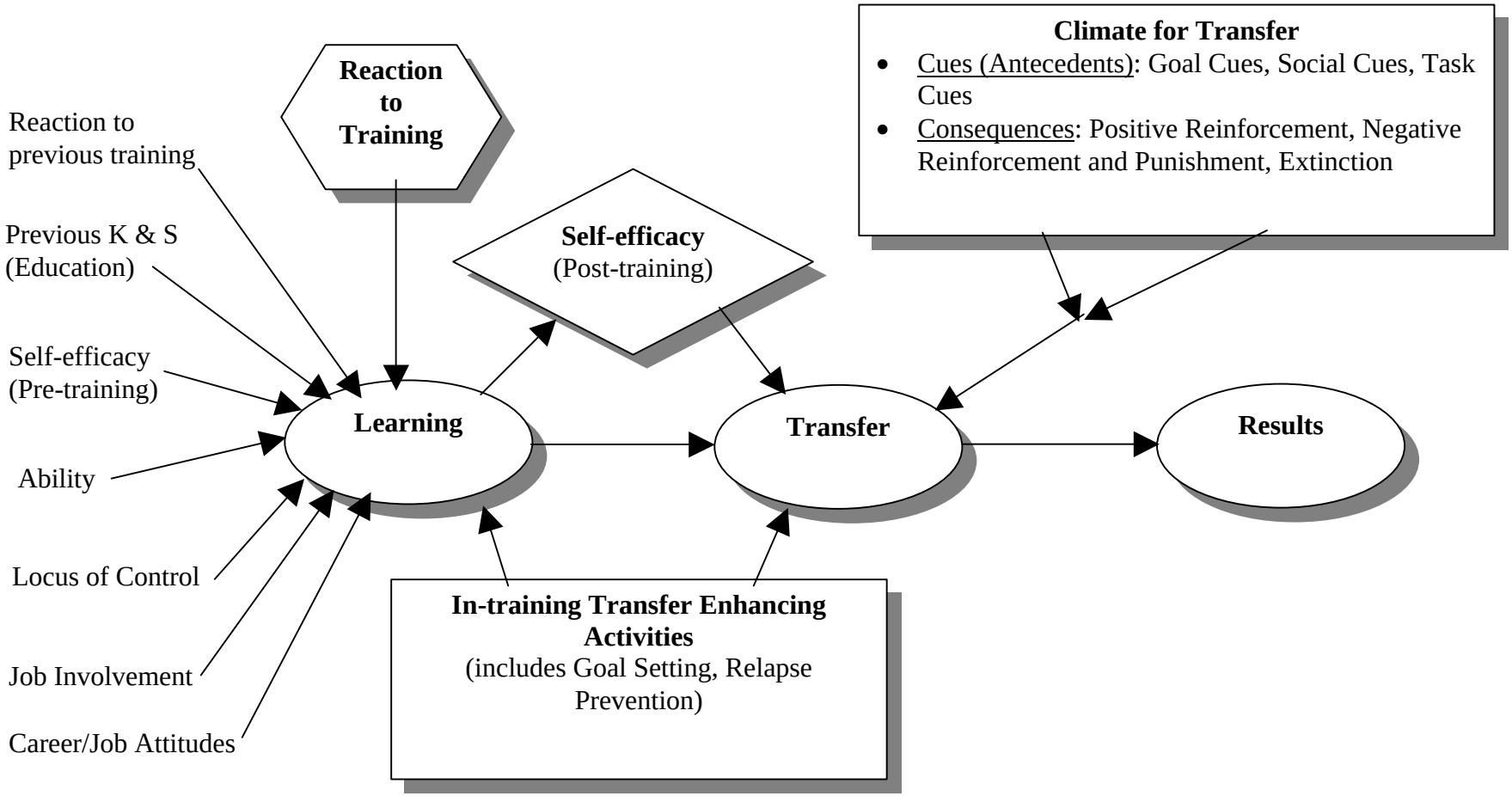

Figure 1.1. Transfer Training Model from Thayer and Teachout (1995).

Holton (1996) also proposed a comprehensive model of transfer of training that included three primary outcomes: individual learning, individual performance, and organisational results. The model also specified the influence of intervening variables on the outcomes and indicated the direction of causal effects. Holton suggested that the intervening variables be separated into primary influences on the outcomes and secondary influences that are mediated by the primary intervening variables. The intervening variables are grouped into three major types of influences: motivational influences, environmental influences, and trainees' abilities or enabling influences. Each of the primary influences is related to each of the three outcomes. For example, for the outcome of individual learning, the primary motivational influence is motivation to learn, the primary environmental influence is reactions to the training climate, and the primary enabling influence is the trainees' experience and ability. For the outcome of individual performance, the primary motivational influence is motivation to transfer, the primary environmental influence is the transfer climate, and the primary enabling influence is the design of the training. Finally, for the outcome of organisational results, the primary influences are: the expected utility of training or return on investment of time and resources, the external events that constrain or amplify productivity, and the linkage between training and the strategic objectives of the organisation.

The major advantages of Holton's (1996) model are that it enabled the critical outcomes of training and influences on those outcomes to be identified, the relationships between these constructs and the direction of causality to be specified, and specific predictions to be tested.

Other models of the determinants of training transfer include Foxon (1993), Yelon (1992) and Milheim (1994). Foxon conceptualised transfer of training as a multi-stage process beginning with intention to transfer and moving through initiation, partial transfer and conscious maintenance to unconscious maintenance. Foxon also developed a framework that examined the effects of inhibiting and supporting factors on intentions to transfer. For the transfer process to proceed through the various stages until transfer is complete, the supporting factors must outweigh the inhibiting factors. Yelon proposed that four factors are primarily responsible for successful transfer: trainee motivation, the trainees' awareness of when to use their new skills, the actual level of skill developed, and the support provided to trainees in their workplace. Milheim emphasised the need to develop pre-training training and post-training strategies that would foster transfer, similar to the prescriptions offered by Broad and Newstrom (1992).

The comprehensive models of transfer of training that have been developed by Cannon-Bowers et al. (1995), Thayer and Teachout (1995), and Holton (1996) have only been partially tested and therefore lack extensive empirical support. Essential elements that the existing models of training effectiveness share include: specification of the relevant training design factors, individual characteristics, and organisational and situational variables that influence individual learning during training, individual performance after training, and subsequent organisational results. It is also essential for a comprehensive model of training effectiveness to provide a description of the events before, during and after training that impact on training outcomes and the process of transfer that occurs after training has completed.

The following section will describe research that has examined the influence of training design factors on training outcomes and transfer of training. This will be followed by further sections describing the influence of individual characteristics on training outcomes and transfer of training, the organisational and situational variables that impact on training outcomes and transfer of training, interventions that have been designed to improve the transfer of training, and issues associated with the measurement of training and transfer outcomes.

Training Design Factors Related to the Transfer of Training

There has been an extensive amount of empirical research into the characteristics of the training design which impact on the transfer of training. However, the overwhelming majority of these studies have been laboratory studies that have focused on the effects of learning a specific task on subsequent acquisition of another task. In these studies, the "learning" task and the "transfer" task are usually of the same type, for example, recall tasks (Kraiger, 1995/96).

It is usually assumed that the training design principles that have been discovered using the above approach will generalise to other settings, such as where the learning task is actually a training programme with multiple tasks delivered outside of a laboratory setting. Also, the transfer task may involve a measure of performance across a range of criterion tasks in a totally different setting such as the trainee's workplace, at a much later time. Therefore, there may be substantive differences between the "learning" environment and the "transfer" environment, which may impact on the trainees' capacity to transfer their skills learned during training.

This section will aim to review the research that has assessed how the degree of transfer is affected when the "learning" task and the "transfer" task are complex, cognitive tasks, and when the "transfer" environment differs substantially from the "learning" environment. This perspective is more closely aligned to the traditional I/O psychology view of transfer than with the cognitive-instructional psychological view.

Baldwin and Ford (1988) reviewed the organisational training literature to determine basic learning principles that had been found to impact on training outcomes or transfer of training. They cited the work of McGehee and Thayer (1961), who found that the majority of the empirical research linking learning principles to the design of training could be summarised into four basic principles. These were (1) the use of identical elements, (2) the teaching of general principles, (3) the provision of stimulus variability, and (4) the conditions of practice. While these principles have been extensively researched from a behaviourist perspective, recent research from a cognitive, information processing perspective has highlighted a number of areas in which the impact on transfer of learning is markedly different from that predicted from earlier research (Druckman & Bjork, 1991, 1994). This research will be reviewed for each of the above principles, and then training design issues associated with the development of adaptive expertise will be considered.

Identical elements. The use of identical elements has been the focus of research that has been conducted over the course of this century. Thorndike and Woodworth (1901) are cited as conducting some of the first studies on the topic of transfer. Their studies, which involved estimating the area of rectangles, showed that extensive training in how to estimate the area of the practice stimuli did not enable subjects to improve their

ability to judge the area of new figures that included rectangles, triangles, and circles. The subjects also failed to improve their ability to estimate the area of successively larger rectangles during the practice trials, indicating that they were attending to specific stimuli that did not allow the transfer of training to occur. Singley and Anderson (1989) concluded that all of the studies that have demonstrated transfer have found that it occurs most often between highly similar situations, and that little positive evidence exists of more general transfer. However, it is not yet clear in what crucial ways the tasks or situations must be similar for transfer to occur. Cognitive theorists such as Anderson (1983, 1987) hold that the development of procedural knowledge underlies the transfer of declarative knowledge across different tasks.

One aspect of task similarity that has been investigated is the concept of fidelity. When the physical characteristics of the transfer environment match the learning environment, the actual stimuli may be identical. However, there may be an even more important dimension to fidelity that occurs when the psychological meaning attached to two situations is identical. Holding (1991) labeled this type of fidelity as functional fidelity, and suggested that it may be achieved even without a high level of similarity of the physical environments. The growing use of flight simulators to train novice pilots to fly highlights the importance of fidelity in training. Lintern (1991), commenting on the evidence emerging from flight training research, concluded that the level of detail provided in flight simulators only needs to be sufficient to provide trainees with the relevant information, and not identical in every detail. Lintern argued that the identities that support transfer are primarily informational, and that they can be identified through task analysis. However, he also recognised that there is not yet a well-developed

theoretical perspective that accounted for the diverse transfer effects. He advocated further research into the aspects of similarity that can be utilised during instruction to enhance transfer of training.

Alessi (1988) reviewed the necessity for fidelity in the design of instructional simulations, and also concluded that reducing the amount of information can enhance transfer, provided that all of the crucial information is made available. Gick and Holyoak (1987) also concluded that the level of perceived similarity between the training and transfer tasks is more important than the actual similarity. Therefore, it is likely that a greater level of physical fidelity would not enhance the overall transfer of the trainees' skills, provided that the appropriate level of psychological or functional fidelity is achieved in the training setting.

General principles. Another line of research that has been developed over the course of this century involved the benefit of teaching general principles. Early research by Judd (1908) involved teaching students how to throw darts at targets underwater. The treatment group was given instruction in how to use the principle of the refraction of light to hit their targets, while a control group practiced without instruction. The transfer task involved attempting to hit targets at varying depths in the water. The experimenters found that the experimental group was better at hitting the underwater targets. However, this result did not constitute transfer of a general principle as the instruction was given using the same task that was used as the transfer task. Numerous studies since that time have also failed to demonstrate that teaching general principles or problem solving strategies has any overall beneficial effect (Detterman, 1993; Holding, 1991).

Salomon and Perkins (1989) have differentiated between “high-road” and “low-road” transfer. Essentially, high-road transfer focuses on assisting learners to develop abstract schemas that can be applied across a number of different types of situations. Low-road transfer involves the development of context-specific skills that, after a great deal of practice, become fairly automatic. While the development of abstract schemas is thought to have benefits for transferring learning in a general sense, it may also make it harder for the learner in the early stages of learning new material. Therefore, the benefits of transfer must be weighed against the possible losses incurred during training (Hesketh, 1997a). This type of training has been described as being high on “effect”, and low on “affect” (Tannenbaum, 1997).

Ivancic and Hesketh (1995/96) also identified a number of other ways in which general transfer may be enhanced by the teaching of general principles. They suggested that training that captures the learner’s attention, provides feedback about the accuracy of the learner’s knowledge structures, and directs the learner’s attention to similar examples from their own experiences may all contribute to the development of a “mindful abstraction” (Salomon & Perkins, 1989).

A great deal of research has focused on the mental models that learners create during the learning process. Holding (1991) suggested that these models could contain both (a) procedural knowledge, that is, knowledge relating to methods, and (b) declarative knowledge, that is, knowledge relating to factual information. The formation of detailed, well-organised knowledge structures will be further discussed at the end of this section when the development of adaptive expertise is examined.

Kraiger, Salas and Cannon-Bowers (1995) used structural assessment techniques to measure the cognitive knowledge structures of trainees before and after their training programs. In their first study, the measure of structural assessment indicated that trainees had improved their understanding of the material during training, but the post-training knowledge structures failed to predict their performance on a transfer task 12 weeks later. In their second study, one group of trainees received information on the goals and objectives before training, while the other group received the same information after training. The measure of structural assessment administered after training showed that the group which received the advance organiser containing information about the goals and objectives prior to training performed significantly better than the other group. Subjects were also required to complete a transfer task that involved a computer-based simulation of the task that was the focus of the training. While the trainees' post-training knowledge structures did not predict performance on the transfer task for the entire group, the measures were highly predictive for the treatment group. Therefore, the use of the advance organisers moderated the relationship between the post-training knowledge structures and the scores on the transfer task.

The development of accurate mental models is one important way in which training may be able to assist in enhancing general transfer. The teaching of abstract schemas may assist learners to develop the necessary mental models, but this may have a negative effect on the initial performance of the learners. Hesketh (1997a) highlighted this problem as one of the major dilemmas facing researchers in the field of transfer of training. Hesketh (1997b) proposed that the resolution of this dilemma involved designing training in order to promote the transfer of that training as the main outcome.

Hesketh (1997b) also proposed that a Transfer of Training Needs Analysis (TTNA) would assist trainers in achieving this outcome.

Stimulus variability. The use of a variety of examples during training is a strategy which may assist trainees to develop an understanding of general rules that could be transferred to other situations by allowing the trainee to abstract the features which are shared by the examples (Gick & Holyoak, 1987). Gick and Holyoak have also identified the need to differentiate between the structural and surface components of situations. While the surface components may be varied to assist trainees to develop general rules, the structural components need to be consistent for transfer of learning to occur.

Baldwin and Ford (1988) also recognised that operationalising stimulus variability can be problematic, particularly in training that emphasises behavioural modeling approaches. With many behavioural skills, the ultimate aim of training is to assist trainees to develop an understanding of a general principle that can be used to generate behaviours which are different from those which were modeled. Baldwin (1992) reported that the inclusion of both positive and negative models in a behavioural modeling program had a significant negative effect on initial learning, but a significant positive effect on transfer to a different task.

Catrambone (1995) examined the effect of tailoring the instruction which trainees received on their initial performance on a word processing task and subsequent transfer to other word processing programs. The more general instructions resulted in poorer initial performance, but better transfer to other tasks. The combination of specific examples and general instructions was found to maximise both immediate and delayed learning

outcomes. Therefore, the use of multiple examples in training could, under some conditions, enhance the effectiveness of transfer of training.

Recent research from a cognitive perspective has also confirmed that the use of a variety of examples has benefits for the transfer of skills, but that it may have a negative effect on initial skill acquisition (Schmidt & Bjork, 1992). This could lead to conclusions about the effectiveness of training based on the evaluation of immediate training outcomes that could differ from the conclusions based on longer-term evaluation (Hesketh, 1997a).

Conditions of practice. Areas that Baldwin and Ford (1988) included under conditions of practice were issues such as the degree of overlearning, the types of reinforcement schedules, the frequency and type of feedback, the distribution of practice, and whole- versus part-task training.

Overlearning is related to the likelihood that material learned during training will be retained after training. By continuing practice well beyond the point at which trainees are able to successfully perform a task, the proportion of material retained is increased (McGehee & Thayer, 1961). However, the benefits of overlearning appear to weaken with time (Driskell, Willis, & Cooper, 1992). Other researchers have highlighted the need to develop automatic processing only on the components of tasks that are consistent across a range of conditions (Proctor & Dutta, 1995; Shriffin & Schneider, 1977).

Patrick (1992) described the relationship between practice and performance as a power law relationship. In this relationship, early increases in learning are larger than later increases, so that it takes more and more practice to achieve the same results later in training.

Feedback has traditionally been regarded as one of the most important elements by which learning is achieved and performance altered (McGehee & Thayer, 1961). Hesketh (1997a) noted that a distinguishing feature of experts is the accuracy of their own self-assessments. When feedback is gradually reduced during skill acquisition, the individual learner is encouraged to develop self-regulatory skills that enhance their ability to generalise their learning beyond the original task. Kluger and DeNisi (1996) have developed a preliminary Feedback Intervention (FI) theory that proposed that feedback effectiveness decreased as the individual's locus of attention moved away from the task towards more general processes. Kluger and DeNisi warned that an FI may create shallow task learning, and have a negative effect on transfer. Therefore, the provision of feedback cues does not automatically enhance learning and transfer.

Training that is grouped is referred to as massed training, while distributed training is spaced out over a number of sessions. Spacing of practice has been found to benefit the long-term retention of learning (Schmidt & Bjork, 1992). However, despite the large amount of evidence to support the use of spaced practice, there is still a strong tendency for training to favour massed practice. Druckman and Bjork (1991) point out that using massed practice may appear to have better learning outcomes when only short-term results are examined. This issue is thoroughly examined by Hesketh (1997a, 1997b) who recommended that several strategies should be adopted to overcome these inconsistencies in training practice. Hesketh suggested that traditional Training Needs Analysis (TNA) should be replaced by a cognitively oriented Transfer of Training Needs Analysis (TTNA). The TTNA would ensure that training included adequate practice in the cognitive and behavioural skills that trainees required in their work setting. Other

benefits of the TTNA would flow from a focus on the barriers to transfer that trainees might face following their training. This may enhance trainee self-efficacy and motivation to transfer their training.

Whole- versus part-task training refers to the situation where components of a task are trained separately before being transferred to the whole situation requiring integration of the components. Druckman and Bjork (1991) highlighted the apparent contradiction between part-task training and the importance of ensuring fidelity in the training setting. While some authors have suggested that part-task training can be effective, particularly where the task is easily decomposed into unrelated subtasks, other authors have questioned these findings (Schmidt & Young, 1987). Another factor that impacts on the effectiveness of part-task training are the strategies that are employed to decompose the task during training, and then reconstruct the whole task at transfer. Druckman and Bjork outlined a number of difficulties that are encountered in recombining part-tasks, especially the need to integrate task components and generate new responses to the same stimuli. Therefore, it is unclear whether the research on part-task training will enable trainers to improve the learning and transfer outcomes for many of the complex, highly integrated tasks that are the focus of workplace training.

Adaptive expertise. Recent research has focused on the development of adaptive expertise (Hesketh, 1997a, 1997b; Holyoak, 1991; Smith, Ford, & Kozlowski, 1997). This research is challenging much of the traditional pedagogy that had influenced the design of training courses. For example, traditionally, many training courses were designed to allow trainees to reproduce behaviours in similar settings with an emphasis on short-term retention, that is, “routine expertise”. Training which has the goal of

developing expertise that can be applied across a range of complex tasks, that is, "adaptive expertise", may require some radical changes in design and a focus on the evaluation of different types of learning outcomes (Smith, et al., 1997).

A number of researchers have suggested that the range of learning outcomes of training should be broadened to include a variety of cognitive, skill-based and affective outcomes (Jonassen & Tessmer, 1996/97; Kraiger et al., 1993). Two outcomes in particular are regarded as important in the development of adaptive expertise. These are the construction of detailed well-organised knowledge structures, and metacognitive skills in the areas of planning, monitoring, and evaluation (Hesketh, 1997a; Smith, et al., 1997).

Ford and Weissbein (1997) identified three training design features that have the potential to improve adaptability and effectiveness of training transfer. These were discovery learning, error-based learning, and developing metacognitive skills. Discovery learning involved allowing trainees the opportunity to explore and experiment with aspects of the training material and thereby infer general rules and strategies. Guidance is provided in the way of answers to questions, asking leading questions, or providing prompts without giving answers (Kamouri, Kamouri & Smith, 1986). A number of explanations have been offered to explain the benefits of discovery learning. Singer and Pease (1976) suggested that the individual learners are more involved and actively engaged during discovery learning. McDaniel and Schlager (1990) proposed that several learning strategies are acquired, and that these strategies involve greater levels of conscious attention in their application. They also proposed that the individual learners become more aware of which strategies are most effective in novel situations. Finally,

Frese and Zapf (1994) pointed out that self-generated knowledge is more easily integrated into existing knowledge, and also able to be applied more flexibly, across different situations.

The second approach to enhancing adaptability has focused on error-based learning (Ivancic & Hesketh, 1995/96). Error-based learning differs from guided discovery learning in that learners develop specific error management strategies that assist them to improve their learning and deal with the motivational consequences of errors. Hesketh (1997a) emphasised the important role that errors play in testing hypotheses about underlying knowledge structures. Frese and Altman (1989) also linked the active processing of errors to the refinement of a trainee's mental model.

The third approach focused on the development of metacognitive skills. Metacognitive skills are the skills that enable the learner to be consciously aware of, and in control of their cognitive processes (Butterfield & Nelson, 1989). Hesketh (1997a) suggested that metacognitive skills promote adaptability of expertise by allowing the strategic use of the various components of expertise. Smith et al. (1997) outlined two avenues by which metacognitive skills may be developed. These are by increasing the degree of control which learners exert over the learning process, and by cultivating a mastery orientation towards the learning task. Volet (1991) has shown that students who received metacognitive skills training received better grades in their course, and were better able to apply their knowledge to solving new problems.

Smith et al. (1997) concluded that use of strategies such as those outlined above may enhance the adaptability of trainees' expertise to the extent to which they assist trainees to develop detailed, well-integrated knowledge structures, and self-regulatory

skills such as planning, monitoring, and evaluation. These outcomes will be described further in the section covering issues associated with the measurement of training and transfer outcomes.

The Influence of Individual Characteristics on Transfer of Training

Baldwin and Ford (1988) identified three types of individual characteristics that could influence training and transfer outcomes. These characteristics were the trainee's level of ability, personality attributes, and motivation. Tannenbaum and Yukl (1992) recommended that research investigating the impact of trainee characteristics on training transfer concentrate on those characteristics that can be most easily influenced before, during, or after the training program as these offer the greatest potential for improving the effectiveness of training. Trainee motivation has received the most attention in the literature and is regarded as one of the key variables influencing the transfer of training (Gist, 1997; Mathieu & Martineau, 1997). Noe (1986) predicted that maximum behaviour change is likely to result when trainees have mastered the program content and are highly motivated to use their newly acquired skills in their work places.

Mathieu and Martineau (1997) presented a comprehensive model of the individual and situational determinants of training motivation. In their model, pretraining motivation mediated the influence of other personal characteristics and the work environment on training and transfer outcomes. Mathieu and Martineau described how training motivation has been variously conceptualised using (a) direct summative measures, usually collected via transparent self-ratings of the trainee's level of motivation; (b) self-efficacy measures that reflect the individual's self-perceptions of trainability; and (c) valence-instrumentality-expectancy (VIE) measures based on Vroom's (1964) theory.

The VIE approach proposed that motivation is a function of three separate processes: the outcomes available, the valence or value the individual places on those outcomes, the degree of association in the individual's mind between performance and the attainment of valued outcomes (instrumentality), and the individual's perceived association between the effort they invest and their performance (expectancy) (Muchinsky, 1997).

Mathieu and Martineau (1997) also outlined several different categories of individual variables that impact on training motivation and/or outcomes. These were (a) demographic variables such as age, education, and gender; (b) knowledge, skills, abilities (KSAs), and previous experiences; (c) personality attributes and goal orientation; and finally (d) work-related attitudes, such as career planning and exploration, and job involvement. Each of these areas will be discussed in turn and then research pertaining to the influence of self-efficacy on training outcomes will be discussed.

Demographic variables. A range of demographic variables has been used in studies examining trainee characteristics. These have included age (Baumgartel & Jean-pierre, 1972; Cannon-Bowers et al., 1995; Fleishman, 1953; Warr & Bunce, 1995), education (Baumgartel & Jean-pierre, 1972; Fleishman, 1953; Tudiana & Ben-Shakhar, 1982), gender (Cannon-Bowers et al., 1995), job tenure (Fleishman, 1953; Warr & Bunce, 1995), job level (Baumgartel & Jean-pierre, 1972; Baumgartel, Reynolds & Pathan, 1984) and number of subordinates (Fleishman, 1953; Miles, 1965). Many of these variables (e.g., age and job tenure, or education and job level) will be highly correlated and are probably interchangeable.

Cannon-Bowers et al. (1995) included several demographic variables in their model of the determinants of training effectiveness. Despite a severe restriction in range,

they still found that age accounted for a small but significant amount of unique variance in a number of training outcome variables such as training reactions, and two indices of training performance. However, age was not related to training or performance expectations, training desires, or pretraining motivation. Gender also accounted for a small amount of unique variance in training performance, with older trainees and women performing better on both academic results and self-ratings of physical performance. No conclusions were drawn regarding the importance of these results. Mathieu and Martineau (1997) proposed that demographic characteristics are not likely to demonstrate consistent effects on pretraining motivation, but that they may interact with the nature of the specific training program with some types of training being more salient to certain demographic groups. For example, sexual harassment training may be more enthusiastically endorsed by woman, or by younger age groups.

Thayer (1997) highlighted the aging and growing diversity of the workforce as two influences that may impact on the effectiveness of training. As the proportion of the workforce over 50 continues to increase, it is expected training programs may need to be adapted to suit the different age distribution. Older trainees may not perform as well on certain speed-related tasks and tasks requiring the formation of elaborate, new knowledge structures (Park & Lee, 1992). Goldstein and Gilliam (1990) have examined the training needs of various subgroups and reported that many of the specialised training programs that are being provided may not be effective, and consequently may be a waste of time and resources.

Knowledge, skills, abilities and experience. Some very large studies have been conducted using military personnel undertaking training in the United States Air Force

(USAF). Ree, Caretta and Teachout (1995) assessed the cognitive ability and job knowledge of 3,428 USAF officers prior to the commencement of their 53-week pilot training course between the years 1981 and 1993. Ree et al. developed and tested a causal model of the impact of *g* and prior job performance on job knowledge acquired during training and work-sample performance during training.

Ree et al. (1995) found that ability had a strong impact on the acquisition of job knowledge. Job knowledge, measured early in training, was a strong influence on measures of subsequent job knowledge and work-sample performance. Prior job knowledge was weakly related to job knowledge acquired during training, and only slightly more strongly related to early work-sample performance. The series of studies that Ree et al. have conducted showed conclusively that trainees who have higher scores on *g* and better job knowledge will perform better during training and on the job, with *g* demonstrating a much greater influence relative to prior job knowledge. More recently, Ree and Caretta (1998) have concluded that *g* predicts not only training and job performance, but also lifetime productivity, and early mortality.

Smith-Jentsch, Jentsch, Payne and Salas (1996) investigated the relationship between specific, negative pretraining events and the post-training performance of trainees who completed a course designed to prevent further negative events, particularly aviation accidents caused by human error. Trainees who had experienced the most negative events prior to training performed better in a transfer task one week after training. For untrained participants, there was no significant relationship between negative pretraining events and post-training performance. Therefore, previous

experience may influence post-training performance by increasing trainees' motivation to learn (Warr & Bunce, 1995).

Mathieu and Martineau (1997) proposed that trainee's perceptions of their abilities and their experience will influence their levels of pretraining motivation. To the extent that trainees perceive that they are able to acquire skills which they do not possess but are able to learn if they invest enough effort, they will experience higher levels of motivation. Training motivation was proposed as the primary mechanism by which other variables impacted on training and transfer outcomes.

Personality and goal orientation. Personality factors have been found to be related to contextual aspects of training performance. Driskell et al. (1994) found that personality variables (measured by the Hogan Personality Inventory) were related to academic performance criteria, but did not add unique variance in addition to the ability variables (measured by the Armed Services Vocational Aptitude Battery, ASVAB). However, the personality variables were related to nonacademic training criteria such as number of infractions, and the ASVAB scores did not contribute any unique variance to the prediction of the performance delinquency composite criterion. Driskell et al. concluded that personality variables impact on training outcomes through their influence on trainees' attitudes towards training and motivation to learn.

Ford and Weissbein (1997) suggested that personality variables might also impact on the learning strategies employed by trainees, the rate of skill acquisition, and transfer of training to the workplace. They highlighted the "Openness to experience" second order personality factor as a possible determinant of trainees' willingness to experiment with transferring their training to novel situations.

The learning strategies used by trainees have also been suggested as a possible determinant of training and transfer outcomes. There is a growing body of research that has focused on the goal orientation of the learner (Button, Mathieu & Zajac, 1996; Farr, Hofmann & Ringenbach, 1993). Dweck (1989) proposed that there are two distinct types of goals that individuals pursue. These are performance goals, which emphasise the demonstration of competence via task performance, and learning goals, which emphasise acquiring new learning and increasing competence on a given task.

Button et al. (1996) used confirmatory factor analysis to demonstrate that learning and performance goals were distinct constructs. They also collected data to support the distinction between situational and dispositional measures of goal orientation. Learning and performance goals were differentially correlated with a range of other variables providing further support for the discriminate validity of the two measures. Button et al. suggested that goal orientation might impact on training-related motivation, as well as on training performance and transfer of training. A learning goal orientation should be associated with a greater willingness to participate in training, and a greater motivation to learn new skills. A performance goal orientation, with its emphasis on the demonstration of competence through higher performance, may be detrimental if participation in training is perceived as a sign that work performance is substandard and if the training activities initially involve publicly demonstrating poorer task performance and receiving negative feedback from others (Farr & Middlebrooks, 1990). Mathieu and Martineau (1997) suggested that training which is highly competitive might be less enjoyable for trainees who have a learning goal orientation. Therefore, the nature of the training program may interact with the trainees' goal orientation.

Ford, Smith, Weissbein, Gully and Salas (1998) examined the effects of goal orientation on metacognitive activity and learning outcomes. Again, a learning goal orientation was positively related to knowledge and skill acquisition when learners exerted control over their speed of learning. Kozlowski, Gully, Smith, Nason and Brown (1995) also found that learning goals positively influenced metacognitive learning outcomes during training, and also enhanced trainees' self-efficacy. Therefore, there is growing support for the beneficial effects of a learning goal orientation on metacognitive processing and subsequent transfer of training.

Work-related attitudes. There have been several studies that have examined the relationships between work-related attitudes and pretraining motivation. Noe (1986) developed a model which included career and job related attitudes such as career explorations and job involvement as important influences on pretraining motivation. However, Noe and Schmitt (1986) did not find any evidence to support the proposed relationships.

Mathieu et al. (1992) examined the impact of career exploration on pretraining motivation and found that there was a non-significant relationship. Facteau, Dobbins, Russell, Ladd, and Kudisch (1995) also found that career exploration and career planning did not significantly impact on pretraining motivation.

Several studies have found a positive link between organisational commitment and pretraining motivation. Facteau et al. (1995) found that individuals who were committed to the values and goals of the organisation had higher levels of pretraining motivation. Cannon-Bowers et al. (1995) also found that organisational commitment was positively related to pretraining performance expectations and training desires, and that

all three were positively related to pretraining motivation. Therefore, organisational commitment may exert a direct influence on pretraining motivation as well as on indirect influence through pretraining performance expectations and training desires.

Mathieu and Martineau (1997) suggested that other attitudinal variables may also exert an influence on training motivation, depending on the purpose and design of the training program. For example, job involvement may become a salient factor when the training is designed to improve performance in critical areas of the trainees' work, whereas training which relates to non-essential job tasks may not be affected by trainees' level of job involvement. Mathieu and Martineau also suggested that changes in work-related attitudes could be used as important criteria for assessing the effectiveness of training.

Self-efficacy. A great deal of research has been devoted to understanding the role of self-efficacy in the learning and transfer process (Gist, 1997). Bandura (1997) described a vast array of research that supported the central role that self-efficacy has in behaviour change. Self-efficacy is a strong determinant of both the level of initial learning and the degree of transfer of training (Frayne & Latham, 1987; Gist, Stevens & Bavetta, 1991; Haccoun & Saks, 1998; Locke & Latham, 1990).

Mathieu, Martineau and Tannenbaum (1993) found that self-efficacy estimates at the mid-point of a training course predicted subsequent performance improvement and were positively related to training reactions. Mathieu et al. concluded that future research should examine the longitudinal, reciprocal relationships between self-efficacy and performance over a sequence of training experiences.

Saks (1995) examined both the moderating and mediating effects of self-efficacy on the relationship between training and adjustment of newcomers during their first year of employment. Initial level of self-efficacy was found to moderate the relationship between training and several outcomes variables such as post training self-efficacy, ability to cope, job performance, and intention to quit the profession. Stronger relationships were found for trainees reporting lower initial levels of self-efficacy suggesting that training was most beneficial for those newcomers with lower initial self-efficacy. Posttraining self-efficacy was found to partially mediate the relationship between training and ability to cope, job satisfaction, commitment and intention to quit. Therefore, the study by Saks highlighted the differential impact of training on personal and organisational outcomes depending on the employees' level of self-efficacy prior to and following training.

Martocchio (1994) used an experimental design in an introductory microcomputer skills course to examine the effect of inducing different conceptions of ability on computer anxiety and computer self-efficacy. Trainees who were led to believe that their performance was influenced by their pre-existing skill levels reported lower levels of computer self-efficacy at the end of training. The manipulation which led trainees to believe that their performance would improve if they practiced the skills and accepted mistakes as a normal part of the learning process resulted in higher levels of computer self-efficacy and lower levels of anxiety. Further analyses failed to demonstrate that computer anxiety and self-efficacy were mediators of the relationship between conceptions of ability and knowledge-based learning outcomes. However, post-training computer anxiety and self-efficacy were both significantly related to the learning

outcome, confirming that computer self-efficacy can account for significant unique variance in learning outcomes for microcomputer skills training.

Gist (1997) and her colleagues (Gist, Bavetta & Stevens, 1990; Gist, Stevens & Bavetta, 1991; Silver, Mitchell & Gist, 1995; Stevens & Gist, 1997) discovered that the influence of self-efficacy on skill maintenance was moderated by post-training interventions. They concluded that a contingency approach to training based on the trainees' level of self-efficacy might yield a greater return on training investment and increase training effectiveness.

In the section on interventions that have been designed to improve transfer of training, strategies for enhancing self-efficacy will be discussed, as these are regarded as the most effective means of ensuring that trainees can successfully transfer their training. Self-efficacy can be viewed as a predictor of training outcomes, as a process variable in training, and an important outcome of training in itself.

Contextual Influences on Trainees' Motivation and Self-efficacy

As well as the individual characteristics that have been discussed, there are several contextual factors which impact on trainees' expectations, self-perceptions, and motivation. Baldwin and Magjuka (1997) have organised these contextual factors into three groups. The first group includes training introduction factors such as whether participation is voluntary/mandatory, trainee participation in decision making, the nature of goals and labels assigned to the training initiative, and organisational information concerning the purpose and intended outcomes of training. The second group of factors concerns the training cohort. This may involve the composition of the training cohort, and the degree of cooperation that is required and which is normative for the group. The

final group of factors concerns the transfer climate. Baldwin and Magjuka proposed that factors such as the degree of management support and organisation support will influence trainees' self- and outcome expectancies for the transfer of their training. This is discussed in greater depth in the section dealing with aspects of the environment that influence transfer of training. The first two categories will be discussed in this section.

Trainees' participation in decision making regarding training initiatives is regarded as an important part of increasing the trainees' commitment to training. One specific issue involves the level of choice which trainees have regarding their attendance at training courses in general, and at a specific training program. Baldwin, Magjuka and Loher (1991) found that participation was able to exert a positive impact on trainees' motivation only when the trainees' input was reflected in the actual training that was received. Where the participative input was not subsequently realised in the type of training received, the level of pretraining motivation decreased as well as the trainees' performance during training.

Hicks and Klimoski (1987) manipulated trainees' choice of whether to attend training and found that trainees who were given a choice reported greater satisfaction, higher motivation to learn, more positive reactions, and performed better on an achievement test.

Mathieu et al. (1992) studied a group of university employees who were attending a proof reading course, and asked them whether they were volunteers or had been directed to attend. Choice was found to be positively related to training reactions, which were in turn positively related to post-training test scores. However, choice was not related to motivation to learn in this study.

Mathieu et al. (1993) examined the relationship between choice and trainees' level of self-efficacy. Mathieu et al. found that trainees who reported a greater preference for enrolling in an introductory ten-pin bowling class were more likely to report higher levels of self-efficacy and subsequently received better grades. The measure of choice used in this study was two items asking the trainees whether they would have taken the physical education course even if it wasn't a requirement for a course. This seems to be framing the choice construct as similar to a desire to attend training which is a motivational variable, rather than simply a matter of choice.

Quiñones (1997) concluded that allowing trainees to participate in decision-making regarding training attendance generally results in a positive impact on trainees' motivation and self-efficacy. However, Baldwin and Magjuka (1997) emphasised that researchers must examine training from an episodic perspective that systematically examines the context within which training takes place. Participation in decision-making regarding training may signal different messages to individuals within one organisation or across several organisations. The choice to attend training is part of a sequence of decisions regarding training attendance.

The framing of reasons for attendance at training is also recognised as an important contextual influence. Martocchio (1992) studied the effects of labeling microcomputer skills training as an "opportunity" for advancement of the trainees career, on computer efficacy and computer anxiety level of learning. The manipulation consisted of statements made to trainees suggesting that the training would enhance their personal gain, lead to the acquisition of positive experiences, and increase trainees' control over their work environment. By making the advantages of computer use more salient,

Martocchio found that trainees reported an increase in computer efficacy and a reduction in computer anxiety as compared to a control group.

Tannenbaum et al. (1991) and Cannon-Bowers et al. (1995) illustrated the impact that fulfillment of trainees' expectations may have on training outcomes. One of the key conclusions that Cannon-Bowers et al. made is that trainees should be helped to develop realistic expectations regarding training. Fulfillment of one's expectations was related to higher levels of motivation, self-efficacy, and organisational commitment. Therefore, organisations should ensure that trainees receive positive cues regarding the benefits of each training program in a particular organisational setting, as long as the expected benefits are relevant to the trainee and are likely to be realised.

The second group of contextual factors that may influence trainees' perceptions and expectations are the training cohort variables. The variables included here concerned the composition of the training group and norms for the degree of cooperative learning required. Baldwin and Magjuka (1997) proposed that trainees do take careful note of who else attends training and the degree of cooperation that is expected from trainees, or for which trainees are rewarded. Depending on the type and purpose of the training, there are arguments that can be made for having relatively homogenous or heterogeneous training groups. However, the trainees would not necessarily share the same understanding of these reasons as those in management responsible for making them. Baldwin and Magjuka concluded that there is very little evidence to support the notion that small, relatively homogenous groups will result in better training outcomes.

There is growing evidence to support the value of cooperative learning as a means of enhancing training performance (Latham & Crandall, 1991). The major factor in

promoting cooperative learning is the development of supportive group norms. When group success depends on all group members improving their performance, it is expected that group members will encourage each other and support cooperative learning (Slavin, 1983).

The final group of contextual factors identified by Baldwin and Magjuka (1997) included components of the organisational climate that relate to the use of trained skills. This has also been described as the organisation's transfer climate (Quiñones, 1997). The variables that are included in this group may have an important influence on trainee motivation and self-perceptions, and may also impact directly on the transfer of training in the workplace. Therefore, they will be discussed in the next section.

Aspects of the Environment Related to Transfer of Training

The model proposed by Baldwin and Ford (1988) included characteristics of the work environment as a direct influence on the two conditions of transfer: generalisation and maintenance of knowledge and skills learned during training. Examples of aspects of the work environment that may impact on transfer included: support from one's supervisor and peers, situational constraints, and opportunity to use one's knowledge and skills on the job. These factors have been incorporated into the more generic construct known as "transfer climate" (Rouiller & Goldstein, 1993).

Earlier work by Peters and O'Connor (1980) suggested that factors that can restrict the utilisation of acquired skills in the workplace could be construed as situational constraints. These situational constraints may affect performance directly or indirectly by impacting on the trainee's motivation, self-efficacy, or transfer intentions. Mathieu et al. (1992) found a negative relationship between situational constraints and training-related

motivation, while Mathieu et al. (1993) found that situational constraints had a negative impact on the development of self-efficacy during training. Where trainees reported greater constraints in their work setting, they also reported more negative reactions to their training.

Peters, O'Connor and Eulberg (1985) identified specific groups of situational constraints that may affect work performance. They suggested that there are 11 basic categories of constraints, and these are: job-related information, tools and equipment, materials and supplies, budgetary support, required services and help from others, task preparation, time available, work environment, scheduling of activities, transportation, and job-relevant authority. While not all of these constraints are relevant to the transfer of knowledge and skills acquired during training, some factors are relevant to the design of training. For example, "Are tools and equipment used in training similar to tools and equipment used on the job?" Other constraints may affect the actual transfer of training, for example, the work environment and scheduling of activities (similar to opportunity to perform). Therefore, it is possible to conceptualise constraints as operating in areas other than the work environment and therefore it is more accurate to refer to them as barriers to transfer.

Foxon (1993, 1994) concluded that forces in the environment, notably the perception of management support, are crucial determinants of training transfer. Foxon suggested that the crucial elements that trainees need to experience are encouragement and positive reinforcement from managers for learning and using their new skills.

Another line of research has focused on factors that influence trainees' opportunity to perform trained tasks on the job (Ford, Quiñones, Sego & Sorra, 1992;

Quiñones, Sego, Ford & Smith, 1995/96). In these studies which involved graduates from United States Air Force (USAF) training courses, supervisor attitudes and workgroup support were both found to have a direct impact on opportunity to perform trained tasks. Other determinants of opportunity to perform included individual characteristics such as trainee self-efficacy and career motivation, even after organisational and work context factors were taken into account. The operationalisation of opportunity to perform was particularly important as the researchers sought a more comprehensive definition that included three dimensions of opportunity: (a) breadth of opportunity (i.e., the number of trainee tasks performed on the job), (b) activity level (i.e., the number of times each trained task is performed on the job), and (c) task type (i.e., the level of complexity or difficulty of the trained tasks).

Building on the earlier work on situational constraints, Rouiller and Goldstein (1993) developed a model of the transfer climate based on social learning theory (see Luthans & Kreitner, 1985). Rouiller and Goldstein used a panel of six subject-matter experts (SMEs) to initially sort 298 critical incidents into two clusters composed of situational cues (e.g., goal, social, task, and self-control cues), and several types of consequences (e.g., positive feedback, negative feedback, punishment, and no feedback). Situational cues served to remind trainees of their training or provided them with opportunities to use their training, while consequences affected the likelihood that trainees would continue to use their skills. This categorisation implied that transfer of skills to the workplace was a complex and dynamic process that may have several phases with different determinants of each phase (e.g., short-term implementation vs. longer-term consolidation). After the initial sorting process, the SMEs sorted each cluster into

the four separate categories of situational cues or the four categories of consequences. Only 112 items were retained after this second clustering procedure. Finally, focus-group interviews were used to determine which items were relevant to the organisation involved, leaving 63 items, 41 pertaining to the situational cues categories, and 22 considered to be consequences. Given that the subscales in each category were highly correlated and the small number of items constituting the various subscales, Rouiller and Goldstein decided to collapse the subscales into the two broader categories of situational cues and consequences. In Rouiller and Goldstein's study, both types of components were found to account for significant unique variance in predicting transfer of training. Where a more positive transfer climate existed, trainees demonstrated significantly more trained behaviours, even after controlling for learning and unit performance.

Tracey et al. (1995) attempted to replicate and expand on the work of Rouiller and Goldstein (1993) by evaluating transfer of training among supermarket managers using separate measures of transfer climate and continuous-learning culture. Both transfer climate and continuous-learning culture were directly related to post-training behaviours, even after accounting for pre-training performance and knowledge learned during training. Tracey et al. found that the social support components in both the climate and culture measured had the strongest relationships with the underlying constructs being measured. This indicated that the extent to which supervisors and coworkers encouraged the learning and use of trained skills on the job might be the crucial elements in the transfer environment.

Xiao (1996) conducted a study of training transfer in four electronics companies in Shenzhen, China. Xiao hypothesised that five key organisational variables, namely, an

application orientation, a matching of skills with work design, reward practices, supervision, and peer relationships, would determine whether trainees' potential capacities were transformed into actual behaviours on the job. Among the organisational characteristics, the level of support from supervisors for transferring one's training appeared to be the most influential determinant of transfer, closely followed by the matching of trainees' skills with work design. This last variable was a complex variable in that it incorporated some items that overlapped with the opportunity to perform construct and several situational constraints. The items that were used to measure transfer behaviour were six self-report items that incorporated several different ideas relating to the impact of training such as performing one's job tasks faster and better, improving the quality of one's work, and making fewer mistakes in production. While these are useful outcomes, they are not actually related to use of knowledge and skills acquired during training, rather, they are related to the effect this may have on work outcomes. Therefore, there are few conclusions that can be drawn from this study about the impact of the work environment on transfer of training.

Holton, Bates, Seyler and Carvalho (1997) attempted to validate the structure of Rouiller and Goldstein's (1993) transfer climate instrument. Their aim was to develop a valid and generalisable set of transfer climate scales to facilitate cross-study comparisons. Holton et al. decided to modify the transfer climate scale used by Rouiller and Goldstein and eliminated 14 items which were deemed inappropriate. Another 17 items were added to increase the range of variables being assessed, including opportunity to perform, aspects of transfer design, and additional social support items relevant to the particular work environment. Exploratory factor analysis with oblique rotation revealed five clear

factors: supervisor support, transfer design, peer/task support, personal outcomes (positive) and personal outcomes (negative). These factors were not consistent with Rouiller and Goldstein's two broad categories or eight specific scales. However, as noted above, of the 66 items used in their study, only 49 were taken directly from the transfer climate instrument developed by Rouiller and Goldstein. Therefore, the lack of support for the constructs used in Rouiller and Goldstein's study does not mean that these constructs should be discarded. Although the actual structure of the transfer climate is still uncertain, Holton et al. suggested that trainees might perceive transfer climate according to organisational referents (e.g., supervisor, peer/task, or self). This is an area in which further research is required.

Another issue related to the way environment factors impact on transfer concerns the level of influence at which these factors operate or the unit of analysis that is chosen. Kozlowski and Salas (1997) suggested that researchers may need to adopt a multilevel perspective when examining the impact of situational influences on transfer of training. They suggested a framework for examining the organisational factors that impact on transfer of training that first of all distinguished between environmental supports that exist at the individual, unit/team, and organisational level and also indicated whether these supports were properly aligned with the objectives underlying the training. This framework also included specification of the rationale that would be used to determine whether training has a focus on technical knowledge and skills or human process knowledge and skills that would enable the technical knowledge to be applied in the workplace. Finally, the framework examined the degrees to which the other factors, that is, level of analysis issues and content issues, need to be congruent. This last area

included the congruence of content areas within each level and the congruence within content domains across levels of analysis. This framework sought to identify the salient features in the work environment that are necessary for transfer of training to take place. It proposed that transfer of training was dependent on organisational factors that were at a higher level of analysis and therefore researchers needed to be aware of the limitations of adopting a strictly individual-level perspective.

Tesluk, Farr, Mathieu and Vance (1995) examined the extent to which variables at the individual, unit and suborganisational levels influenced the generalisation of employee involvement (EI) training beyond specific EI activities. They collected data from 252 employees and supervisors drawn from 88 work units across 11 suborganisational units. This design allowed Tesluk et al. to analyse the separate influence of individual characteristics such as the number of EI activities and training sessions attended, level of organisational commitment, level of organisational cynicism, and belief in improvability; and situational characteristics such as the manager's attitudes and behaviour towards EI and the degree to which the climate supported participation, both of which were assessed at the unit level and the suborganisational level. Tesluk et al. found that the individual characteristics as well as the characteristics at the unit and suborganisational levels were able to significantly predict the generalisation of EI knowledge, skills and attitudes. While this study had some excellent features, Tesluk et al. omitted to assess work-group level influences, such as supervisor and coworker support, that other studies have found to have a major impact on transfer of training.

Mathieu and Martineau (1997) suggested that environmental constraints would operate to decrease transfer through two mechanisms. The first was through the avenues

already discussed in this section, that is, the lack of opportunities to perform and adequate support and encouragement from supervisors and coworkers. The second was an indirect influence on training and transfer outcomes by influencing the trainee's level of pretraining motivation and expectations. Therefore, environmental constraints were seen as exerting both a direct and an indirect influence on transfer success. This is a question that further research studies need to address. In particular, the question as to whether the direct influence of transfer climate on transfer behaviour is stronger that the indirect influences through trainee motivation and self-efficacy. Quiñones (1997) supported the idea that transfer climate affects training outcomes and transfer through its effect on individual variables such as trainees' motivation and self-efficacy. The next section will focus on studies that have attempted to enhance the transfer of training, mainly through the enhancement of self-efficacy and motivation.

Interventions Designed to Improve Transfer of Training

The conceptual model proposed by Baldwin and Ford (1988) has been the basis for many interventions that were designed to increase transfer of training. However, other frameworks have also been utilised to assist trainers, training managers and trainees to improve the transfer. For example, Broad and Newstrom (1992) analysed the roles that each of the major stakeholders (managers, trainers, and trainees) have in promoting transfer according to three key time frames for the implementation of transfer strategies: before, during and after training. Even though this framework seems atheoretical, the authors outline seven behavioural processes that they see as underlying successful transfer of training. These included: creating positive expectations using strategies such as positive self-talk and visualisation of successful performance; use of appropriate cues

to remind trainees to use their newly acquired skills; use of managers as role models; participatively setting difficult, specific goals for transfer of training; provision of regular feedback; provision of positive reinforcement; and support from peers. While these strategies were not explicitly linked to any particular theoretical framework, they are similar to the transfer enhancement procedures that have received the most research support (Haccoun & Saks, 1998).

Broad (1997) recommended that a systematic approach to enhancing human performance requires a high level of involvement from all stakeholders in any training project. Broad suggested that trainers need to adopt a wider focus which addressed all factors related to performance, including the design, delivery and evaluation of training. This would require trainers to adopt new roles as performance consultants who can coach managers to undertake to be responsible for performance improvement issues. Training programs are less likely to be effective if they are not tied to strategic goals and organisational priorities, if they do not have clear objectives, and if they do not have adequate resources to support transfer of training to the workplace (Broad, 1997; Martocchio & Baldwin, 1997).

Haccoun and Saks (1998) further developed the importance of including non-subject matter, content interventions that they called Transfer Enhancement Procedures (TEPs). The three major types of interventions that have been studied include: self-management, relapse prevention, and goal setting.

The self-management (SM) approach was pioneered by Frayne and Latham (1987) and further developed by Gist et al. (1991). It essentially involved encouraging trainees to set goals, identify obstacles to the achievement of these goals, plan ways to

overcome any potential obstacles, monitor their own progress, and use self-reinforcement to maintain motivation. Self-management was found to be particularly effective with trainees with lower levels of self-efficacy, whereas goal setting appeared to be more effective with trainees with higher self-efficacy levels (Gist et al.). Stevens and Gist (1997) replicated the previous self-efficacy by training method interaction with a more complex interpersonal task.

Relapse prevention (RP) training has also shown considerable promise in enhancing transfer of training (Marx, 1982). This approach is focused on the period after training as the most crucial period in facilitating positive transfer (Wexley & Baldwin, 1986). Tannenbaum and Yukl (1992) also strongly recommended that greater research be focused on the critical period after training is completed in order to understand what interventions may be effective in promoting successful transfer.

Relapse prevention training originated in the field of clinical psychology and was developed to improve the likelihood that people recovering from addictive behaviours would be able to anticipate and effectively deal with difficult situations without relapsing into their former addictive behaviours (Marlatt & Gordon, 1985). The focus of RP training was to develop high levels of self-efficacy for identifying problematic situations and exercising control over one's behaviour using appropriate coping strategies.

Tziner, Haccoun and Kadish (1991) demonstrated that training which incorporated an RP module was found to be more effective in that trainees reported greater use of the transfer strategies they had learned and supervisors judged those trainees as demonstrating greater use of their trained skills. The trainees who received RP training also demonstrated higher levels of mastery of the training content, although the

reason for this is unclear as the RP module was not equally effective for all trainees in all situations, with transfer being influenced by personal and situational elements extraneous to the training intervention.

Burke (1997a, 1997b) used an experimental design to assess the effectiveness of two types of RP training (full RP or modified RP) on the maintenance of knowledge and skills following an assertiveness training session. The full RP group focused on a specific assertiveness skill and set a specific, measurable, skill-maintenance goal. Cognitive and behavioural strategies were developed to assist trainees to deal with a relapse in which the skill was not used. The modified RP group did not set any skill maintenance goals but still discussed strategies that would assist them in coping with relapses. While RP training did result in improved perceptions of ability to transfer, it also resulted in lowered motivation to transfer. No differences were found for any of the three transfer outcome measures collected three weeks after training. The results of this study are somewhat questionable because of low internal reliability coefficients for the scale assessing use of transfer strategies. This study also used two interventions to enhance transfer, that is, goal setting and relapse prevention training, thereby confounding the effects of each of the interventions.

Haccoun (1997) described SM and RP as two strategies which focus on “the development of proactive, strategic actions that take into account work level constraints” (p. 342) and therefore may have an impact on trainee’s expectations that the training can be successfully transferred. The action plans may be crucial in the period immediately following training when trainees are most susceptible to the influence of barriers to transfer in the workplace. Also, these procedures assist trainees to attribute failures to

transfer their training as being deficits in the use of transfer strategies, rather than deficits in motivation or ability. Haccoun and Saks (1998) recommended that trainers should use a contingency approach to the implementation of TEPs, taking into account the characteristics of the trainee, the task that is being learnt, and the training and transfer environment. Their call for these issues to be addressed in the training needs assessment supports Hesketh's (1997b) suggestion that a Transfer of Training Needs Analysis become a standard part of training design and delivery.

Foxon (1997) investigated the influence of three variables (two measured and one manipulated) on transfer of interpersonal skills training. The variable that was manipulated was formulation of an action plan for transfer. The action plan comprised a set of statements that contained specific, measurable actions that the learners intended to undertake after training to demonstrate the application of their training. In effect, the trainees were operationalising what transfer of their training meant to them. The action plan included three action items, each of which contained a description of specific situations where the training would be used, the specific skills involved, and the outcomes expected to flow from this. Foxon found that, contrary to her predictions, the trainees who prepared an action plan reported lower motivation to transfer. Anticipated and reported levels of manager support were far more important in influencing transfer than the development of an action plan. While the effect of action planning was to lower motivation to transfer, the trainees' levels of self-efficacy were not measured. Therefore, it is possible that any beneficial effects of action planning remained unmeasured.

The last transfer enhancement procedure (TEP) mentioned by Haccoun and Saks (1998) was goal setting. Murtada and Haccoun (1996) claimed that goal setting was the

least effective procedure for enhancing transfer of all the TEPs studied, especially for trainees with low self-efficacy. However, Latham and Seijts (1997; 1999) claimed that the setting of proximal transfer goals in addition to distal transfer goals would improve transfer outcomes because proximal goals assisted trainees to identify specific opportunities to build self-efficacy following training.

Wexley and Baldwin (1986) used goal setting strategies to facilitate maintenance and application of targeted time-management skills and found that post-training transfer was enhanced through the use of goal setting. Tziner et al. (1991) suggested that goals may contribute to greater transfer of training because goal-setting provides information useful for improving self-efficacy estimations. Therefore, there appears to be a complicated reciprocal relationship between self-efficacy and goal setting with both of these constructs being strong predictors of subsequent performance.

Saks (1997) suggested that the developing trainees' self-efficacy was the most effective method for enhancing transfer of training. However, factors such as the level of pre-training self-efficacy, the type of training used, and the complexity of the training content are important factors in determining the effect of training on self-efficacy. Researchers need to determine what techniques would be most effective in enhancing self-efficacy, and at what stage (e.g., prior to, during, or after training) they should be employed. Saks concluded that TEPs were able to enhance transfer to the extent to which they enabled trainees to develop stronger levels of self-efficacy.

Measurement of Training and Transfer Outcomes

A number of problems associated with the measurement of transfer of training have been identified. In particular, Baldwin and Ford (1988) have noted that very few

studies have attempted to assess transfer over time. Most studies have focused solely on initial generalisation to the job and ignored the issue of maintenance. Baldwin and Ford recommended that researchers adopt a dynamic perspective that examines the amount of transfer that occurs over time. Just as researchers have represented learning in the form of "learning curves", they proposed that the maintenance of trained knowledge, skills and behaviour could be represented through the use of "maintenance curves".

Baldwin and Ford (1988) also noted that many studies rely solely on self-report data for all variables. This practice introduces an unknown amount of common method variance which can result in an overestimation or inflation of measures of association such as correlations or path coefficients (Williams & Brown, 1994). In these kinds of studies, alternative measures of performance during training and subsequent to training which are not self-report measures should be used. For example, supervisors could be asked to rate the extent to which trainees had demonstrated successful transfer of trained skills, according to a set of specific criteria.

Another issue related to the evaluation of training outcomes involves the measures of learning that are used. Kraiger, et al.’s (1993) multidimensional model of learning outcomes incorporates cognitive, skill-based, and affective outcomes. The cognitive outcomes consist of three different constructs: verbal knowledge, knowledge organisation, and cognitive strategies. Kraiger et al. posited that these three constructs are listed in approximately the order in which they would be expected to develop. Based on Anderson’s (1983) ACT* theory of skill acquisition, trainees would initially acquire declarative knowledge which, with practice, would become increasingly 'proceduralised'. In later stages, procedural knowledge would be a better indicator of the level of skill of

the trainee. Therefore, while measures of declarative knowledge may be appropriate at the end of training, knowledge organisation and strategy-based measures may be more appropriate indicators of performance when measuring long-term transfer of training.

There has also been an increasing emphasis on the measurement of "adaptive expertise" (Hesketh, 1997a, 1997b; Smith, et al., 1997). Ford (1997) pointed out that any conceptualisation of transfer that included adaptive expertise faced three key questions. These were:

1. What is expected to change as a result of training?
2. Which behaviours and under what circumstances should the trainee be able to demonstrate adaptability? and
3. What standard of adaptive expertise should the trainee demonstrate?

Regarding the first question, within the different types of learning outcomes suggested by Kraiger et al. (1993), Ford (1997) suggested that adaptive expertise incorporated three different cognitive processes. These were the development of accurate mental models, the acquisition of procedural knowledge, and the creation of metacognitive skills that allowed individuals to monitor and regulate their own learning. It is important for researchers to begin to find ways to measure these processes, particularly changes that occur during training programs.

The second issue raised by Ford (1997) concerned the specific behaviours in the workplace which reflect increases in adaptive expertise, and the range of different situations in which trainees are expected to demonstrate their knowledge, and /or skills. This requires that researchers develop a comprehensive taxonomy of behaviours and situations, so that adaptive expertise can carefully defined.

The last issue that Ford (1997) raised concerned the level of proficiency that would be required in order to confirm that successful transfer had occurred. Even though there does not yet exist a clear set of criteria for assessing the development of adaptive expertise, Ford (1997) highlighted several possible indicators such as evidence of new adaptive behaviours appearing after training, evidence of behaviours which indicate proficiency occurring more frequently, improvements in time taken to complete a task, and a reduction in errors made during completion of a task.

Smith et al. (1997) supported the development of adaptive expertise which they defined as involving detailed and well-organised knowledge structures, and the ability to monitor and control one's behaviour in order to adapt to changing or new task demands. Smith et al. suggested that the strongest form of adaptability involved the adaptation of different methods from those learned during training and the use of existing knowledge to generate new approaches and strategies which would be increasingly required by more complex tasks and more demanding environments.

Kraiger and Jung (1997), building on the earlier work of Kraiger et al. (1993), suggested that the evaluation of training should be linked to a broad range of learning outcomes. Kraiger and Jung focused on the mechanisms that were required to be able to translate instructional objectives into learning outcomes.

In a review of empirical articles on transfer of training published after Baldwin and Ford's (1988) review, Ford and Weissbein (1997) examined the extent to which more recent research had overcome some of the limitations identified by Baldwin and Ford. In the area of criterion measurement, Ford and Weissbein found that a greater variety of measures were being employed and a greater range of time intervals used. Instead of a

reliance on self-report measures of transfer, more objective, behavioural measures were used, along with supervisory and peer ratings. Those studies that used ratings tended to rely on more specific measures of transfer that were tailored to the knowledge and skills being trained, rather than global ratings of behaviour. The mixed results obtained in studies that incorporated multiple measures of transfer (e.g., Tziner et al., 1991) suggested that transfer of training is a multidimensional construct, and that researchers need to develop more sophisticated, construct-based measures which can be applied across different levels of analysis (e.g., individual group/team, unit/department, and organisational).

Oliver and Fleming (1997) advocated the use of within-subjects methodology in order to capture changes in the levels, variability, and trend of trained behaviours over time. Oliver and Fleming argued that particular research questions concerning the effects of different training-related variables on transfer of training are best answered using within-subjects designs. A feature of this type of design is that it also emphasises direct observation and measurement of behaviour. These techniques are applied routinely in the field of behaviour analysis, where the focus is on within-subjects and within-groups designs (e.g., multiple baseline designs).

Therefore, the measurement of training and transfer outcomes has shown considerable progress towards operationalising transfer as a multidimensional construct that requires a dynamic perspective, as well as multiple levels of analysis.

Summary of the Literature

There are several themes that featured prominently in the literature. Previous reviews of the literature (Baldwin & Ford, 1988; Ford & Weissbein, 1997) focused on research that examined the influence of training design factors, trainee characteristics, and contextual influences on transfer of training. These reviews demonstrated that training design features that promote the development of detailed, well-integrated knowledge structures and metacognitive skills would improve the adaptability and transfer of training. The reviews also demonstrated that several individual characteristics are important determinants of the transfer of training. These characteristics included: the trainees' motivation to learn and transfer their training, the trainees' goal orientations, and most importantly, the trainees' self-efficacy, especially for dealing with post-training barriers to transfer. Finally, the reviews demonstrated that there are important contextual influences on the transfer of training. The main influence in this category was the organisational climate for transfer of training. Various authors (e.g., Kozlowski & Salas, 1997) also suggested researchers need to adopt a multilevel perspective when examining the influence of the workplace climate for transfer on transfer of training, given that the degree of successful transfer at one level (e.g., the individual level) is affected by constraints at the next highest level (e.g., the unit/team level).

Several types of interventions designed to enhance the transfer of training were reviewed. The three major types included: self-management training, relapse prevention training, and goal setting. Saks (1997) recommended that trainers should select the intervention that best suited the characteristics of the trainee, the nature of the task being

trained, and the training and transfer environment. The usefulness of any intervention is determined by the extent to which trainees develop higher levels of self-efficacy for use of those skills.

The last major issue that was addressed in the literature reviews concerned the measurement of training and transfer outcomes. Researchers have focused on obtaining more objective, behaviourally-oriented measures of performance, allowing longer time intervals before assessing transfer outcomes, and including multiple levels of analysis.

Based on the literature that was reviewed, three main research questions were generated. These three questions and possible hypotheses that could be derived from them will be discussed followed by an overview of the two studies that were conducted as part of this research program. More specific hypotheses are presented within each of the studies that follow in chapters in chapters two and three, and these will be derived from reviewing additional research that pertains to each of the studies.

General Research Questions

The two studies that are described briefly in the next section and in greater detail in chapter two and three addressed a number of questions that were derived from the literature.

The first question concerned the process by which trainees' motivation and self-efficacy influenced the training and transfer outcomes. The first study examined the influence of self-efficacy and motivation on trainees' self-set goals for transfer of training, as well as commitment to those goals. The second study examined the impact of self-efficacy and motivation on trainees' implementation intentions and implementation activities. It was expected that higher levels of post-training self-efficacy and motivation

would lead to higher self-set goals for transfer and stronger commitment to those goals, as wall as stronger intentions to use implementation activities and greater actual use of implementation activities.

The second question concerned the process by which transfer climate factors influenced the training and transfer outcomes. The first study examined the impact of situational constraints on the trainees' self-set goals for transfer and commitment to those goals as well as on transfer success. The second study examined the impact of organisational climate for transfer on trainees' pre-training self-efficacy and motivation, as well as the mediating influence of trainees' affective states. It was expected that greater levels of situational constraints would be related to lower self-set goals for transfer and lower commitment to those goals, as well as reduced transfer success. It was also expected that a more positive climate for transfer would lead to higher levels of pre-training self-efficacy and motivation, although this might be mediated by trainees' affective states.

The third question concerned the impact of various transfer enhancing activities occurring during training on the training and transfer outcomes. While the first study was focused on the impact of goal setting, the second study included measures of goal setting, relapse prevention, and self-control techniques, as well as overlearning, fidelity, stimulus variability, and use of general principles. It was expected that greater use of these transfer enhancing activities, particularly the first three, would lead to stronger intentions to use implementation activities and greater actual use of implementation activities.

Overview of the First Study

The first study was conducted with members of the Queensland Police Service (QPS). The QPS employs over 6500 sworn police officers and more than 1600 unsworn police officers (QPS, 1997). The participants were all required as part of their duties to undertake a three day training program every six months to update their knowledge and skills. The training courses covered three separate areas: law and criminal procedures such as arrest procedures, and the criminal code; computer skills training that involved using the QPS mainframe and desktop computing; and firearms practice. Each trainee was required to reach a minimum standard of competency in each of the three areas of the training program.

In summary, the first study aimed to evaluate the impact of trainee characteristics such as self-efficacy and motivation, and work environment constraints on trainees' transfer goals, commitment to their transfer goals, and their success at transferring their training. The identification of influential determinants of training transfer apart from the actual course design will potentially enable training researchers to explain why and when transfer of training is most effective (Tannenbaum & Yukl, 1992).

Overview of the Second Study

The second study was also conducted with members of the Queensland Police Service (QPS). The Director of the Information Management Division in QPS suggested contacting the Information System Branch (ISB), which was responsible for the design and implementation of a new, integrated, computerised information system for police (POLARIS). The researcher offered to design an evaluation of the training strategy developed to support the implementation of POLARIS, and this offer was accepted.

The POLARIS system involved the integration over several years of numerous separate police computer databases. The first release involved the inclusion of a new warrants system, an interface to the TRAILS database maintained by Queensland Transport which included drivers license and vehicle registration information and an interface to the National Exchange of Police Information (NEPI) database.

The scale of the integration of systems to form POLARIS necessitated multiple releases over a period of approximately five years. The first release occurred on the 29th October, 1996. Each release contains significant changes to operational policing, and therefore as each component is released, a training strategy was implemented to support the acquisition of the skills required.

The training strategy adopted for the first release of POLARIS involved providing three levels of training so that all members of QPS received an appropriate level of training prior to the release of the system. This training was supported by the provision of on-line training environments where any member of QPS could interact with the POLARIS system using a specially constructed training database.

In order to ensure that all operational police could access the POLARIS system once it was released, the QPS provided new computer terminals to all police stations in Queensland and linked these to the control database. A number of other information technology initiatives were also developed to maximise the use of this new technology, for example, electronic mail.

The research strategy that was developed involved the administration of pre-training, post-training and follow up questionnaires to all Level 3 trainees (approximately 150 staff). These trainees were to receive one week of intensive training

prior to the system's release. They were then responsible for delivering training in their own districts (30 in Queensland) to approximately 750 staff who would utilise the system (called Level 2 trainees). All other staff of QPS below the rank of Inspector (approximately 6000) were required to complete a computer based training package which incorporated basic information and guidelines for using POLARIS. This was designated as Level 1 training. In order to assess the transfer of their training of the workplace by the level 3 trainees, a sample of Level 2 trainees were contacted by telephone after the release of the POLARIS system. This evaluation was focused on the training they had received from the Level 3 trainees prior to the system being released.

The focus of the second study was the evaluation of training that was primarily designed to develop end-user computing skills. The evaluation included an assessment of the climate for transfer prior to training commencing, the level of several transfer-enhancing activities that occur during training, the learning outcomes resulting from training and the transfer of that learning to the workplace.

In summary, the second study aimed to evaluate parts of the model of the transfer process developed by Thayer and Teachout (1995). This model incorporated the climate for transfer and the transfer enhancing activities occurring during training as two primary influences on the training and transfer outcomes.

CHAPTER TWO: STUDY ONE

Rationale for Study 1

A vital aspect of any training programme involves determining how effectively skills learned in training are transferred to on-the-job performance. Evaluating transfer of training is important as it indicates whether changes or improvements in the participants' job-related knowledge and skill have resulted in improved job performance. In other words, has the training programme produced tangible performance outcomes, and thereby achieved a satisfactory return on the time and resources invested by the organisation (Lewis, 1996).

In spite of the importance of evaluating the effectiveness of training programmes, until recently, little attention has been devoted to determining why training programs are effective for some participants but not for others. Researchers have begun to address the problem by undertaking systematic research into the factors which influence the effectiveness of training programmes (e.g., Milheim, 1994; Yelon, 1992). Variables that impact on training outcomes include individual characteristics, training design variables, and factors in the work environment (Baldwin & Ford, 1988).

In Baldwin and Ford's (1988) model, all three training sets of input factors mentioned above were viewed as directly affecting the training outputs of learning and retention which in turn affected the conditions of transfer. The model also proposed a direct effect of trainee characteristics and work-environment characteristics on the conditions of transfer. This direct influence of both trainee characteristics and work-environment characteristics on transfer of training may explain why training is more

effective for some trainees and provide the basis for a strategy to maximise the transfer which occurs by ensuring that the prerequisites for transfer are satisfied.

Trainee motivation is regarded as one of the key variables in the transfer process. Noe (1986) predicted that maximum behaviour change is produced when trainees have mastered the programme content and are highly motivated to use newly acquired skills on the job. There have been numerous attempts to operationalise the construct of motivation and develop models of how it can be applied to training. The three major lines of research have been based on: (a) the use of an expectancy framework; (b) an examination of how trainee self-efficacy develops; and (c) the use of goal-setting to guide behaviour change.

Expectancy valence theory (Vroom, 1964) proposed that motivation was a function of the outcomes available, the valence or value the individual placed on those outcomes, the degree of association in the individual's mind between performance and the attainment of valued outcomes (instrumentality), and the individual's perceived association between the effort invested and performance (expectancy). Mathieu, Tannenbaum, and Salas (1992) examined the influence of several individual variables (career planning and job involvement) on valence-instrumentality-expectancy cognitions and the subsequent effects on learning. While Mathieu et al. found virtually no support for the hypothesised antecedents of trainees' training-related motivation, training motivation influenced both reactions to training and learning. Training motivation also interacted with reactions to training to influence learning. Mathieu et al. concluded that training motivation could be conceptualised in a number of other ways and future research should investigate these other conceptualisations. In particular, the use of self-efficacy based measures may be a better choice when performance outcomes are the

focus of interest, whereas VIE based measures may be preferred when the focus is on the impact of work-context variables (Mathieu & Martineau, 1997).

Self-efficacy has been found to play an important role in behaviour change in a range of organisational settings (Gist & Mitchell, 1992). Mathieu et al. (1993) presented a model of the antecedent of self-efficacy development during training and of the subsequent influence of self-efficacy on trainees' reactions and performance improvements. In their study involving ten-pin bowling trainees, self-efficacy estimates at the mid-point of training contributed to subsequent performance improvements and was positively related to training reactions.

Gist (1997) described her own research that has focused on the role that self-efficacy and post-training interventions play in subsequent skill maintenance and generalisation. Self-efficacy was significantly related to performance levels after training and predictive of skill maintenance over a seven-week period. However, the influence of self-efficacy on skill maintenance was moderated by the type of post-training intervention. While self-management training attenuated the relationship between self-efficacy and skill maintenance, goal-setting training accentuated the differences between trainees with high and low self-efficacy. Gist concluded that a contingency approach to training may yield a greater return on training investment and increased training effectiveness. The level of a trainee’s self-efficacy could be used as an indicator as to whether a goal-setting approach or self-management intervention is more beneficial after training.

Goal setting has been used as a post-training intervention designed to facilitate transfer by guiding action, producing incentives, and contributing to the development of

self-efficacy (Bandura & Cervone, 1986). Self-efficacy has also been found to affect both the level of self-set goals and commitment to those goals (Gist & Mitchell, 1992). Locke, Frederick, Lee and Bobko (1984) have shown that higher self-efficacy contributes to better performance by reinforcing the individual's judgement that better performance is possible and through a greater commitment to self-set performance goals.

Wexley and Baldwin (1986) found that post-training transfer of targeted time-management skills was enhanced through the use of goal setting. They concluded that in addition to increasing employees' motivation, goal setting is also useful for facilitating positive transfer. Tziner et al. (1991) also supported the view that goals contribute to greater transfer of training by providing information that helps to improve self-efficacy. Both self-efficacy and goal setting are variables that have been shown to predict subsequent performance levels.

The studies reviewed above and in the first chapter highlighted the importance of trainees' motivation to transfer and level of self-efficacy as precursors to the development of stronger transfer intentions, which were proposed as one of the preconditions for effective transfer of training. Researchers of the effects of behavioural and goal intentions on performance (e.g., Ajzen, 1988; Gollwitzer, 1993; Schwarzer, 1992) have noted that the link between intentions and behaviour may also be moderated by various inhibiting and facilitating control factors. Elements in the transfer environment have the potential to interfere with transfer of training. Foxon (1993, 1994) reconceptualised transfer of training as a multi-stage process beginning with intention to transfer and moving through initiation, partial transfer, and conscious maintenance to unconscious maintenance. Foxon also developed a framework that examined the effect of inhibiting and supporting factors

on intentions to transfer. Where the supporting factors outweigh the inhibiting factors, the transfer process is able to proceed through the various stages until transfer is complete. Therefore, the individual and work-related factors that influence intentions to transfer are of great relevance to the transfer process. The next section discusses the factors that impact on goal setting in the transfer process.

The Influence of Goal Setting on Transfer of Training

Goal constructs are central to the study of behaviour and span the history of psychology as well as cutting across nearly all domains within psychology (Austin & Vancouver, 1996). The effect of goals on performance is regarded as one of the most robust effects of any to be found in the literature on motivation (Locke & Latham, 1990).

A number of authors have suggested that setting specific goals for the transfer of training will assist trainees to maximise the level of transfer that occurs (Latham & Frayne, 1989; Tziner et al., 1991). However, some recent studies have questioned the effectiveness of goal setting as a procedure for enhancing transfer, particularly for trainees with low self-efficacy (Stevens & Gist, 1997; Murtada & Haccoun, 1996). Latham and Seijts (1997) recommended that trainees should also set proximal as well as distal goals as this provides trainees with more immediate opportunities for successful outcomes that will lead to higher levels of self-efficacy and further goal attainment. Latham and Seijts advocated that proximal goals should be set for knowledge and skill acquisition during training, and then for maintenance and generalisation of the knowledge and skills learned after training. Hesketh (1997a) stated that goal setting may assist trainees to strive for longer-term outcomes that appear less attractive due to the delay in achieving them.

Specific, difficult goals lead to individuals accomplishing more than ambiguous, easy, or do-your-best goals (Locke & Latham, 1990). However, the investment of effort in accomplishing difficult goals requires commitment to achieving those goals. Locke and Latham also have demonstrated that self-efficacy is an important determinant of goal choice and commitment to those goals. Bandura (1997) pointed out that goal attainment also helps to build and strengthen a sense of self-efficacy by increasing individuals' beliefs in their capabilities, as well as creating self-satisfaction and increasing interest in one's tasks. Phillips and Gully (1997) reported that self-set goals for academic achievement were strongly influenced by the student's level of self-efficacy and weakly influenced by need for achievement (NAch). Therefore, the influence of self-efficacy on training performance and transfer success may be partly mediated by the level of goals that trainees set for the transfer of their skills, their commitment to those goals, or a combination of the two.

Wofford, Goodwin and Premack (1992) found that the influence of personal factors such as self-efficacy and expectancy and situational factors such as task difficulty and task complexity on goal achievement and performance was mediated through personal goal level and goal commitment. In particular, Wofford et al. found that the antecedents of personal goal level are predominantly informational variables such as feedback, prior performance, and ability, while the antecedents of goal commitment are predominantly motivational variables such as expectancy, self-efficacy, valence, rewards/incentives, supervisor and peer support, and need for achievement. These are the same variables that are proposed as determinants of transfer of training (Baldwin & Ford, 1998). In Baldwin and Ford's model, work-environment characteristics included support

for utilisation of newly acquired skills and the opportunity to use these skills in the job context. Where a lack of support was evident or a lack of opportunity to perform trained tasks existed, these factors could inhibit the transfer of training.

Specific Aims of Study 1

Study 1 was conducted to examine the effects of a number of variables such as self-efficacy and motivation, as well as situational constraints in the work environment, on trainees' success at achieving their goals for learning during training and transferring their skills to the workplace after training. It was expected that the individual variables such as self-efficacy and motivation would impact on training and transfer success through the goals that individuals set for themselves and through their commitment to those goals. This model was consistent with research that has shown that specific behavioural intentions are a direct precursor to behaviour (Tubbs & Ekeburg, 1991) and that goals are more proximal determinants of intention and effort than dispositional or environmental perception variables (Austin & Vancouver, 1996).

The models that were tested in this study involved the measurement of variables across three times with Time 1 variables (measured prior to training) allowed to influence Time 2 variables (measured at the end of training), which in turn were allowed to influence Time 3 variables (measured one week after training). This sequence is depicted in Figure 2.1. Figure 2.1 contains a total of 15 variables, 13 that are directly related to the transfer process and two demographic variables, Age and Years of Service. The main research question addressed in this study concerned the role of self-set goals for transfer of training and commitment to those goals in the transfer process.

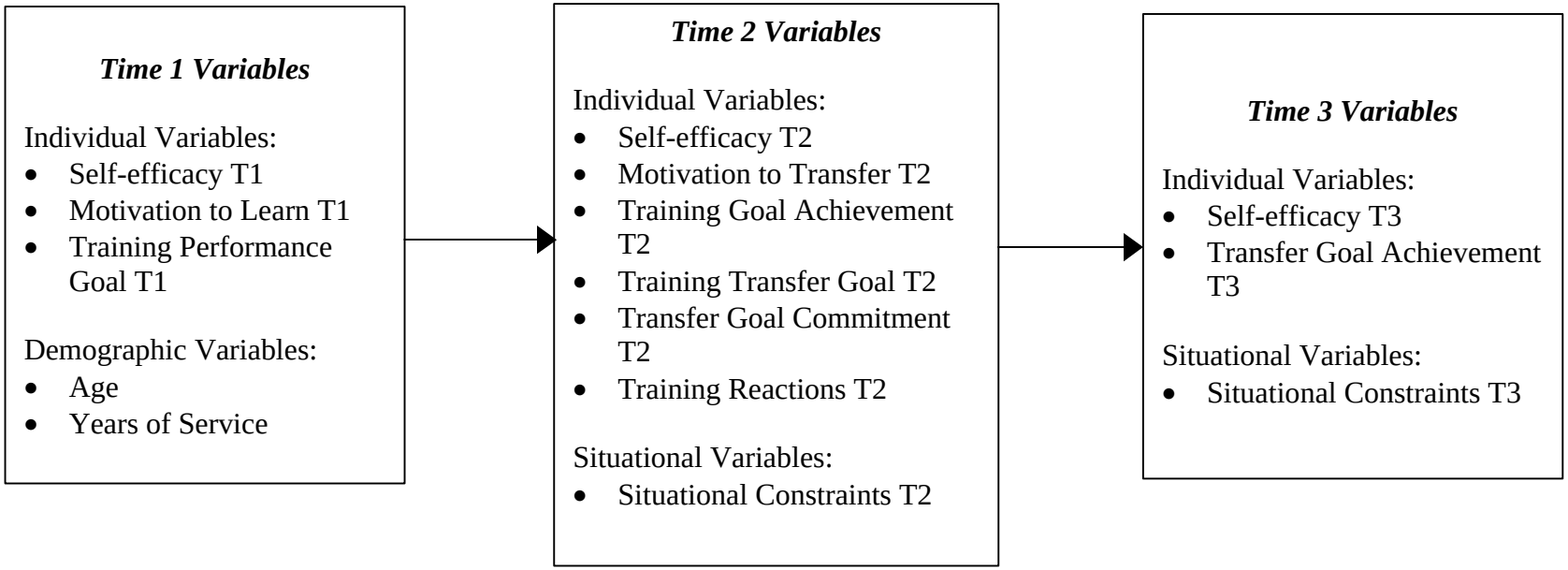

Figure 2.1. Sequential model of the variables measured at times 1, 2, and 3.

The first *a priori* model that was developed included self-efficacy, motivation to learn, and goal for training performance as time one (T1) variables measured prior to training. The model traced the impact of these pre-training variables on several post-training variables, including self-efficacy, motivation to transfer, training reactions, achievement of training goals, and transfer intentions. Transfer intentions was operationalised as including the trainees' goals for training transfer as well as their commitment to those transfer goals. The first part of the model is depicted in Figure 2.2. The nature of the expected relationship between the variables is illustrated by the plus or minus sign next to the path.

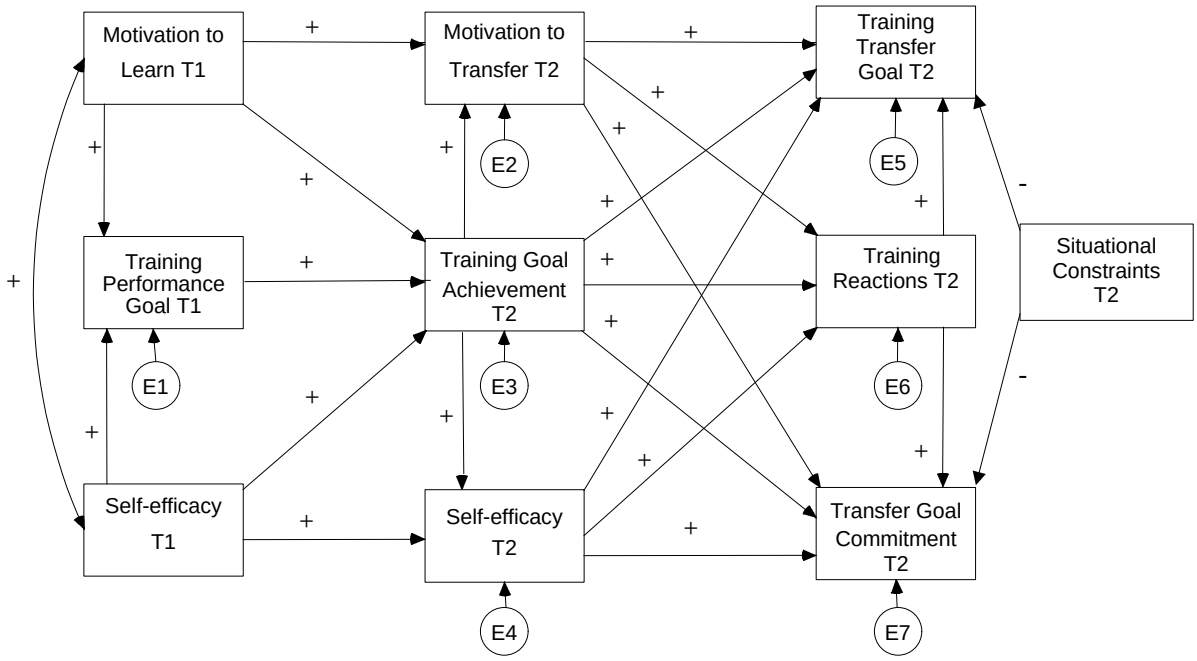

Figure 2.2. First a priori structural model of time 1 and time 2 variables.

The second *a priori* model examined the impact of self-efficacy, motivation to transfer, training reactions, achievement of training goal and transfer intentions at the end of training, as well as perceived situational constraints on transfer goal achievement after training. This second model attempted to analyse the process by which transfer occurred and thus had the potential to explain more about why and when transfer was most effective. The second part of the model is depicted in Figure 2.3. The nature of the expected relationship between the variables is illustrated by the plus or minus sign next to the path.

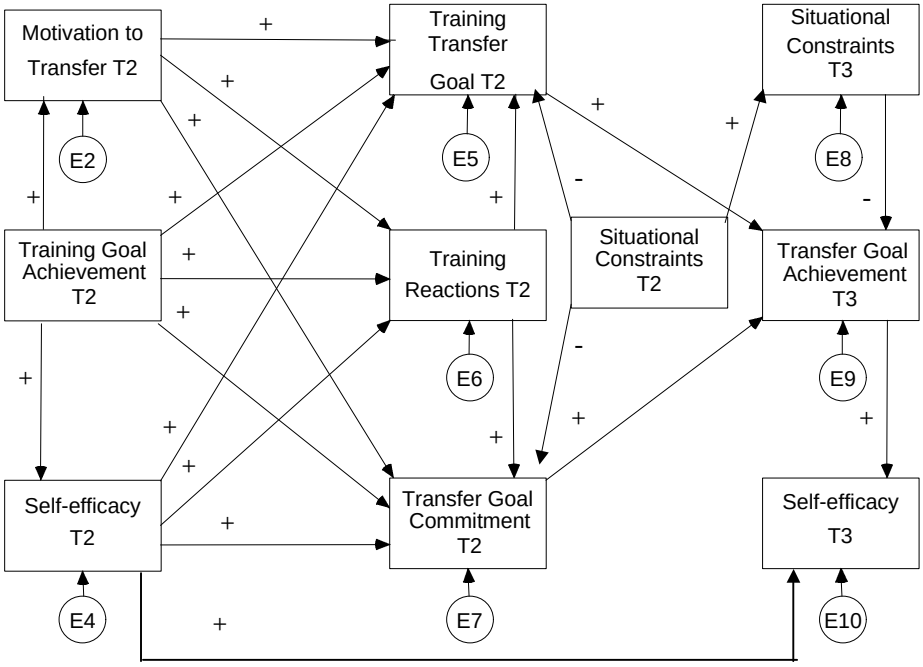

Figure 2.3. Second a priori structural model of Time 2 and Time 3 variables.

Hypotheses Relating to Demographic Variables

2.1. It was hypothesised that Age and Years of Service would not be significantly related to any of the individual or situational variables. This hypothesis was based on the work of Mathieu and Martineau (1997) which suggested that demographic variables are unlikely to demonstrate consistent relationships with variables such as pre-training motivation. Age has been found to be related to post-training reactions (Cannon-Bowers, 1995), however, and was therefore included for the purpose of examining its relationship with other training-related variables.

Hypotheses Relating to the First *a priori* Structural Model

2.2. It was hypothesised that paths from Self-efficacy T1 and Motivation to Learn T1 to both Training Performance Goal T1 and Training Goal Achievement T2 would have positive path coefficients, and also that paths from Self-efficacy T1 to Self-efficacy T2 and from Motivation to Learn T1 to Motivation to Transfer T2 would have positive path coefficients. These expectations were based on the work of Locke and Latham (1990) relating self-efficacy and motivation to self-set goals and goal achievement.

2.3. It was hypothesised that the paths from Training Goal Achievement T2 to Self-efficacy T2, Motivation to Transfer T2, Training Reactions T2, Training Transfer Goal T2, and Transfer Goal Commitment T2 would all have positive path coefficients. These expectations were also based on the work of Locke and Latham (1990) which demonstrated that goal attainment had a positive effect on self-efficacy, motivation, and future goal levels.

2.4. It was hypothesised that the paths from both Self-efficacy T2 and Motivation to Transfer T2 to Training Reactions T2, Training Transfer Goal T2, and Transfer

Goal Commitment T2 would all have positive path coefficients. It was also predicted that the paths from Training Reactions T2 to Training Transfer Goal T2 and Transfer Goal Commitment T2 would have positive path coefficients. These expectations were based on the work of Wofford et al. (1992) which demonstrated that personal factors such as self-efficacy and expectancy are determinants of personal goal level and goal commitment.

Hypotheses Relating to the Second *a priori* Structural Model

2.5. It was hypothesised that the path from Situational Constraints T2 to both Training Transfer Goal T2 and Transfer Goal Commitment T2 would have negative path coefficients and that the path to Situational Constraints T3 would have a positive path coefficient. These expectations were also based on the work of Wofford et al. (1992) which demonstrated that situational factors are determinants of personal goal level and goal commitment. Also, Mathieu et al. (1992) showed that situational constraints negatively affected motivation and self-efficacy during training, although in the current study, it was expected that situational constraints would directly impact on self-set goals and commitment to those goals.

2.6. It was hypothesised that the paths from both Training Transfer Goal T2 and Transfer Goal Commitment T2 to Transfer Goal Achievement T3 would have positive path coefficients. These expectations were also based on the work of many researchers (e.g., Haccoun & Saks, 1998; Locke & Latham, 1990), which demonstrated that the level of self-set goals and commitment to those goals are a strong determinant of the degree of transfer of training.

2.7. It was hypothesised that the paths from Self-efficacy T2, Motivation to Transfer T2, and Training Reactions T2 to Transfer Goal Achievement T3 would all have nonsignificant path coefficients. That is, they would not be significantly different

from zero. These expectations were also based on the work of Wofford et al., (1992), who found that the influence of personal factors such as self-efficacy and expectancy and situational factors such as task difficulty and task complexity on goal achievement and performance was mediated through personal goal level and goal commitment.

2.8. It was hypothesised that the path from Situational Constraints T3 to Transfer Goal Achievement T3 would have a negative path coefficient. This expectation was based on the work of Peters et al. (1985) who identified specific groups of situational constraints that affected work performance.

2.9. Finally, it was hypothesised that the paths from Self-efficacy T2 and Transfer Goal Achievement T3 to Self-efficacy T3 would have positive path coefficients. These expectations were also based on the work of many researchers (e.g., Gist, 1997; Mathieu, et al., 1993; Saks, 1995) which has demonstrated that self-efficacy is not only a determinant of training outcomes, but an outcome of a reciprocal relationship with training performance.

Method

Participants

Fifty-three participants began the training on four separate courses. Of these, 40 completed the training, and all 40 were included in the follow up at Time 3. Subject attrition was mainly due to the participants failing to complete their training courses because of work interruptions. Participants' ages ranged from 20 to 44 years with a mean of 31.5 years (SD = 6.46). The education level of trainees ranged from Year 10 High School to the completion of tertiary degrees. The participants worked in

a variety of positions, ranging from traffic duties to Criminal Investigation and crime scene work. The job levels of participants included Uniformed Constables, Sergeants, Detective Senior Constables and Detective Constable. The average number of years of service was 7.79 years (SD = 6.13).

The training course was a 19 hour course for police officers conducted over three days and covered a number of areas, including: law and criminal procedures, firearms practice, and computer skills.

Procedure

The participants were required to complete three questionnaires. The first and second were administered by the researcher on the first and last days of the training program. The third was given to trainees at the end of training and they were asked to complete it one week after training and return it directly to the researcher.

Questionnaire Measures

First Questionnaire

The first questionnaire completed prior to training contained the following measures:

Demographics. Trainees at time 1 were required to provide the following demographic data: Sex, Age, Level of Education, Rank, and Number of years in the Police Service.

Self-efficacy T1. Five items were developed for this study to measure self-efficacy strength on a seven-point Likert-type scale ranging from “Not at all confident” to “Extremely confident”. Bandura (1997) has defined three dimensions to self-efficacy: magnitude (or level), strength, and generality. Bandura recommended that researchers follow a standard format for assessing self-efficacy that requires

individuals to rate the strength of their belief in being able to perform a set of activities that are ordered in an increasing level of difficulty. In one format, the individual first judges whether or not they can perform a task and then, for the tasks that they judged they can do, they rate the strength of their belief. Bandura also describes a second format that simply asks individuals to rate the strength of their self-efficacy using a single-judgement format that pertains to every item in the activity domain. This latter type of format is somewhat simpler to complete but was found to be less predictive of behavioural outcomes and only weakly related to composite measures of efficacy to fulfill graded task demands (Lee & Bobko, 1994).

More recently, Maurer and Pierce (1998) compared a Likert-type measurement format with a traditional format for measuring self-efficacy. They found that the Likert-type format demonstrated similar levels of reliability, provided equivalent levels of predictive validity, and had a similar factor structure and discriminability. They concluded that a Likert-type scale seems to offer an acceptable alternative method to measure self-efficacy. The items used in the present study assessed trainees' confidence of their ability to master the content of the course, their confidence about being able to perform satisfactorily on the course, their confidence about being able to effectively use the skills learned on the course, their confidence about being able to develop expertise in the skills learned on the course, and their confidence about being able to overcome any obstacles to using the skills learned on the course. In this study, trainees with higher scores were reporting higher confidence in their ability to effectively acquire the skills required for the course. The Cronbach Alpha reliability coefficient for this scale was 0.82, which is adequate for the purposes of assessing self-efficacy strength.

Motivation to Learn T1. Motivation to learn was assessed using the expectancy theory approach used by Noe (1986). Five items were included to assess: the participants' expectancy that investing effort (i.e. trying hard) would result in achieving their highest level of successful performance during training (one item); participants' instrumentality beliefs about whether successfully achieving their best and learning the required skills during training would result in better job performance (one item); and three items assessing participants' perceptions regarding the extent to which successfully achieving their best during training would be beneficial to them, important to them, and a source of satisfaction for them. All items were measured using seven point Likert-type response scales ranging from "Not at all" to "Extremely". The Cronbach Alpha reliability coefficient for this scale was 0.87, which is adequate for the purposes of assessing training motivation.

Training Performance Goal T1. Trainees were required to set a specific goal representing the highest level of successful performance they aimed to achieve during training. This single item utilised a continuum ranging from 0% to 100% with 0% representing "No course objectives achieved during training" and 100% representing "All course objectives achieved during training".

Second Questionnaire

The second questionnaire completed at the end of training contained similar measures to the first questionnaire with the following changes:

Self-efficacy T2. Self-efficacy was assessed using five items that were similar to the five items used in the first questionnaire. The Cronbach Alpha reliability coefficient was 0.76, which is still adequate for the purposes of assessing self-efficacy strength.

Motivation to Transfer T2. Motivation to transfer was measured using similar items to those in the first questionnaire that assessed motivation to do well during training. The Cronbach Alpha reliability coefficient for this scale was 0.89, which is adequate for the purposes of assessing motivation to transfer.

Training Transfer Goal T2. Trainees were required to set a specific goal for the utilisation of skills learned during training after they had recommenced their normal work. The response scale was a continuum ranging from 0% to 100% with 0% representing “No utilisation of skills learned during training” and 100% representing “Complete utilisation of skills learned during training”.

Transfer Goal Commitment T2. Trainees were also required to complete three items relating to their level of commitment to their transfer goal. These items used seven-point Likert-type response scales ranging from “Not at all” to “Extremely” and assessed the trainees’ confidence in achieving their goal for skill utilisation, their commitment to achieving their goal for skill utilisation, and their perception of how difficult it would be for them to achieve their goal for skill utilisation. By eliminating the third item regarding their perception of how difficult it would be to achieve their goal for skill utilisation, the Cronbach Alpha increased to .78. Therefore, the measure of goal commitment was revised to include only two of the three items in the questionnaire.

Reactions to Training T2. Six items were used to assess trainees’ reactions to their training course. These items used seven-point Likert-type response scales ranging from “Not at all” to “Extremely” and assessed the two general areas recommended by Mathieu et al. (1992), that is, the trainee's affective reactions to training and their beliefs about the utility of the training programme. Questions included: how suitable the training course was to the trainees’ level of experience, the

extent to which trainees felt ready for the course, the extent to which the information contained in the course was relevant to performing their jobs, the extent to which trainees were satisfied with the training course, the extent to which trainees enjoyed participating in the course, and extent to which trainees believed they benefited from participating in the course. The Cronbach Alpha reliability coefficient for this scale was 0.92, which is adequate for the purposes of assessing trainees' reactions.

Situational Constraints T2. An 11 item measure was developed based on Peters et al. (1985) eleven categories relating to perceived constraints on trainees' ability to utilise trained skills. Items were rated on seven-point Likert-type response scales ranging from "Does not restrict at all" to "Completely restricts" and assessed the extent to which the following aspects of the work situation could restrict the trainees' ability to utilise their skills in the workplace: the amount of job-related information; specific tools and equipment needed to do the work; materials and supplies needed to do the work; budgetary support; the services and help of others needed to do the work; the need for preparation through education, training and experience; the availability of time to do the work; physical aspects of the work situation; the arrangement of their work schedule; transportation needed to get to and complete the work; and job-relevant authority needed to do the work. The Cronbach Alpha reliability coefficient for this scale was 0.84 , which is adequate for the purposes of assessing situational constraints.

Training Goal Achievement T2. Participants were required to rate their own success at achieving their personal performance goal for training using a seven-point Likert-type response scales ranging from "Not at all successful" to "Extremely successful".

Third Questionnaire

The third questionnaire was completed one week after the end of training. It contained similar measures to the first two questionnaires with the following changes:

Transfer Goal Achievement T3. One item was included on the third questionnaire relating to how successful trainees were at utilising the skills learned during training in their workplaces. Responses were scored on a seven-point Likert-type response scale ranging from "Not at all successful" to "Extremely successful".

Self-efficacy T3. Self-efficacy was again assessed using five items which were similar to the five items used in the first and second questionnaires. The Cronbach Alpha reliability coefficient was 0.87, which is adequate for the purposes of assessing self-efficacy strength.

Situational Constraints T3. The same 11 items were used to assess perceived constraints on trainees' ability to utilise trained skills after they had returned to work. The Cronbach Alpha reliability coefficient for this scale was 0.91, which is adequate for the purposes of assessing situational constraints.

Analyses

The initial analyses consisted of examining the correlations between the variables and discussing the relationships between the time one, time two, and time three variables. The data was subsequently analysed using Amos (Arbuckle, 1997), a structural equations modeling package. This type of analyses can simultaneously test both a measurement model and a structural model. However, a measurement model is only possible where more than one measure of an underlying factor is available. Therefore, in this study, only a structural model of the causal links between variables was analysed.

Anderson and Gerbing (1988) recommended that both the saturated model (where all variables are allowed to influence one another), and the independence model (where all variables are specified as being unrelated to one another) are considered in conjunction with the theoretical structural model of interest. Whenever a measurement model formed part of the analysis, the first step involved estimating the chi-square statistic for the measurement model (in this case, the saturated model), but using the associated degrees of freedom for the independence model. This pseudo chi-square test determines whether any structural model will give acceptable fit, and a significant result would indicate that the measurement model has been misspecified. As there is no measurement model in this study, the saturated model would be just identified, and automatically have a chi-square value of zero with zero degrees of freedom.

The second step in Anderson and Gerbing's (1988) two-step modeling approach also involved specifying two additional structural models, representing the "*next most likely constrained and unconstrained alternatives* from a theoretical perspective to the substantive model of interest" (p. 418). Sequential chi-square difference tests (SCDTs) are calculated using the difference between the chi-square statistic values and the difference in degrees of freedom for each of the pairs of nested models, starting with the saturated model and the theoretical model of interest. The null hypothesis for the difference tests between two nested structural models is that there is no significant difference between the two models. That is, the more constrained model is not any poorer fitting than the less constrained model. If the null hypothesis is upheld (i.e. not rejected), then the SCDT comparison for the alternative that is the next most likely constrained model and the theoretical model of interest is made. However, if the null hypothesis is rejected, the SCDT for the same comparison

is made. Each successive test is assessing whether the addition of more constraints to the model results in a significant difference in the explanation of the estimated construct covariances given by the two structural models. Anderson and Gerbing provide a decision tree that outlines the appropriate SCDT for all possible combinations of results. This process will be followed in this study.

The output provided by Amos includes the chi-square and associated degrees of freedom for all of these alternatives. Amos also provides a range of fit statistics that allow the researcher to make inferences about the adequacy of the theoretical model. Marsh, Balla and Hau (1996) discussed the tendency of major statistical packages to include fit indices that have undesirable properties, probably for the sake of completeness and they advised researchers to "use a variety of qualitatively different indices from different families of measures" (p. 315). Marsh, et al. suggested that, on the basis of their comparison, the RNI and the NNFI (or their normed counterparts, the CFI and the NTLI) are useful in evaluating the fit of structural equation models. Gerbing and Anderson (1993) also recommended the RNI (and its normed counterpart, the CFI), as well as the IFI, primarily because it was free from sample size bias and had considerably smaller standard errors than the NNFI. However, McDonald and Marsh (1990) subjected the IFI to a more critical evaluation and Marsh et al. suggested that Gerbing and Anderson's conclusion regarding the IFI might have been premature. Marsh (1995) suggested that the NNFI might be particularly suitable in the comparison of nested models as the NNFI rewards model parsimony. Anderson and Gerbing (1984) reported that the NNFI can have extreme values when the sample size is very small ($\underline{N} \leq 50$), although Marsh et al. recommended that using the normed counterpart (the NTLI) would assist in compensating for sampling fluctuations. Due to the small sample size in the current

study, the CFI and the NTLI were chosen as complementary indices for evaluating the goodness of fit of the models and, in addition, the GFI and the AGFI were reported as additional checks on the level of fit of the models.

The measures collected at time one and time two were initially specified in an *a priori* structural model in order to assess the relationships between the time one variables, and the impact of time one variables on the time two variables. This model is displayed in Figure 2.2. A second *a prior* structural model was specified that consisted of the measures collected at time two and time three. This second model is displayed in Figure 2.3. The main reason for splitting the overall model into two was that the variable to subjects ratio was not low enough, that is, there was insufficient subjects to attempt to tests an overall model of variables across all three times. Testing two separate models allowed conclusions to be drawn about the relationship between time 1 and time 2 variables, and between time 2 and time 3 variables, but not between time 1 and time 3 variables.

Results

Table 2.1 presents the means and standard deviations of all variables, while Table 2.2 presents the intercorrelations of the variables in the study.

Table 2.1

Number of Cases, Means, Standard Deviations & Cronbach Alphas for all Variables in Study 1

Variables	Num. of Items	Mean	SD	Alpha
1. Age	1	32.02	6.78	
2. Years of Service	1	7.83	6.11	
3. Self-efficacy T1	5	25.90	4.38	.82
4. Motivation to Learn T1	5	26.75	6.32	.87
5. Training Performance Goal T1	1	.83	.13	
6. Training Goal Achievement T2	1	5.32	.99	
7. Self-efficacy T2	5	25.65	4.32	.76
8. Motivation to Transfer T2	5	26.73	5.90	.89
9. Training Transfer Goal T2	1	.73	.21	
10. Transfer Goal Commitment T2	2	5.19	1.22	.78
11. Training Reactions T2	6	30.58	6.73	.92
12. Situational Constraints T2	11	41.60	9.06	.84
13. Self-efficacy T3	5	25.78	4.54	.87
14. Situational Constraints T3	11	35.10	11.76	.91
15. Transfer Goal Achievement T3	1	4.80	1.32	

Note: N = 40

Table 2.2

Intercorrelations for all Variables in Study 1

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Age	1.00														
2. Years of Service	.61	1.00													
3. Self-efficacy T1	.17	.28	1.00												
4. Motivation to Learn T1	.09	.21	.30	1.00											
5. Training Performance Goal T1	.07	.08	.44	.32	1.00										
6. Training Goal Achievement T2	.16	.18	.53	-.03	.25	1.00									
7. Self-efficacy T2	.16	.23	.80	.36	.26	.57	1.00								
8. Motivation to Transfer T2	.18	.21	.30	.75	.19	.05	.50	1.00							
9. Training Transfer Goal T2	.10	.17	.44	.45	.31	.08	.43	.81	1.00						
10. Transfer Goal Commitment T2	.24	.25	.48	.50	.10	.17	.67	.84	.75	1.00					
11. Training Reactions T2	.18	.20	.42	.46	.06	.17	.61	.74	.68	.77	1.00				
12. Situational Constraints T2	-.30	.06	-.01	-.01	-.05	-.34	-.14	-.12	-.03	-.26	-.13	1.00			

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
13. Self-efficacy T3	.09	.22	.81	.19	.29	.72	.82	.34	.39	.50	.58	-.02	1.00		
14. Situational Constraints T3	-.33	-.05	.12	-.22	.05	-.23	-.01	-.15	-.06	-.13	-.08	.70	.08	1.00	
15. Transfer Goal Achievement T3	.03	.21	.41	.26	.05	.28	.55	.63	.69	.70	.55	-.14	.55	-.10	1.00

Note. N = 40. Values greater than .31 are sig. at .05, greater than .40 are sig. at .01, and greater than .50 are sig. at .001. T1 = Time 1, T2 = Time 2, & T3 = Time 3.

Correlational analyses

The intercorrelations revealed that the demographic variables measured at time one (Age and Years of Service) were significantly related to one another (r = .61, p < .001) and that the only other significant correlation was between Age and Situational Constraints T3 (r = -.33, p < .05). Therefore, both Age and Years of Service were excluded from any further analyses.

Self-efficacy T1 was positively related to Training Performance Goal T1 (r = .44, p < .01) and Training Goal Achievement T2 (r = .53, p < .001), as expected. That is, higher levels of self-efficacy prior to training were related to higher levels of goals for training and greater success in achieving one's training goals. Motivation to Learn T1 (r = .32, p < .05) was positively related to Training Performance Goal T1 (r = .44, p < .01) but was not related to Training Goal Achievement T2 (r = -.03, NS), indicating that higher levels of pre-training motivation were also associated with higher levels of goals for training but not with success in achieving one's training goals. This result was contrary to what was expected. The self-efficacy and motivation variables measured at Time 1 were strongly related to their respective counterparts measured at Time 2 (r = .80, p < .001 and r = .75, p < .001 respectively).

Training Goal Achievement T2 was positively related to Self-efficacy T2 (r = .57, p < .001), but was not related to Motivation to Transfer T2 (r = .05, NS), to Training Reactions T2 (r = .17, NS), to Training Transfer Goal T2 (r = .08, NS), or to Transfer Goal Commitment T2 (r = .17, NS) as was expected. However, Training Goal Achievement T2 was also negatively related to Situational Constraints T2 (r = -.34, p < .05). Therefore, a higher level of achievement of training goals was related to a higher level of post-training self-efficacy and a lower level of perceived situational constraints in the workplace.

As expected, both Self-efficacy T2 and Motivation to Transfer T2 were strongly, positively related to Training Reactions T2 ($r = .61$, $p < .001$ and $r = .74$, $p < .001$ respectively), Training Transfer Goal T2 ($r = .43$, $p < .01$ and $r = .81$, $p < .001$ respectively), and Transfer Goal Commitment T2 ($r = .67$, $p < .001$ and $r = .84$, $p < .001$ respectively). These results indicated that higher levels of post-training self-efficacy and post-training motivation were related to more positive reactions to the training program, higher goals for the transfer of one's training, and greater commitment to those goals.

Situational Constraints T2 was not related to either Training Transfer Goal T2 ($r = -.03$, NS), or Transfer Goal Commitment T2 ($r = -.26$, NS), contrary to what was expected. However, Situational Constraints T2 was positively related to Situational Constraints T3 ($r = .73$, $p < .001$) as was expected. Therefore, the level of goals for the transfer of one's training and the level of commitment to those goals were not related to the level of perceived situational constraints in the workplace.

Both Self-efficacy T2 ($r = .55$, $p < .001$) and Motivation to Transfer T2 ($r = .63$, $p < .001$) were positively related to Transfer Goal Achievement T3. A similar relationship existed between Training Transfer Goal T2 and Transfer Goal Achievement T3 ($r = .69$, $p < .001$), Transfer Goal Commitment T2 and Transfer Goal Achievement T3 ($r = .70$, $p < .001$), and Training Reactions T2 and Transfer Goal Achievement T3 ($r = .55$, $p < .001$). These results indicated that higher levels of post-training self-efficacy and post-training motivation, higher goals for the transfer of one's training, greater commitment to those goals, and more positive reactions to the training program were all predictive of success at achieving one's transfer goals. The measure of Situational Constraints T3 was not found to have any significant relationship with Transfer Success T3 ($r = -.14$, NS). This result indicated that the

level of perceived work constraints was not related to success at achieving one's transfer goals.

Finally, Self-efficacy T2 (r = .82, p < .001) and Transfer Goal Achievement T3 (r = .55, p < .001) were both positively related to Self-efficacy T3. This result indicated that a higher level of post-training self-efficacy and greater success at achieving one's transfer goals were both associated with higher levels of self-efficacy after transfer had been attempted. Self-efficacy T3 was also positively related to Self-efficacy T1 (r = .81, p < .001), Training Goal Achievement T2 (r = .72, p < .001), Motivation to Transfer T2 (r = .34, p < .05), Training Transfer Goal T2 (r = .39, p < .05), Transfer Goal Commitment T2 (r = .50, p < .001) and Training Reactions T2 (r = .58, p < .001). Therefore, the level of pre-training self-efficacy was very strongly related to the level of self-efficacy after transfer had been attempted. Also, a greater success at achieving one's training goal, higher levels of post-training motivation, higher goals for the transfer of one's training, greater commitment to those goals, and more positive reactions to the training program were all related to a higher level of self-efficacy after transfer had been attempted.

Structural equations modeling

The previous section reported the results that pertained to the relationships between the time one and time two variables, and between the time two and time three variables. The *a priori* structural equation models specified in Figures 2.2 and 2.3 were then analysed. These analyses examined the direct and indirect effects of the Time 1 variables on related Time 2 variables, and the direct and indirect effects of Self-efficacy T2, Motivation to Transfer T2, Training Reactions T2, Training Transfer Goal T2, and Transfer Goal Commitment T2 on Transfer Goal Achievement T3.

The results of testing the *a priori* structural model in Figure 2.2 revealed that this model was a poor fit to the data and the null hypothesis that the specified model was able to adequately represent the data was rejected ($\chi^2 = 74.37$, d$f = 22$, $\underline{p} < .001$, GFI = .76, AGFI = .41, NTLI = .63, CFI = .82). An examination of the standardised regression coefficients revealed that many were non-significant (i.e., had a critical ratio less than 1.96 indicating that those coefficients were not significantly different from zero). The significant standardised regression coefficients are highlighted in bold in Figure 2.4.

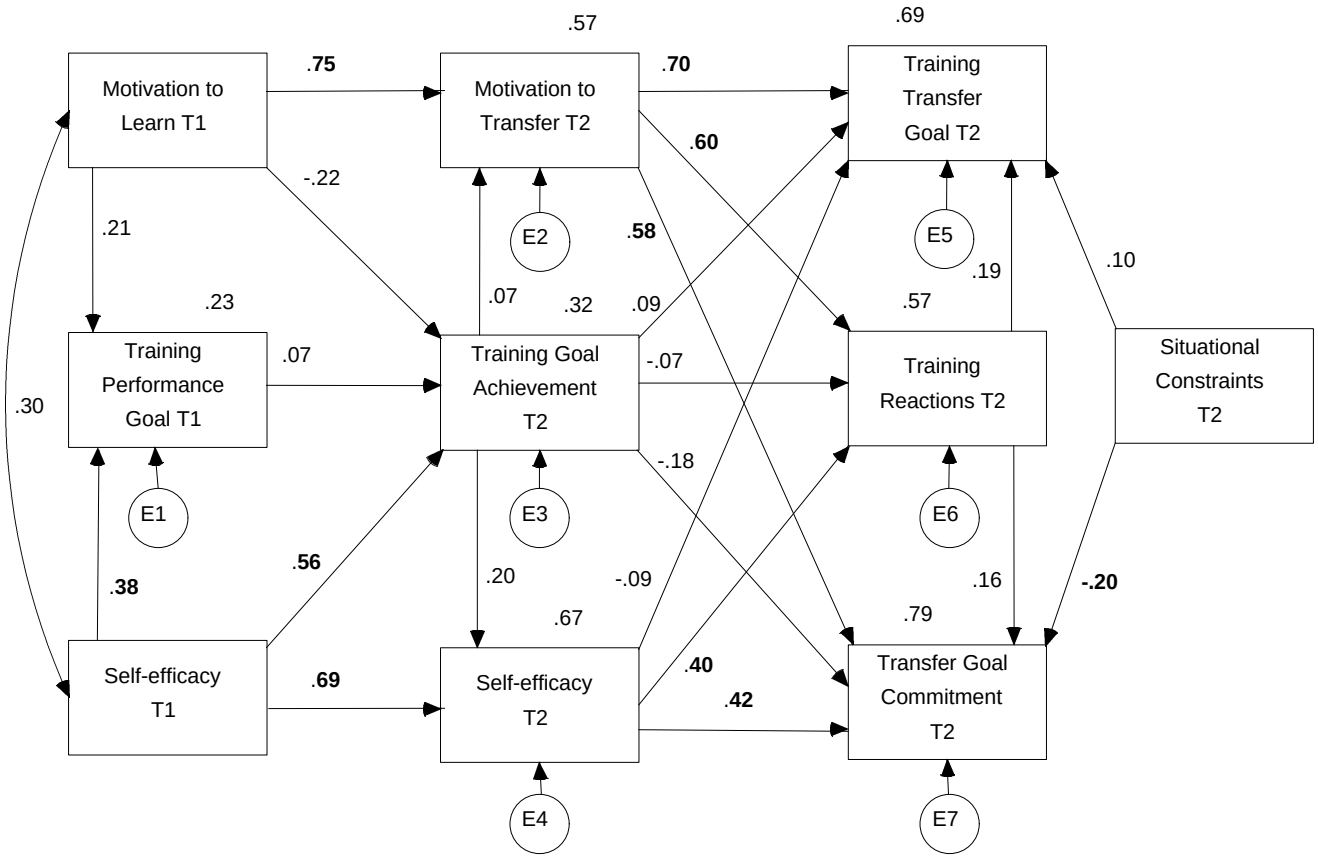

Figure 2.4. Standardised regression coefficients for *a priori* structural model of Time 1 and Time 2 variables.

The non-significant coefficients were subsequently deleted from the model following Anderson and Gerbing's (1988) recommended procedure, and the model then reestimated. The more constrained model (i.e., the one with the non-significant paths deleted) was also not a good fit to the data (χ^2 = 94.89, df = 35, $\underline{p} < .001$, GFI = .73, AGFI = .57, NTLI = .73, CFI = .79). A SCDT between the two models showed that the more constrained model was not any poorer fitting than the original theoretical model and, therefore, the null hypothesis that there is no significant difference between the two nested structural models failed to be rejected ($\Delta\chi^2$ = 20.52, df = 13, NS). No further attempts were made to respecify the model in order to obtain better indices of fit, even though this is a common approach in the empirical literature (Byrne, 1998).

Jöreskog (1993) distinguished among three approaches to testing structural equation models, that included a strictly confirmatory (SC) approach, an approach that tested alternative models (AM), and finally, a model generating (MG) approach. It is this last approach that described those situations where the researcher had postulated and rejected a theoretically derived model, and then proceeded to respecify the model on the basis of modification indices or by reviewing the theoretical bases of the model.

There were several reasons why respecification was not attempted. The main reason for splitting the overall model into two separate structural equation models was due to the small number of respondents who returned all measures at times one, two, and three (T1, T2, and T3 respectively). By using the SEM estimation procedures with a lower ratio of variables to subjects, it was less likely that spurious results would be obtained. Also, inspection of the correlations between the time one variables and the other variables showed that the T1 variables could be omitted from the model.

Training Performance Goal T1 was not strongly correlated with any of the T2 or T3 variables. Also, Motivation to Learn T1 was most strongly related to Motivation to Transfer T2 ($\underline{r}$ = .75), while Self-efficacy T1 and Self-efficacy T2 were similarly strongly related ($\underline{r}$ = .80). Inclusion of these highly correlated variables in a structural model could create estimation problems. Therefore, rather than respecify the model with the T1 variables, all three T1 variables were omitted from further analyses.

Apart from the problems associated with a small sample size that were mentioned earlier, the purpose of testing a separate structural model of the T1 and T2 variables was to identify the main influences on the T2 variables prior to testing the model containing the T2 and T3 variables. The T1 variables were found to influence their respective T2 counterparts (i.e., Self-efficacy T1 was strongly related to Self-efficacy T2, and Motivation to Learn T1 was strongly related to Motivation to Transfer T2) as expected and Self-efficacy T1 was found to influence Training Goal Achievement T2 which, in turn, did not have any significant paths to any of the other Time 2 variables. Other significant paths in the model were from Self-efficacy T2 to both Training Reactions T2 and Transfer Goal Commitment T2, and from Motivation to Transfer T2 to Training Reactions T2, Training Transfer Goal T2, and Transfer Goal Commitment T2. There was also a significant path from Situational Constraints T2 to Transfer Goal Commitment T2. These results will be discussed after the second *a priori* model linking the Time 2 and Time 3 variables is analysed.

The initial *a priori* model linking T1 and T2 variables was the one specified in Figure 2.2. Even though some of these paths were found to be non-significant, they were originally specified in the second *a priori* model (see Figure 2.3) and this original model was the one analysed. Anderson and Gerbing (1988) suggested that the

theoretical model to be tested should be relatively unconstrained so that other nested models could be compared to it using SCDTs.

The results of testing the *a priori* structural equation model shown in Figure 2.3 revealed that this model was a poor fit to the data and the null hypothesis that the specified model was able to adequately represent the data was rejected (χ^2 = 74.51, d*f* = 24, p < .001, GFI = .80, AGFI = .53, NTLI = .69, CFI = .83). An examination of the standardised regression coefficients revealed that many were non-significant (i.e., had a critical ratio less than 1.96 indicating that those coefficients were not significantly different from zero). The significant standardised regression coefficients are highlighted in bold in Figure 2.5. The non-significant coefficients were subsequently deleted from the model following Anderson and Gerbing's (1988) recommended procedure, and the model then reestimated. The more constrained model was also not a good fit to the data (χ^2 = 85.03, d*f* = 34, p < .001, GFI = .77, AGFI = .62, NTLI = .78, CFI = .83). A SCDT between the two models showed that the more constrained model was not any poorer fitting than the original theoretical model, and therefore, the null hypothesis that there is no significant difference between the two nested structural models failed to be rejected ($\Delta\chi^2$ = 10.52, d*f* = 10, NS).

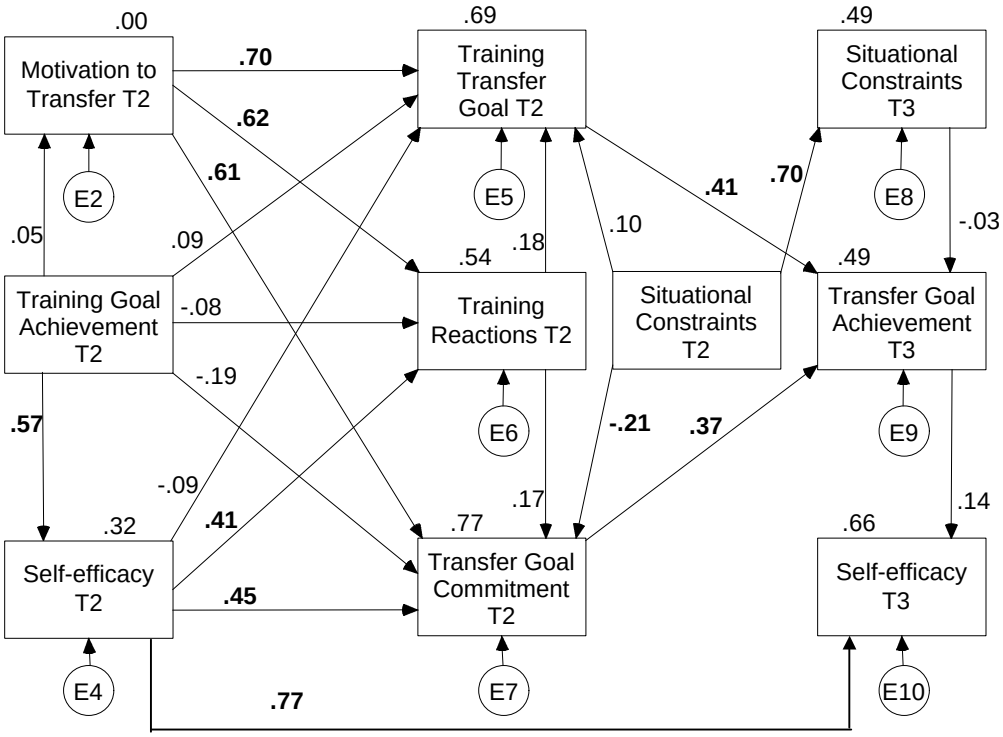

Figure 2.5. Standardised regression coefficients for *a priori* structural model of Time 2 and Time 3 variables.

At this stage, Jöreskog's model generation approach was applied, leading to the nonsignificant path from Situational Constraints T3 to Transfer Goal Achievement T3 being deleted from the model. Without paths linking it to any other variables, Situational Constraints T3 was also deleted from the model. The path from Transfer Goal Achievement T3 to Self-efficacy T3 was also found to be non-significant so the Self-efficacy T3 measure was also dropped from the model, leaving only the Time 2 measures and Transfer Goal Achievement T3. In essence, the revised structural model represented a test of the proposal that the influence of Self-efficacy T2 and Motivation to Transfer T2 on Transfer Goal Achievement T3 was mediated by Training Transfer Goal T2 and Transfer Goal Commitment T2.

The revised structural model that specified links only between two T2 measures (i.e., Training Transfer Goal T2 and Transfer Goal Commitment T2) and Transfer Goal Achievement T3 is shown in Figure 2.6. All significant standardised regression coefficients are highlighted in bold. The results indicate that this model was still a poor fit to the data and the null hypothesis that the specified model was able to adequately represent the data was rejected ($\chi^2 = 37.87$, d$f = 19$, $\underline{p} < .01$, GFI = .83, AGFI = .68, NTLI = .86, CFI = .91).

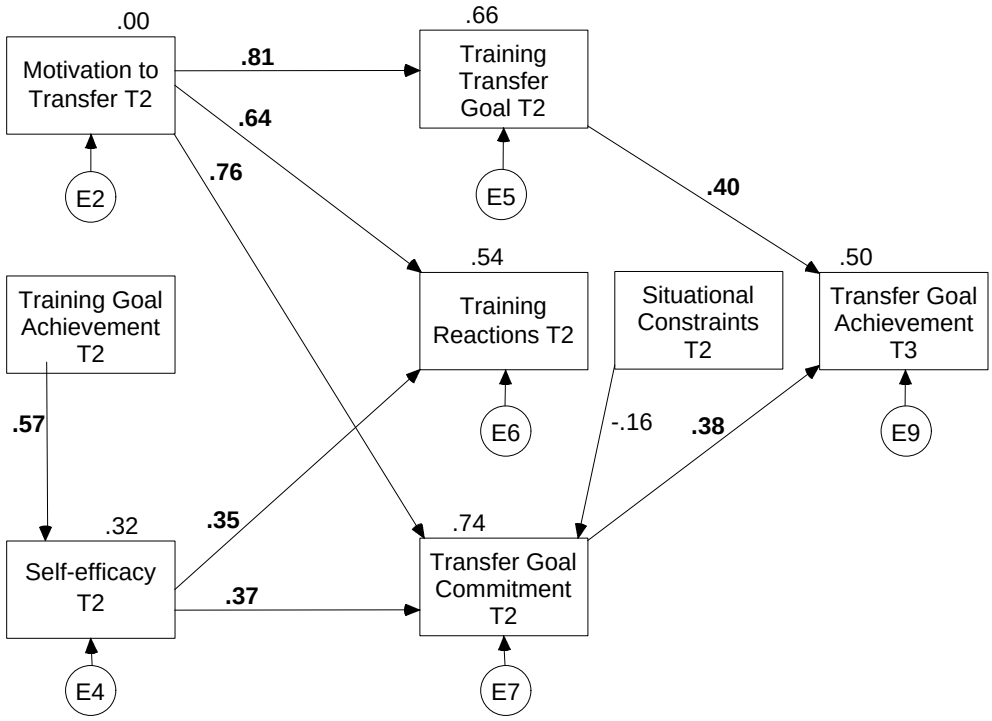

Figure 2.6. Revised structural model of Time 2 variables impacting on Transfer Goal Achievement T3.

Anderson and Gerbing (1988) suggested that if a model is not a good fit to the data (i.e., the null hypothesis is rejected), the theoretical model may be respecified by relaxing a constraint (or constraints), thus freeing up a degree (or degrees) of freedom. This conforms to the model generation approach described in Jöreskog (1993). Accordingly, the modification indices in the Amos output were inspected for a path that, if specified in the model, would result in the largest decrease in chi-square. It was apparent that a path needed to be specified from Motivation to Transfer T2 to Self-efficacy T2. This was because these variables were strongly correlated ($\underline{r} = .50$) and the process of model respecification had removed any way of explaining this correlation. There was no compelling theoretical reason for the link to go in only one direction, and it could have been specified as a covariance pathway as was used in the first *a priori* model to link Motivation to Learn T1 and Self-efficacy T1. The results for this less constrained model indicate that is a good fit to the data ($\chi^2 = 22.25$, d*f* = 18, NS, GFI = .88, AGFI = .77, NTLI = .97, CFI = .98). The SCDT between the two models showed that the more constrained model was a poorer fitting model than the less constrained model, and therefore, the null hypothesis that there is no significant difference between the two nested structural models was rejected ($\Delta\chi^2 = 15.62$, d*f* = 1, $\underline{p} < .001$), leading to the less constrained model being adopted as a better fitting model. The resulting model with parameter estimates is shown in Figure 2.7.

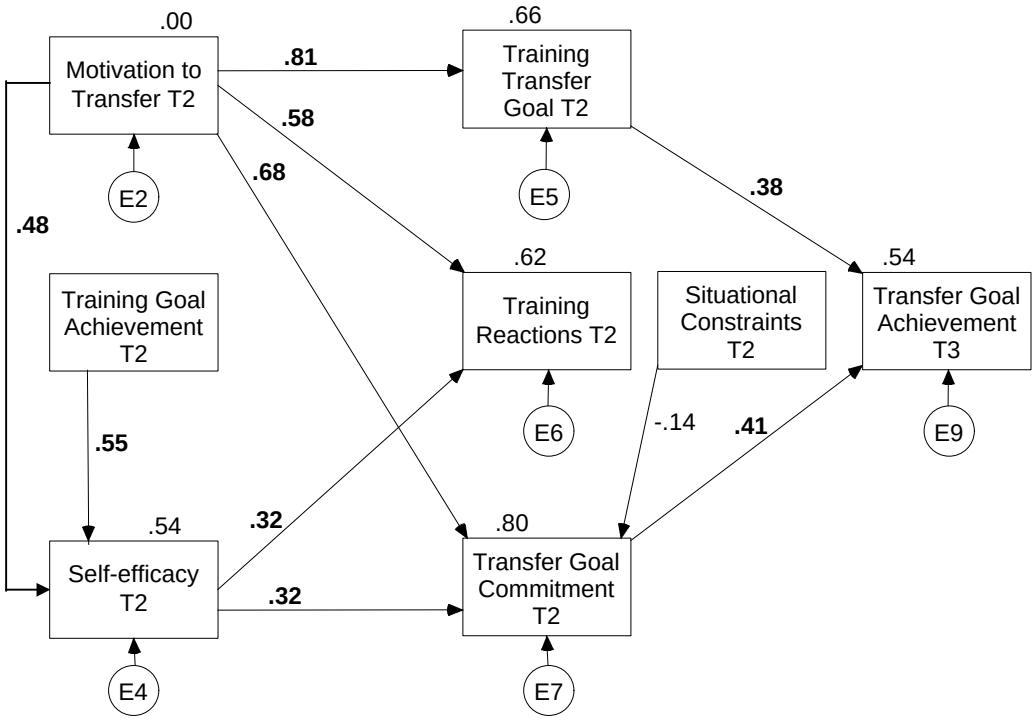

Figure 2.7. Final structural model of Time 2 variables impacting on Transfer Goal Achievement T3.

The endogenous variables that included in Figure 2.7 all had large proportions of their variance accounted for. For example, Self-efficacy T2 had 54% of its variance accounted for by Motivation to Transfer T2 and Training Goal Achievement T2. Training Reactions T2 had 62% of its variance accounted for by Motivation to Transfer T2 and Self-efficacy T2. Training Transfer Goal T2 had 66% of its variance accounted for by Motivation to Transfer T2. Transfer Goal Commitment T2 had 80% of its variance accounted for by Motivation to Transfer T2 and Self-efficacy T2. Finally, Transfer Goal Achievement T3 had 54% of its variance accounted for by Training Transfer Goal T2 and Transfer Goal Commitment T2.

Discussion

The present study examined the effects of a number of individual variables measured before training and again at the end of training, as well as situational constraints in the work environment, on trainees' success at achieving a self-set goal for the transfer of their skills learnt during training to the workplace. A model was developed that hypothesised that the individual variables would impact on transfer through the goals for transfer that individuals set for themselves and through their commitment to those goals. This model was consistent with research that has shown that the influence of personal and situational factors on performance is mediated through personal goal level and goal commitment (Wofford et al., 1992).

The first hypothesis (2.1) concerned the significance of the relationship between two demographic variables and all other variables measured at T1, T2, and T3. With one

exception, Age and Years of Service were not related to any of the other variables measured. The exception was a negative relationship between Age and Situational Constraints T3, which may simply be a Type I error resulting from the number of correlations that were calculated. Therefore, little importance was attached to this finding.

The second hypothesis (2.2) was that the paths from Self-efficacy T1 and Motivation to Learn T1 to Training Performance Goal T1 and Training Goal Achievement T2 would have positive path coefficients. While the correlations suggested that both Self-efficacy T1 and Motivation to Learn T1 were positively related to Training Performance Goal T1, the results of testing the first *a priori* structural model showed that the path from Motivation to Learn T1 to Training Performance Goal T1 was not significant (see Figure 2.4). This highlighted the advantage of a model that allowed the separate influences of each variable to be assessed simultaneously. The path from Self-efficacy T1 to Training Goal Achievement T2 was positive and significant, while the path from Motivation to Learn T1 to Training Goal Achievement T2 was non-significant. It was also hypothesised that Self-efficacy T1 and Motivation to Learn T1 would be positively related to their respective counterparts at T2 and this was found to be the case (path coefficients of .69 and .75 respectively). As a result of the very high correlations between the T1 and T2 self-efficacy and motivation variables ($\underline{r}$ = .80 and $\underline{r}$ = .75 respectively), an inspection of the means for these variables showed that both self-efficacy and motivation hardly changed at all during the course of the training. Saks (1997) highlighted that research has shown that training almost always increases self-efficacy, and that the effect of training on training outcomes is largely a function of the

trainee's self-efficacy. Therefore, the static levels of self-efficacy found in this study may indicate that the trainees were close to their upper limit before training started.

The third hypothesis (2.3) stated that the paths from Training Goal Achievement T2 to Self-efficacy T2, Motivation to Transfer T2, Training Reactions T2, Training Transfer Goal T2, and Transfer Goal Commitment T2 would all have positive path coefficients. In the first *a priori* structural model that incorporated the T1 variables, none of the paths from Training Goal Achievement T2 to any of the other T2 variables were significant. In the second *a priori* structural model that was tested, Training Goal Achievement T2 was found to have a direct positive effect on Self-efficacy T2 (see Figure 2.5). However, the first *a priori* structural model demonstrated that Self-efficacy T2 and Training Goal Achievement T2 are both directly affected by Self-efficacy T1, and that Training Goal Achievement T2 only weakly affected Self-efficacy T2 (see Figure 2.4). Therefore, the significant effect in the second model between the two T2 variables is explained by their relationship with Self-efficacy T1. Locke and Latham (1990) concluded that higher post-training performance positively affected self-efficacy and that this in turn impacted positively on future performance. However, it was not clear how motivation to transfer would influence this relationship, given that there were strong, positive correlations between the self-efficacy and motivation to learn/transfer in this study. For example, would higher self-efficacy lead to higher levels of motivation, or would they both be influenced by another variable? Therefore, the direction of the relationship between self-efficacy and motivation to transfer is an important issue that additional studies could examine.

The fourth hypothesis (2.4) stated that the paths from Self-efficacy T2 and Motivation to Transfer T2 to Training Reactions T2, Training Transfer Goal T2, and Transfer Goal Commitment T2 would all have positive path coefficients. These expectations were confirmed, although both the first and second *a priori* structural models showed that the path from Self-efficacy T2 to Training Transfer Goal T2 was not significant. Also, in contrast to what was predicted, the paths from Training Reactions T2 to both Training Transfer Goal T2 and Transfer Goal Commitment T2 were non-significant. Wofford et al. (1992) discussed the results of a meta-analysis that showed that the antecedents of personal goal level are predominantly informational variables, while the antecedents of goal commitment are predominantly motivational variables. However, in this case, one kind of motivational variable (i.e., Motivation to Transfer T2) was a strong predictor of Training Transfer Goal T2, while another kind (i.e., Self-efficacy T2) wasn't a predictor, although it was positive correlated (r = .43). Wofford et al. mentioned a number of potential moderators that may attenuate the relationships between individual variables and personal goal level such as task ambiguity. Further investigation is required to determine whether this is a plausible explanation.

As predicted in the fifth hypothesis (2.5), the path from Situational Constraints T2 to Transfer Goal Commitment T2 had a negative path coefficient, and the path from Situational Constraints T2 to Situational Constraints T3 had a positive path coefficient. However, contrary to what was predicted, the path from Situational Constraints T2 to Training Transfer Goal T2 was non-significant. While the second *a priori* structural model showed that the path from Situational Constraints T2 to Transfer Goal Commitment T2 was significant (see Figure 2.5), the respecified structural models

showed this path was not significant. This issue is raised again when the eighth hypothesis is discussed later in this section.

The sixth hypothesis (2.6) predicted that the paths from Training Transfer Goal T2 and Transfer Goal Commitment T2 to Transfer Goal Achievement T3 would have positive path coefficients. Both paths from Training Transfer Goal T2 and Transfer Goal Commitment T2 to Transfer Goal Achievement T3 were found to positive, significant path coefficients as was expected.

The seventh hypothesis (2.7) stated that the paths from Self-efficacy T2, Motivation to Transfer T2, and Training Reactions T2 to Transfer Goal Achievement T3 would all have non-significant path coefficients. This would be consistent with the trainees' goals for transfer of their training and commitment to those transfer goals mediating the influence of self-efficacy, motivation to transfer, and reactions to training on successful achievement of transfer goals. The paths linking Self-efficacy T2, Motivation to Transfer T2, and Training Reactions T2 with Transfer Goal Achievement T3 were not specified in the second *a priori* model (i.e., they were constrained to be equal to zero), and this model obtained a good fit to the data (see Figure 2.5). These results support the central role that transfer intentions play in the transfer of training. However, the use of single items to reflect trainees' transfer goals and commitment to those goals may not adequately reflect trainees' goal implementation intentions. Gollwitzer (1993) argued that goal achievement may be impeded during the initiation or successful execution of goal-directed behaviours and, at this point, implementation intentions become crucial. These intentions form a connection between goal-directed behaviour and a specific situational context that might be encountered. Therefore, a more

elaborate assessment of trainees' implementation intentions at the end of training might be helpful in explaining the transfer of training process.

The paths from Self-efficacy T2 and Motivation to Transfer T2 to Training Reactions T2 were found to have positive, significant path coefficients, although because these variables were measured simultaneously, the direction of the relationships could reversed. If this was the case, reactions to training might have an indirect relationship to Transfer Goal Achievement T3 through its influence on Self-efficacy T2 and Motivation to Transfer T2.

Alliger and Janak (1989) and Alliger, Tannenbaum, Bennett, Traver and Shotland (1997) have examined the relationships between training evaluation criteria. Starting with Kirkpatrick's (1967) four levels of evaluation, that is, reactions, learning, behaviour and results, they developed an augmented framework that separated training reactions into affective and utility reactions, and learning into immediate post-training learning, knowledge retention, and behavioural/skill demonstration. The earlier review by Alliger and Janak did not consistently show any strong relationship to exist between reactions and behaviour (i.e., transfer in the model presented in Thayer & Teachout, 1995). However, as demonstrated in this study, this relationship might be mediated by other variables. The later review by Alliger et al. revealed that utility-based measures of training reactions were more strongly related to learning or on-the-job performance than affective-based reactions. In the current study, the measure of training reactions included items measuring both affective reactions and utility reactions. Alliger et al. also found that utility-based measures of training reactions were more strongly associated with transfer than were the measures of learning. The explanation they offered to account for

this finding was that trainees' utility-based reactions are influenced by their knowledge of work environment constraints. However, they cautioned that their conclusions are based on a small number of studies and therefore must remain tentative.

The eighth hypothesis (2.8) stated that the path from Situational Constraints T3 to Transfer Goal Achievement T3 would have a negative path coefficient. This was not supported. It is still possible that work environment constraints might exert an indirect influence on successful transfer of training through its effect on pre-training self-efficacy and motivation (Mathieu & Martineau, 1997). It is also possible that there may also be other constraints operating in the workplace which were not included in the 11 categories measured. Villanova (1996) suggested that the predictive validity of self-report measures of situational constraints might be attenuated when global performance criteria are used (as was used in the current study) rather than more specific performance criteria. Peters et al. (1985) cautioned that self-reports of situational constraints may be contaminated by dispositional variables that impact on the perception and reporting of external events. One such variable that warrants further attention is the study is the role of Negative Affectivity (Spector, Zapf, Chen & Frese, in press).

A more sensitive measure of work-related variables that might impact on the transfer of training would be valuable. Several researchers have recently been developing suitable measures, such as Rouiller and Goldstein (1993), Tracey, Tannenbaum, and Kavanagh (1995), and Thayer and Teachout (1995). A suitable measure of the climate for transfer could contain multiple items relating to opportunity to perform, supervisor attitudes and workgroup support as these have been identified as key situational variables operating in the transfer environment (Quiñones et al., 1995/96).

The ninth hypothesis (2.9) stated that the paths from Self-efficacy T2 and Transfer Goal Achievement T3 to Self-efficacy T3 would have positive path coefficients. The correlation between Self-efficacy T2 and Self-efficacy T3 was very high (r = .82), paralleling that found between Self-efficacy T1 and Self-efficacy T2. Even though the correlation between Transfer Goal Achievement T3 and Self-efficacy T3 was positive and significant, the second *a priori* structural model showed that the path from Transfer Goal Achievement T3 to Self-efficacy T3 was not significant (see Figure 2.5). This finding seems to contradict the substantial research that has shown that goal achievement has beneficial effects on self-efficacy (Locke & Latham, 1990), and that the level of trainees' self-efficacy is a determinant of transfer outcomes. However, the use of structural equation modeling has the same limitations as multiple regression in that the standardised regression coefficients may not reflect the same relationships as the underlying correlations. Structural equation modeling can provide an explanation of why variables are correlated. In the current study, the strong relationship found between self-efficacy and motivation to learn/transfer means that once the influence of motivation to learn/transfer was taken into account, self-efficacy may have had very little unique influence of its own.

Contribution of Study 1

Study 1 demonstrated that the influence of personal and situational factors on transfer goal achievement is mediated by the trainees' personal goal levels and goal commitment. This finding emphasises the importance of considering transfer intentions in understanding the process by which transfer of training to the workplace occurs. Study 1 failed to demonstrate that the measure of situational constraints influences the trainees'

transfer intentions. However, the measure of situational constraints used was not based on the recent theoretical developments in the area that have emphasised the measurement of multiple dimensions of the transfer environment (Quiñones, 1997). Therefore, the process by which the transfer climate may influence the transfer of training to the workplace needs to further researched.

Limitations of Study 1

A number of methodological problems are evident in this study. First, the relatively small sample size meant that there was reduced statistical power to detect significant relationships. Some path coefficients that were nonsignificant, such as the direct effects of Training Reactions T2 on both Training Transfer Goal T2 and Transfer Goal Commitment T2 might in fact be significant in a larger sample. Second, a reliance on self-report data introduces an unknown amount of common method variance that can result in an overestimation or inflation of measures of association such as correlations or path coefficients (Williams & Brown, 1994). Further, objective measures of performance during training and transfer of training are needed. For example, supervisors or an independent rater could be asked to rate the extent to which trainees had demonstrated successful transfer of trained skills, according to a set of specific criteria. Finally, the third problem also relates to measuring job performance. The actual measure of performance used can influence the relationships between the individual and work characteristics and the measure of transfer.

Baldwin and Ford (1988) recommended that researchers adopt a dynamic perspective that examines the amount of transfer that occurs over time. Just as researchers have represented learning in the form of "learning curves", they proposed that the

maintenance of trained knowledge, skills and behaviour could be represented through the use of "maintenance curves". Also, transfer success which is measured soon after training is at risk of measuring short-term benefits and possibly failing to differentiate those factors which promote longer-term transfer (Hesketh, 1997a, 1997b).

Conclusions

Based on the results of this study, individuals who have lower post-training self-efficacy or lower motivation to transfer are more likely to set lower goals for transfer of their training and have lower commitment to those goals, thereby resulting in less success at achieving their goals for transferring their skills learnt during training. In order to enhance training effectiveness, trainers should assess trainees after training and identify those who are most at risk of failing to transfer their training. The use of specific transfer strategies such as goal-setting combined with feedback, or relapse prevention could be incorporated into an ongoing post-training evaluation in which the trainee is regularly monitored to ensure that the skills and knowledge acquired during training are generalised and maintained. It is also important to develop better techniques and instruments for assessing barriers to transfer which exist in the work environment, as well as those aspects of the work environment that enhance transfer outcomes. This would enable a comprehensive strategy to be developed to maximise training transfer.

CHAPTER THREE: STUDY TWO

Rationale for Study 2

The effective acquisition of end-user computer skills is becoming a major concern for organisations whose employees face a rapid increase in the use of computer technology, even for lower-level jobs ("Tackling the Information Technology Skills Gap," 1993). There has also been a rapid increase in the use of computer technology in training programs, necessitating better models of how end-user training should be designed to enhance learning and transfer (Simon, Grover, Teng & Whitcomb, 1996; Patrick, 1992). Some of the research that has focused on the determinants of training effectiveness in the area of computer skills will be reviewed and this will be followed by closer examination of the importance of transfer intentions in the transfer process and the individual and environmental determinants of transfer intentions.

Compeau and Higgins (1995) used Social Cognitive Theory (Bandura, 1997) as the basis for developing a computer skills training program incorporating behavioural modeling. Compeau and Higgins found that trainees who had higher levels of self-efficacy also had higher outcome expectations and better performance on two computer software packages. Gist, Schwoerer and Rosen (1989) also demonstrated that behavioural modeling is effective at developing higher levels of self-efficacy, which had a positive impact on trainees' performance. Compeau and Higgins concluded that the trainees' levels of self-efficacy were a mediator, that helped to explain the influence of behavioural modeling on training performance.

Klein, Hall and Laliberte (1990) argued that the quality and type of training associated with the introduction of new technology is critical in determining the impact

of the new technology on the organisation. Klein and Ralls (1997) also proposed with respect to the transfer of training to use new technology, that employees who were not able to transfer these skills to their jobs following training might feel resentful, frustrated, or cynical. Therefore, successful transfer of technology training is important in that it enables employees to undertake the tasks required by their jobs and fulfils their expectations about the utility of their training. However, Klein and Ralls warned that training does not automatically transfer to other contexts, but that transfer must be deliberately fostered.

The above conclusion is supported by many other training researchers and practitioners (Broad & Newstrom, 1992; Gist, 1997; Milheim, 1994). For transfer of training to be successful, the organisation's management, instructional designers, training facilitators, employees and their supervisors must all be involved in fostering the transfer of training.

A limited number of studies have been conducted with the goal of identifying the characteristics of end-user training which promote the transfer of end-user computing skills. Simon et al. (1996) and Simon and Werner (1996) reported on a longitudinal, field study that used three instructional strategies (behaviour modeling, exploration, and standard lecturing) to teach trainees a new software package. The results showed that the behavioural modeling approach resulted in superior retention of knowledge, better transfer of learning, and greater end-user satisfaction.

Hesketh and Chandler (1987, 1990) reported an example of training in the use of numerically controlled (NC) and computerised numerically controlled (CNC) systems. One study focused on the methods of training that would develop the highest levels of

self-efficacy in trainees that would assist them in learning to operate other, similar equipment. Interestingly, the performance of both males and females was superior under training conditions that allowed trainees to observe a demonstration of each technique followed by a verbal description of the steps involved. The separation of the demonstration and description of the steps seemed to allow trainees the opportunity to reduce the initial cognitive demands of the learning task and therefore develop superior skills. It is not clear, however, the conditions under which these skills would transfer to other situations.

Ivancic and Hesketh (1995/96) examined the research concerning the incorporation of error in training and concluded that the proper management of errors during training may also help to foster transfer of training. The processes which they postulated as being critical to the transfer of training included the development of well understood principles (or schema) which the trainee could use to guide their actions in other settings (Annett & Sparrow, 1986; Cooper & Sweller, 1987; Salomon & Perkins, 1989). Other processes which could potentially impact on transfer of training included the degree to which training requires trainees to utilise principles and procedures which are similar to those required in the transfer setting (Roediger, 1990). However, these studies did not specifically focus on the transfer of end-user computing skills and therefore further studies are needed to assess whether training that includes these characteristics will promote transfer of end-user training.

Gattiker (1992) reviewed the literature relating to employee's acquisition of computer skills and identified a number of groups of variables that may influence the effectiveness of end-user computer training. Gattiker defined computer skills as a

combination of both learned behaviour and mental processes, which is included in a broader category called “technology skills”. Gattiker proposed that “Achieving *satisfactory performance* (during learning and, thereafter, on-the-job) hinges first upon individual abilities (motor and cognitive process capabilities, e.g., information processing), second, the degree of substantive complexity and autonomy-control offered/required by the job and, third, upon the mix of declarative and procedural knowledge the person has in basic, social, conceptual, technology, technical, and task skills *before* training as well as the mix to be acquired during training” (p. 552).

The first group of variables identified by Gattiker (1992) comprised individual factors such as sociodemographic characteristics, abilities and motivation. Age, gender, level of education, various types of abilities (e.g., general abilities, perceptual speed abilities and psychomotor abilities as proposed by Ackerman, 1989), motivation and expectancy were all regarded as important influences on skill acquisition. For example, Kanfer and Ackerman (1989) found that goal-setting was detrimental to the acquisition of new skills when demands of the task required trainees to utilise their cognitive resources in learning declarative information about the task. Goal setting was effective in promoting better learning outcomes after the basic declarative information had been transformed into procedural knowledge.

A second group of variables Gattiker (1992) identified included the characteristics of the task and the design of the person-computer interface. Where the computerised task to be learned has similar characteristics to other tasks, positive transfer of training may assist trainees in acquiring the new skills. However, where the computerised task differs substantially from previous non-computerised tasks, the transfer of skills and knowledge

would be limited. Also, the design of the person-computer interface and hardware factors can contribute to variability in the levels of skill acquired by trainees (Wærn, 1989).

Gattiker (1992) also mentioned the importance of identifying participants' training needs, the use of a variety of learning settings such as classroom, laboratory or on-the-job, the use of a variety of teaching methods such as videos, computer-assisted learning, behavioural modeling, and peer training, and the duration and frequency of training sessions as all contributing to the acquisition of end-user computing skills. The factors already mentioned (demographic characteristics, abilities, motivation, work design and person-computer interface characteristics) may interact with this last group of factors relating to the design and implementation of the training program. However, while Gattiker identified a diverse range of variables that impact on the initial acquisition of end-user computer skills, limited research has been conducted to assess the influence of these variables on transfer of end-user computer skills to other setting. In particular, there is no research that has focused on the impact of the transfer climate on the acquisition and transfer of end-user computing skills. Therefore, the current study attempted to develop a model that would describe how the transfer climate would influence the transfer process. Before, this model is presented, a description of the types of transfer intentions that trainees form will be provided.

The Role of Transfer Intentions

One of the conclusions of the first study was that transfer intentions played an important role in the transfer of training process, and therefore, a greater understanding of the nature of trainees' implementation intentions at the end of training was required.

Gollwitzer (1993) proposed that there are two kinds of intentions that impact on goal achievement: goal intentions and implementation intentions. Goal intentions were defined as specifying a desired end state, as well as some level of commitment to achieving that end state. This is the kind of transfer intention that was used in the first study. Gollwitzer defined implementation intentions as specifying the situational cues or conditions that trigger goal-directed actions. That is, this kind of intention is a commitment to act in a certain way whenever certain conditions are fulfilled. Implementation intentions were regarded as instrumental in making salient to the individual the aspects of the environment that were relevant to the achievement of their goals. Austin and Vancouver (1996) highlighted that a similar distinction is often made between outcome and process goals across a number of domains. Whereas outcome goals are fixed endpoints, process goals are directions in which the individual wishes to move. Individuals may represent goals in different ways, and this includes the kind of cues that are used to ascertain whether a goal has been achieved.

The kinds of implementation intentions that are relevant to the transfer of training are likely to be intentions to use the transfer enhancement procedures such as goal setting, self management, and relapse prevention that are effective in promoting the transfer process (Haccoun & Saks, 1998). Other activities that might promote transfer include seeking support from supervisors and peers, as well as practicing the skills learnt in training, and looking for opportunities to demonstrate the skills learnt during training. Therefore, a measure of implementation intentions that included all of the above activities was included in this study as one of the important outcomes of training. These intentions were measured at the end of training and then, subsequently, trainees were

asked to report on their actual implementation of these activities and their success at transferring their skills.

Determinants of Transfer and Implementation Intentions

Thayer and Teachout's (1995) original model of the transfer process (see Figure 1.1) portrayed the climate for transfer of training and the transfer-enhancing activities that occur during the training program as influencing the training and transfer outcomes. The climate for transfer part of Thayer and Teachout's model was directly based on Rouiller and Goldstein's (1993) model that depicted transfer climate as consisting of two components: antecedents and consequences. Thayer and Teachout subsequently created a Climate for Transfer Questionnaire that incorporated many of the items from Rouiller and Goldstein's questionnaire, plus additional items they developed themselves. One category of items in Rouiller and Goldstein's model (self-control cues) was omitted from the Climate for Transfer Questionnaire (CTQ) and incorporated into a second questionnaire called the Transfer-Enhancing Activities Questionnaire (TEAQ). This second questionnaire assessed the presence of various transfer-enhancing elements in training, such as overlearning, varied practice, physical and psychological fidelity, teaching of principles, as well as other strategies that impact on transfer such as goal setting, relapse prevention, self-management activities, and top management support. Both questionnaires were developed to measure the various constructs in sufficient detail so that the impact of their component parts could be determined.

The questionnaires developed by Thayer and Teachout (1995) enabled a number of issues raised at the end of the first study to be addressed. First of all, the trainees' perceptions of their transfer environment could be measured prior to training in order to

determine the influence of transfer climate on pre-training self-efficacy and motivation. Mathieu and Martineau (1997) and Quiñones (1997) predicted that climate for transfer would influence trainees' self-efficacy and motivation, and that these would in turn impact on trainees' transfer intentions.

Another issue that was raised at the end of the first study concerned whether the perception of workplace constraints affecting transfer of training might be biased by individual differences in disposition. Attributional style has been proposed as a possible determinant of self-reports of situational constraints, such that individuals who attribute failures to external events would be expected to report higher levels of constraints (Villanova & Roman, 1993). However, further studies by Villanova (1996) demonstrated that self-reported constraints were independent of attributional style, while the relationship between situational constraints and performance was mediated by proximal motivational constructs such as self-efficacy and self-set goals. This finding supported the proposal that climate for transfer operates indirectly on transfer outcomes through self-efficacy, motivation, and transfer intentions.

Tellegen (1985) suggested that there may be a strong link between dispositional variables such as positive and negative affectivity (PA and NA respectively) and employees' sensitivity to signals of reward and punishment in the workplace. In particular, NA has been found to have a direct influence on self-reports of strain, as well as a moderating and confounding effect (Burke, Brief & George, 1993; Moyle, 1995). Spector, et al. (in press) argued that rather than attempt to control for any biasing effect of NA by including items with a lower affective tone, or by partialing out the influence of NA, researchers should examine whether NA may have an important substantive role to

play in the job stress process. For example, NA may be an outcome of negative events occurring in the workplace, and thereby become a mediator of the influence of workplace climate on individual variables such as self-efficacy, and motivation. Positive Affectivity may play a similar role, but there is less research to support this notion.

One study that examined the role of both NA and PA in the job stress process, (Fogarty, et al., 1999) found that NA was more strongly related to employee's perceptions of stressors in the workplace and PA was more strongly related to employee's self-reported coping strategies. It seemed that appraisal of both positive and negative work-related variables may be influenced by PA and NA, but Fogarty et al. cautioned that work-related variables may also have an influence on PA and NA. In the current study, it was expected that NA would be more closely related to the perceptions of negative aspects of the workplace, while PA would be more closely related to the positive aspects of workplace. Therefore, PA and NA were measured in order to determine whether these variables were related to trainees' perceptions of the work environment, and whether PA and NA were mediators of the relationship between climate for transfer and individual variables such as self-efficacy and motivation.

A third issue concerned the components of training measured in the TEAQ that would have the greatest influence on the trainees' implementation intentions. It was expected that those components that focused on developing the trainees' awareness of self-control cues (i.e., feedback cues), those that assisted the trainees to set goals for the use of their skills, and those that focused on relapse prevention behaviours would be most influential (Haccoun & Saks, 1998). The other components of training included in the TEAQ, such as overlearning, fidelity, varied practice, and the teaching of principles

(principles-meaningfulness) were expected to have a stronger impact on the trainees' actual level of learning, rather than their intentions to transfer their training. It was also expected that the components of training measured in the TEAQ would impact directly on the trainees' levels of post-training self-efficacy and motivation.

The variables that were measured at each of the three times are depicted in Figure 3.1. This model contains 17 variables measured at Time 1 variables (prior to training), 11 variables measured at Time 2 (at the end of training), and three variables measured at Time 3 (four weeks after training).

In the current study, Thayer and Teachout's (1995) model was adapted to focus on the development of implementation intentions (see Figure 3.2). Thayer and Teachout suggested that both the climate for transfer variables and the in-training transfer enhancing activities would impact on the transfer of training. However, the current study was designed to test hypotheses about the climate for transfer variables, which suggested that this set of variables impact directly on pre-training self-efficacy and motivation. Therefore, the climate for transfer variables, PA, NA, self-efficacy, and motivation were assessed prior to the training commencing. The main research questions to be addressed in this study concern the role that climate for transfer and transfer enhancement procedures have on trainees' transfer implementation intentions and their actual use of implementation activities.

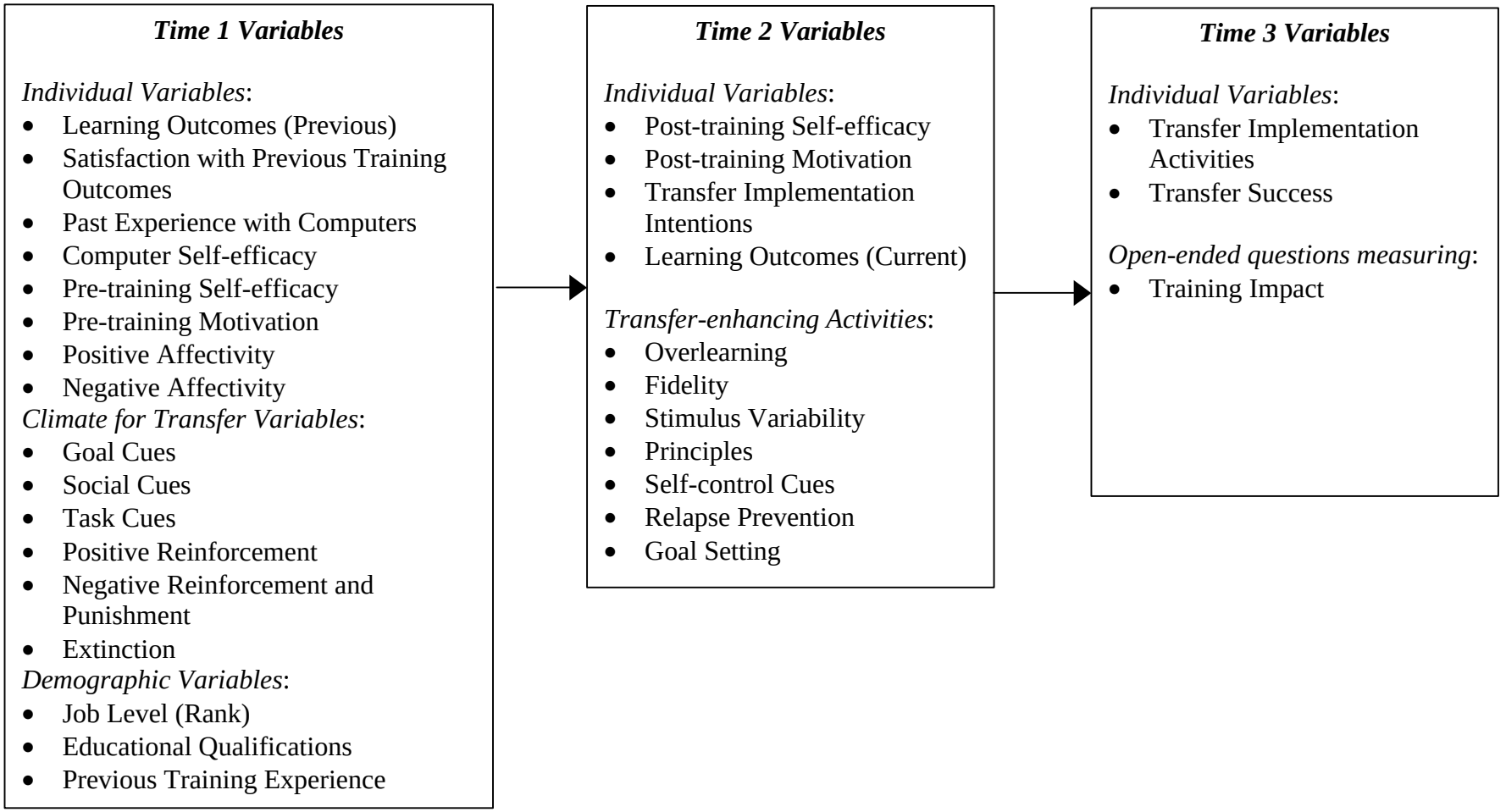

Figure 3.1. Sequential model of the variables measured at times 1, 2, and 3 in Study 2.

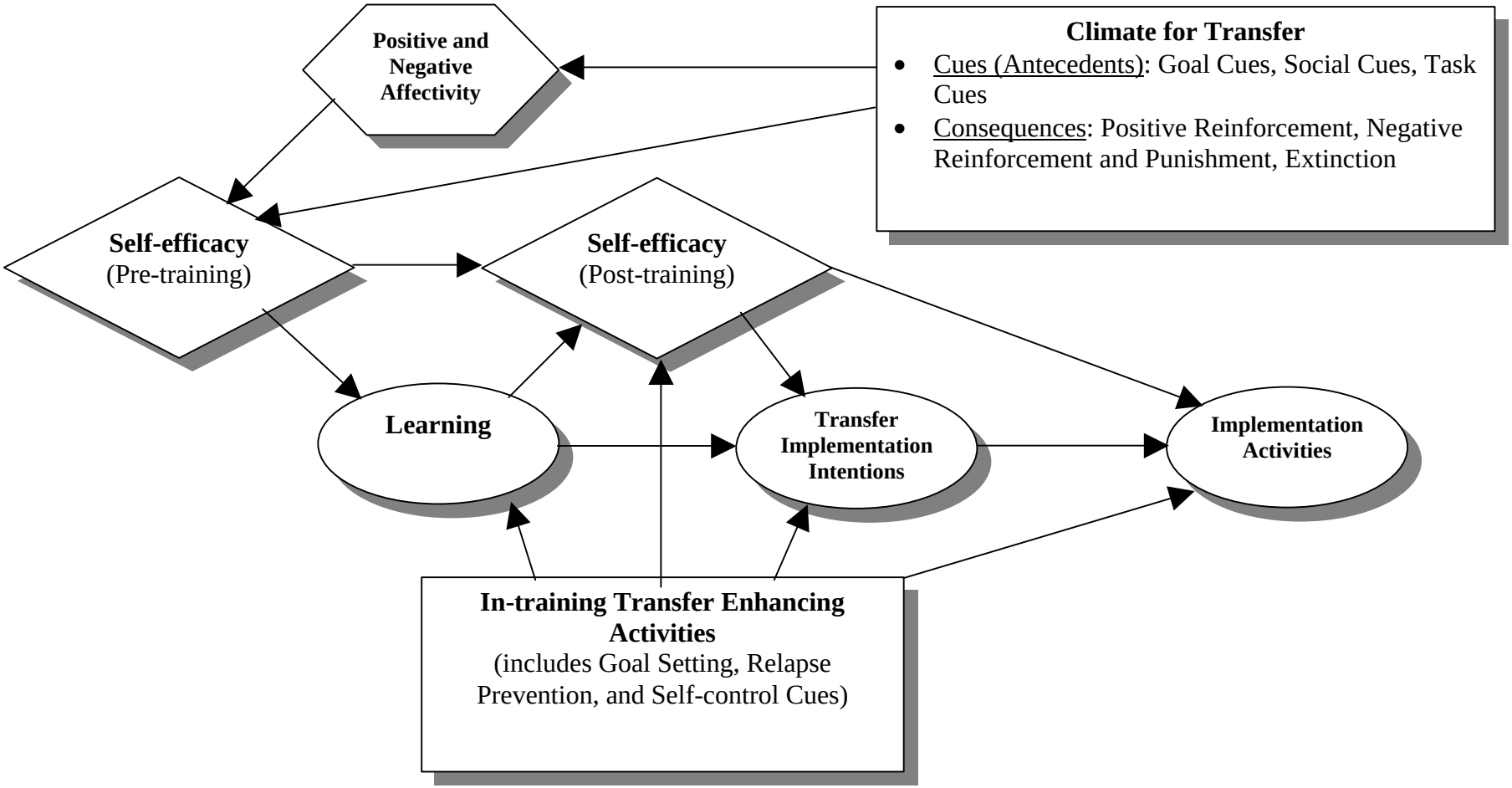

Figure 3.2. Modified Model of Training Transfer (based on Thayer & Teachout, 1995).

Hypotheses related to the climate for transfer variables

3.1. It was hypothesised that the six climate for transfer scales contained in Thayer and Teachout (1995) could be reduced to two underlying constructs as suggested by Rouiller and Goldstein (1993): (a) antecedents, comprising Goal Cues, Social Cues, and Task Cues, and (b) consequences, comprising Positive Reinforcement, Negative Reinforcement and Punishment, and Extinction. This hypothesis was assessed by constructing a measurement model of the climate for transfer variables (not portrayed in Figure 3.2).

3.2. It was hypothesised that the six climate for transfer variables would be positively related to pre-training self-efficacy and motivation (see Figure 3.2). The scales measuring Negative Reinforcement and Punishment, and Extinction were scored so that a higher score represented lower levels of that construct. This hypothesis was based on the work of Mathieu and Martineau (1997) and Quiñones (1997) which suggested that trainees' perceptions of their environment would influence their pre-training self-efficacy and motivation.

3.3. It was hypothesised that PA and NA would mediate the influence of the climate for transfer variables on pre-training self-efficacy and motivation (see Figure 3.2). This hypothesis was developed from the work of Fogarty et al. (1999) and Spector et al. (in press) which suggested that the appraisal of both positive and negative work-related variables may be influenced by affective variables such as PA and NA, but may also be a determinant of PA and NA. In this study, PA and NA were portrayed as predominantly state measures of affect, although these variables are often portrayed as dispositional or trait measures (e.g., as in Fogarty, et al., 1999).

Hypotheses relating to the influence of self-efficacy and motivation

3.4. It was hypothesised that pre-training self-efficacy and motivation would be positively related to post-training self-efficacy and motivation, and also to the trainees' level of learning during training (see Figure 3.2). This hypothesis was based on the results obtained in study 1, as well as the work of many researchers (e.g., Gist, 1997, Haccoun & Saks, 1998; Locke & Latham, 1990) that has shown that self-efficacy is an important determinant of training outcomes and an important outcome of training in itself.

3.5. It was hypothesised that post-training self-efficacy and motivation would be positively related to the trainees' level of learning during training, the trainees' implementation intentions, and the trainees' implementation activities (see Figure 3.2). This hypothesis was also based on the results of study 1 as well as the work of many authors (e.g., Gist, 1997; Locke & Latham, 1990; Mathieu & Martineau, 1997) which demonstrated the important role of self-efficacy and motivation in the transfer process.

Hypotheses related to the transfer enhancing activities

3.6. The sixth hypothesis was that the in-training transfer enhancing activities would be positively related to the trainees' level of learning during training, to the trainees' level of post-training self-efficacy and motivation, to the trainees' implementation intentions, and to the trainees' implementation activities (see Figure 3.2). This hypothesis was based on several separate lines of research (see Baldwin & Ford, 1988; Ford & Weissbein, 1997; Thayer & Teachout, 1995) which have demonstrated that training design factors such as overlearning, varied practice, physical and psychological fidelity, the teaching of principles, goal

setting, relapse prevention, and self-management training all influence training and transfer outcomes.

3.7. The seventh hypothesis was that the transfer enhancement activities such as overlearning, fidelity, varied practice, and principles-meaningfulness would have a weaker relationship to the trainees' implementation intentions and implementation activities, while goal setting, relapse prevention, and self-control/feedback cues would be more strongly related to implementation intentions and implementation activities (not portrayed in Figure 3.2). Self-management strategies, relapse prevention techniques, and goal setting have all been found to strongly influence the transfer of training (Haccoun, 1997; Haccoun & Saks, 1998), while overlearning, varied practice, physical and psychological fidelity, and the teaching of principles have a weaker influence on transfer outcomes (Hesketh, 1997a; Ford & Weissbein, 1997).

Hypotheses relating to Implementation Intentions, Implementation Activities, and Transfer Success

3.8. It was also hypothesised that implementation intentions would be positively related to implementation activities (see Figure 3.2). This hypothesis was based on the work of Gollwitzer (1993) and Schwarzer (1992) that described the importance of intentions to implement transfer enhancement procedures as a precursor to the actual use of those procedures.

3.9. The last hypothesis was that the implementation activities would be positively related to transfer success (both portrayed in Figure 3.2 and both measured at time 3). The implementation activities that were assessed involved a range of activities such as self-management, relapse prevention, and goal setting. This hypothesis

was based on the work summarised in Haccoun and Saks (1998) demonstrating the impact of various transfer enhancement procedures on transfer outcomes.

Method

Participants

The participants in the study were members of the Queensland Police Service[1] (QPS) who were undertaking advanced (Level 3) training for a computerised information system (POLARIS). The subjects were recruited from the 30 Police Districts in Queensland and were all experienced in the use of computers in police work. The subjects subsequently assumed overall responsibility for the training of POLARIS within their Police District. There were 149 trainees who attended one of nine Level 3 training courses. Eighty-nine trainees (60%) completed the Pre-training questionnaire, while 104 trainees (70%) completed the Post-training questionnaire, and a further 64 trainees (43%) completed the follow-up questionnaire.

Demographic data was available for 85 of the trainees who completed the Pre-training questionnaire. Most of the Level 3 trainees (82%) were sworn QPS staff. Sworn staff were from the ranks of Constable (N = 11), Senior Constable (N = 32), Sergeant (N = 26) and Senior Sergeant (N = 3), while the unsworn staff were employed as either an Administrative Services Officer Level 1 (ASO1; N = 1), ASO2 (N = 8), ASO3 (N = 4) or Professional Officer Level 2 (PO2; N = 1).

Nineteen (22%) of the trainees stated that they had not been involved in any kind of formal training programs where they were the trainer. Forty-five trainees (53%) stated that they had formal training qualifications, predominantly Instructional Skills courses provided through the Technical and Further Education (TAFE) system.

[1] The participants were not the same as those in the first study.

Procedure

The subjects all received a questionnaire prior to their attendance at the training programme. The covering letter explained the purpose of the study as well as the steps that were taken to ensure confidentially of the data. The subjects were also asked to sign a statement of informed consent.

First Questionnaire

The first questionnaire completed prior to training contained a number of measures that were not part of the model being tested. These variables were included to provide feedback to the trainers about the trainees' past experience with computers, their computer self-efficacy, their learning outcomes from previous training programs, and their satisfaction with their previous training outcomes. These variables are described below for the sake of completeness. The complete questionnaire is contained in Appendix A.

Learning Outcomes (from previous training programs) (see Appendix A Part 1). This was assessed using seven items which were developed for this study, and included: “I was able to master the content of the training programme”, and “I performed well on the training programme”.

Satisfaction with Previous Training Outcomes (see Appendix A Part 1). This was also measured using seven items developed for this study, and included: “I was satisfied with the level of skill I developed during training” and “The training programme met my expectations”.

Past Experience with Computers (see Appendix A Part 2). This was measured with five items that were developed for this study. They included, “I have a great deal of experience working with computers”, and “I have used a computer often in the last twelve months”.

Computer Self-efficacy (see Appendix A Part 2). This was measured using 14 items from the 32 item Computer Self-efficacy scale developed by Murphy, Coover and Owen (1989). Items included: “I feel confident working on a computer”, and “I feel confident learning to use a variety of programs (software)”. The 14 items chosen were the ones representing advanced level computer skills and had a Cronbach Alpha reliability coefficient of .96 (Murphy, et al.).

Pre-training Self-efficacy (see Appendix A Part 2). These constructs were measured using 12 items developed for this study and included items such as: “I am confident that I can perform satisfactorily during training”, and “I am confident that I will benefit from the skills I learn during training”.

Pre-training Motivation (see Appendix A Part 3). Motivation was measured using nine items developed for this study which assessed the trainees’ intensity of desire to acquire new skills (including five items covering their commitment to learning, the level of effort they were willing to expend, the importance to them of performing satisfactorily, their anticipated satisfaction, and the perceived usefulness of the course) and their intentions to acquire new skills during training (including four items measuring their aim to master the required skills and develop their expertise). Examples included: “It will be satisfying for me to do well during training”, and “I aim to master all of the required skills during training”.

Positive and Negative Affect (see Appendix A Part 4). This was measured using the 20 item Positive and Negative Affect Schedule (PANAS: Watson, Clark & Tellegan, 1988). There are 10 items which are markers of positive affect (PA) and 10 items which mark negative affect (NA). Markers of PA include items such as: “I feel interested”, and “I feel excited”, while markers of NA include items such as: “I feel distressed” and “I feel hostile”. The instructions used for the current study asked

respondents to indicate the extent to which, on average, they have felt this way over the last six weeks. Scores for each set of 10 items are totaled to provide an indicator of each person's level of positive and negative affect. Higher scores indicate a higher level of affectivity. The Cronbach Alpha reliability coefficients for the two affectivity scales in the Watson et al. (1988) study when rated over the period of the previous few weeks were .87 for PA and .87 for NA.

Climate for Transfer Questionnaire (see Appendix A Part 5). This measure contained 56 items developed by Thayer and Teachout (1995), based directly on Rouiller and Goldstein's (1993) transfer environment factors. Thayer and Teachout included many of the items from Rouiller and Goldstein's questionnaire, but reduced the representation of social cues (from 20 items to 10), combined the negative reinforcement and punishment categories, and developed additional items for the other categories (goal cues, task cues, positive reinforcement and extinction). Also, the category of self-control cues was moved into the transfer-enhancing activities questionnaire. The final version of the CTQ contained 56 items in six subscales:

1. A six item subscale measuring Goal Cues, with items such as "Supervisors meet with employees to set goals following training", and "Supervisors expect employees to use their training on the job";
2. A 10 item subscale measuring Social Cues, with items such as "Employees can count on getting answers from supervisors to questions about the use of training on the job", and "Supervisors meet regularly with employees when they arrive from training to work on problems they may have in trying to use their training";
3. A 10 item subscale measuring Task Cues, with items such as "The equipment at this location allows employees to use the skills gained in training", and "There is never enough time to do the job the way we are taught in training";

4. A 10 item subscale measuring Positive Reinforcement, with items such as "Supervisors praise employees when they use their training", and "Fellow employees appreciate employees who do their jobs as they were taught in training";
5. A 10 item subscale measuring Negative Reinforcement and Punishment, with items such as "When employees fail to use their training, they can expect to be reprimanded", and "Supervisors give poor performance reports to those who do the job the way it is taught in training instead of his/her way"; and
6. A 10 item subscale measuring Extinction, with items such as "Supervisors pay only lip service to the value and usefulness of training", and "Supervisors don't tell employees whether they're doing their job correctly or incorrectly".

Second Questionnaire

At the end of the training programme, the subjects were administered the second questionnaires which included the following: The complete questionnaire is contained in Appendix B.

Post-training Self-efficacy (see Appendix B Part 1). This was assessed using 12 items that were similar to the 12 items in the first questionnaire. Examples included: "I can effectively use the skills which I learned", and "I was successful at solving problems I encountered during the training course".

Post-training Motivation (see Appendix B Part 1). This was assessed using the nine items which were similar to the nine items in the first questionnaire. The items were worded to emphasise the use of the new skills learned during training. Examples include: "I aim to develop greater expertise in using the skills which I have learned during training", and "It will be satisfying for me to utilise the skills which I have learned during training".

Transfer Implementation Intentions (see Appendix B Part 2). Eleven items were developed specifically for this study to assess the trainees' intention to engage in specific behaviour that would facilitate transfer of their skills. The three main areas that were targeted in the development of items as being crucial in promoting skills transfer were goal setting, self-management, and relapse prevention. However, items pertaining to seeking support from supervisors and peers, practice of the skills learned during training, and looking for opportunities to demonstrate the skills learned during training were also included. The eleven items that were developed are listed below:

1. I will discuss with my supervisor ways to develop the skills which I have learned;
2. I will discuss with my co-workers ways to develop the skills which I have learned;
3. I will spend time thinking about how to use the skills which I have learned;
4. I will evaluate how successfully I can use the skills which I have learned;
5. I will look for opportunities to use the skills which I have learned;
6. I will review course materials in order to develop the skills which I have learned;
7. I will practice using the skills which I have learned;
8. I will set specific goals for maintaining the skills which I have learned;
9. I will seek expert help/advice in order to maintain the skills which I have learned;
10. I will examine my work environment for potential barriers to using the skills which I have learned; and
11. I will monitor my success at using the skills which I have learned.

Transfer-Enhancing Activities Questionnaire (see Appendix B Part 3). (TEAQ: Thayer & Teachout, 1995). This questionnaire contained 70 items grouped into eight subscales assessing the degree of in-training transfer enhancing activities. As mentioned above, some of the items were included from Rouiller and Goldstein's (1993) self-control cues category, while the other items were developed from previous

studies that had addressed the training-related determinants of transfer. A retranslation process (Smith & Kendall, 1963) was employed to assess the representativeness of each item for its intended category. After perusing the instructions that included definitions for each of the eight categories, three researchers sorted the individual, randomly ordered items into their respective categories. Complete agreement was obtained for 57 of the 70 items, and the remaining 13 were assigned after being rewritten to better fit their categories. The eight categories used in the retranslation process and their definitions were as follows:

1. Overlearning, defined as engaging in practice beyond one successful attempt at a new skill, or practicing a skill in the same way repeatedly.
2. Fidelity, defined as the physical or psychological similarity between the training setting and skills taught, and what exists on the job.
3. Varied Practice, defined as learning new knowledge or skills under a variety of conditions or problems during training. This is not the same as repeated practice required under overlearning.
4. Principles-Meaningfulness, defined as including a variety of things that can be done to make material more meaningful, and to teach the reasons why things work the way they do.
5. Self-control Cues (feedback cues), defined as being taught how to observe one's own performance so that one knows whether one is doing the job correctly. Cues may come from one's own behaviour or from feedback by what one did. It also includes the provision of lists or cues to remind one of important points.
6. Relapse prevention, defined as training that involves helping trainees to recognise situations that may come up after training that will interfere or prevent one from

doing what one was trained to do. It also includes making plans for how to overcome those situations.

7. Goal Setting, defined as a very specific activity that involves goals or plans set in training to be implemented on the job.
8. Top Management Support, defined as the emphasis placed on the value of training from highly placed administrators or commanders.

Only seven of the subscales were used in this study. Top Management Support (containing four items) was omitted at the request of the organisation. The subscales that were used were as follows:

1. Overlearning, which contained 10 items such as: “During training, we practiced using the skills taught to us over and over”, and “During training, if you didn't get it the first time, there was no time allowed to learn it later”.
2. Fidelity, which contained 11 items such as: “The problems we learned to solve during training are similar to those on the job”, and “During training, we never had the chance to try our new skills on a number of different problems”.
3. Varied Practice (i.e., stimulus variability), which contained six items such as: “During training, the instructors gave us a lot of different problems to work on”, and “During training, we never had the chance to try more challenging tasks that required advanced knowledge and skill”.
4. Principles-Meaningfulness, which contained six items such as: “During training, the instructors never told us why, just what to do”, and “During training, the instructors clearly explained why it was necessary to do things a certain way”.
5. Self-control Cues (i.e., feedback cues), which contained 13 items such as: “During training, we couldn’t tell whether or not we made mistakes”, and “During training,

the instructors taught us things to look for to make sure we were doing the job correctly".

6. Relapse Prevention, which contained 13 items such as: "During training, we were told about problems we might have on the job in using what we learned", and "During training, the instructors discussed the possibility of no supervisory support for our training when we were on the job"; and
7. Goal Setting, which contained seven items such as: "During training, we set goals for using our new skills on the job", and "During training, we talked to each other about the goals we set for using our training on the job".

Learning Outcomes (from current course) (see Appendix B Part 4). Nine items were developed from the learning objectives of the training course asking trainees to rate their level of agreement. Examples of two of the items include: "I understand the POLARIS system", and "I understand the limitations of POLARIS".

Third Questionnaire

In order to assess how effectively the subjects had used their newly acquired skills and knowledge to train other staff, they were asked to complete a follow-up questionnaire approximately four weeks after their training which included Likert type response scales and open ended questions. The following variables were measured:

Transfer Implementation Activities (see Appendix C Part 1). This scale examined trainees' transfer implementation activities since training, using the same items which appeared on the transfer intentions scale in the previous questionnaire plus one additional item which asked the trainees to rate their overall level of success at implementing their training.

Open-ended Questions (see Appendix C Part 2). The effect of training on job performance was assessed with a series of open-ended questions. The questions were designed to assess the impact of trainees using their training on their job performance. The data gained from this section was used to give feedback to the trainers about difficulties that trainees were experiencing. Due to the qualitative nature of the data, it was not used to test any part of the model of transfer that was outlined earlier. The questions included:

1. What is your current level of skill at using the POLARIS system?
2. What evidence do you have about the level of skill you have attained?
3. How does this compare to the level you attained at the end of training?
4. Have you utilised the practice training environment?
5. How frequently?
6. How beneficial was the practice environment?
7. What aspects of the POLARIS system have you found to be the most difficult to understand or learn to use?
8. What strategy (strategies) have you used personally to learn these parts of the system?
9. What has been the effect of the training you received on your job performance?
10. How important is understanding POLARIS to effectively performing your job?
11. Describe the factors in your work environment which have had the most influence on how successful you have been at applying your training? (Begin with the most influential).

Strategy for Analysing Longitudinal Data

Longitudinal research often results in incomplete data sets that can either decrease the level of statistical power, cause parameter estimates to be biased, or do

both (Roth, 1994). Roth described the traditional techniques used to deal with data files that contain missing data such as pairwise or listwise deletion of those cases where data is missing, mean substitution, which replaces missing data with the mean of the variable, or forms of imputation, usually involving regression to estimate the missing scores based on other variables in the data set. However, these techniques are now being replaced by the use of maximum likelihood (ML) estimation and related methods (Arbuckle, 1996). Structural equations modeling (SEM) packages such as Amos (Arbuckle, 1997) allow the analysis of missing data by using full-information maximum likelihood (FIML). The full-information method used by Amos is a more efficient strategy when the incomplete data is missing-at-random (MAR). However, if the data is not MAR, Amos' estimates are generally less biased than those produced by pairwise or listwise deletion, or mean imputation (Arbuckle, 1996; Brown, 1994; Little & Rubin, 1989). Amos' FIML function, which maximizes the case-wise likelihood of the observed data, is not limited by the number of missing data patterns, and does not require the user to take elaborate steps to accommodate missing data (Wothke, in press). However, the current version of Amos (Version 3.6) did not supply the normal fit indices where there was missing data in the data file.

Graham and Donaldson (1993) have shown that ML methods such as the Expectation Maximisation (EM) algorithm produce less bias than listwise or pairwise deletion. The EM algorithm used the saturated model containing all data to impute values for the missing data and then used the completed data matrices in subsequent analyses by traditional structural equation modeling techniques (Schafer, 1997). It was decided to use the EM algorithm to generate a covariance matrix based on all participants, and to then input this matrix into Amos for model testing.

Another approach to analysing longitudinal data such as that collected in this study would be to test parts of the model separately using different data sets corresponding to those respondents who completed all of the Time 1 and Time 2 measures, and then those who completed all of the Time 2 and Time 3 measures. This was the approach used in the first study. A model that incorporated variables across all three times would contain the greatest proportion of missing data, and therefore, even using a package such as Amos would not allow assessment of the fit of the theoretical model to the data. It was judged that the needs of this study were best served by conducting separate analyses of the two data sets collected across times one and two, and across times two and three. This approach still allowed the hypotheses to be tested. In study 1, this proved to be an effective strategy because the time 1 variables were eliminated from the model after the first analysis. It was not expected that time 1 variables would be eliminated in the current study as the climate for transfer variables were central to the hypotheses about the indirect influence of the environment on transfer intentions.

Anderson and Gerbing (1988) outlined a comprehensive, two-stage approach to structural equation modeling that requires the researcher to construct a series of nested measurement and structural models that are tested using sequential chi-square difference tests. Anderson and Gerbing have argued that the first stage of model estimation should focus on the estimation and (if necessary) respecification of the measurement model. These steps allow an ordered progression of analyses that begin with models that are more confirmatory and then introduces models that are increasingly exploratory. It is rarely the case that the initially specified measurement model adequately fits the data so the model is respecified and reestimated using the same data until acceptable fit is achieved. It would then be necessary to cross-validate

the final measurement model using another sample drawn from the population to which the results are to be generalised.

The second stage recommended by Anderson and Gerbing (1988) involves simultaneously estimating the measurement and structural submodels. Whereas the measurement model specifies the relations of the observed measures to their underlying constructs, the structural model specifies the causal relations of the constructs to one another. Once again, the initially specified structural model often fails to provide acceptable fit to the data, and is then respecified and reestimated using the same data until acceptable fit is achieved.

Anderson and Gerbing (1988) emphasised that it is essential to achieve unidimensional measurement in order to be able to assign unambiguous meaning to the underlying constructs. Measurement models also require multiple indicators of each estimated construct, where each construct is defined by at least two measures, and each measure is intended as an estimate of only one construct. Anderson and Gerbing also argued that "measurement models that contain correlated measurement errors, or have indicators that load on more than one estimated construct do not represent unidimensional construct measurement" (p. 415).

Results

Data Screening

The numerical data from the three questionnaires was entered into Microsoft Excel. Missing data was left blank. The data was then transferred from Excel into the Statistical Package for the Social Sciences (SPSS) for Windows Ver. 8.0. Various SPSS programs were used to check for accuracy of data entry, missing values, normality, heteroscedasticity, univariate and multivariate outliers, and multicollinearity. As a guide, a correlation of .7 or above was an indication of multicollinearity and a correlation of .9 or above was an indication of singularity (Pedhazur & Schmelkin, 1991).

The number of respondents varied for each of the three times (N = 89 at T1, N = 104 at T2 and N = 64 at T3), while the number who completed all sections of every questionnaire for times one and two was 71, for times two and three was 48, and for times one, two, and three was 39. In order to allow the analysis of the hypotheses to proceed, the EM algorithm in SPSS 8.0 was used to impute values for total scale scores (not individual scale items) where they were missing, and generated a covariance matrix of the scores for all variables based on 104 of the trainees. One assumption that is tested when missing values are imputed is whether the data are missing completely at random (MCAR). The result of this test (Little's MCAR test) was not significant ($\chi^2 = 244.47$, $df = 212$, $p = 0.06$).

Exploratory Factor Analyses

Initially, the new scales that were developed specifically for this study were analysed in a series of exploratory factor analyses (EFAs) as a way of examining the

dimensionality of these scales. These analyses were performed using the original data set with N = 89 for the T1 scales, N = 104 for the T2 scales, and N = 64 for the T3 scales. Carroll (1985) recommended that EFA be used where scales were not designed to test specific hypotheses about factorial models. The use of confirmatory factor analysis (CFA) should be preferred when testing hypotheses about the factor composition of a set of variables (or items), or hypotheses about the underlying structure of the factors. Each scale of the scales that was analysed had been created for the current study for use as a unidimensional scale in further analyses. Therefore, it was important to determine whether the scale totals could reasonably be used as reliable measures of the proposed constructs.

Principal component (PC) analysis was used as the method of extraction in order to determine the latent roots of the correlation matrix and to generate a plot of the eigenvalues (Tabachnick & Fidell, 1996). The Kaiser-Guttman rule (Kaiser, 1960) that used factors that had a minimum eigenvalue of one and the Cattell's (1966) scree test were used as the criteria for deciding the number of factors that were extracted. Varimax rotation was applied after extraction in order to obtain predictor variables that were independent, and the proportions of variance accounted for by each factor after rotation were examined. Rotated factor loadings were examined to determine the number of items that loaded on each factor.

Scales that were assessed using the approach outlined above included: Learning Outcomes (from Previous Training Programmes), Satisfaction with Previous Training Outcomes, Past Experience with Computers, Pre-training Self-efficacy, Pre-training Motivation, Post-training Self-efficacy, Post-training Motivation, Transfer Intentions, Learning Outcomes (from current Course), and Transfer Implementation. The results of the EFAs are presented in Table 3.1.

Table 3.3

Exploratory factor analyses of new scales

Variables	No. of items	No. of roots > 1	Scree test
1. Learning Outcomes (from Previous Training Programmes)	7	1	1
2. Satisfaction with Previous Training Outcomes	7	2	2
3. Past Experience with Computers	3	1	NA
4. Pre-training Self-efficacy	12	2	1 or 2
5. Pre-training Motivation	9	1	1
6. Post-training Self-efficacy	12	2	2
7. Post-training Motivation	9	2	1 or 2
8. Transfer Intentions	11	3	2 or 3
9. Learning Outcomes (from Current Course)	9	2	2
10. Transfer Implementation	11	3	2 or 3

Hambleton, Swaminathan and Rogers (1991) suggested that where the initial factor extracted using PC analysis accounted for a large proportion of the variance, and where the variance accounted for by the first factor is more than three times the variance accounted for by the second factor, then the scale can be viewed as unidimensional. In all cases, this was the pattern of the results and the scale totals were used rather than an alternative such as factor scores. The results of the EFAs for each of the new scales is reported in more detail below.

For the measure of Learning Outcomes (from Previous Training Programmes), one factor was extracted accounting for 73.1% of the variance, and this scale was judged to be clearly unidimensional. For the measure of Satisfaction with Previous Training Outcomes, two factors were extracted accounting for 53.9% and 21.9% of

the variance respectively. The rotated factor loading matrix showed that the first three items loaded highly on the first factor, and the next two items loaded highly on the second factor, giving an indication that two factors were being measured by these items. For the measure of Past Experience with Computers, one factor was extracted accounting 54.8% of the variance. As this scale only contained three items, there were not enough items to adequately assess its structure. As mentioned in the section describing the scales, the previous four scales were included to give feedback to the trainers, and were not related to the hypotheses of this study. The above results are included for the sake of completeness.

For the measure of Pre-training Self-efficacy, two factors were extracted accounting for 61.8% and 10.6% of the variance respectively. The rotated factor loading matrix showed that the first nine items loaded highly on the first factor, and the other items loaded highly on the second factor, giving an indication that two factors were being measured by these items. However, the first factor accounted for the majority of the variance and this suggested that the second factor may be relatively unimportant. This issue is discussed further in the next paragraph. For the measure of Pre-training Motivation, one factor was extracted accounting for 61.4% of the variance. For the measure of Post-training Self-efficacy, two factors were extracted accounting for 54.1% and 11.6% of the variance respectively. The rotated factor loading matrix showed that the first seven items loaded highly on the first factor, and the other items loaded highly on the second factor, again giving an indication that two factors were being measured by these items. For the measure of Post-training Motivation, two factors were extracted accounting for 54.2% and 11.4% of the variance respectively. The rotated factor loading matrix showed that six of the items loaded highly on the first factor, and the other three items loaded highly on the

second factor, again giving an indication that two factors were being measured by these items. For the measure of Transfer Intentions, three factors were extracted accounting for 50.7%, 12.6%, and 9.7% of the variance respectively. Two and three factor solutions were compared with the three factor solution resulting in the simplest structure. For the measure of Learning Outcomes (from current Course), two factors were extracted accounting for 54.1% and 18.7% of the variance respectively. The rotated factor loading matrix showed that four of the items loaded highly on the first factor, and the other three items loaded highly on the second factor, again giving an indication that two factors were being measured by these items. Finally, for the measure of Transfer Implementation, three factors were extracted accounting for 43.4%, 15.8%, and 9.9% of the variance respectively. Two and three factor solutions were compared with the three factor solution again resulting in the simplest structure.

Several of the measures gave indications that they may not be unidimensional measures such as Pre-training Self-efficacy, Post-training Self-efficacy, Post-training Motivation, and Learning Outcomes (from current Course) for which two factors were extracted, and Transfer Intentions and Transfer Implementation for which three factors were extracted. However, in all cases, the initial factors that were extracted accounted for the majority of the variance, according to the Hambleton, et al. (1991) criterion. Therefore, only the total scale scores were used for further analysis in this study.

Reliability Analyses

The next set of analyses involved calculating the reliability coefficients (coefficient alphas) for all of the scales. These analyses were performed using the original data set (that is, the one containing missing data). There are several different formulae that can be used to estimate the internal-consistency reliability of a scale,

with coefficient alpha (also known as Cronbach's alpha) the most widely used (Pedhazur & Schmelkin, 1991). A separate analysis was conducted for each of the 26 scales in the study with more than one item. Several of the scales contained items that were either negatively correlated with the scale's total score or not highly correlated with the scale's total score (i.e., $\underline{r} < .3$) and these items were examined to determine whether they should be reversed or deleted. Where scales were altered, the Cronbach alphas were recalculated. Table 3.2 presents the Cronbach alphas for all of the scales in the study, some of which were modified in the manner described above.

Table 3.4

Number of items, Cronbach alphas, number of cases, means, and standard deviations for all variables in Study 2

Variables	No. of items	Alpha	N	M	SD
1. Learning Outcomes (from Previous Training Programmes)	7	.94	75	6.39	.56
2. Satisfaction with Previous Training Outcomes	7	.85	75	5.99	.75
3. Computer Self-efficacy	14	.96	77	5.85	.90
4. Past Experience with Computers	3	.57	77	6.17	.78
5. Pre-training Self-efficacy	11	.94	77	6.57	.45
6. Pre-training Motivation	9	.92	77	6.72	.40
7. Positive Affectivity	10	.89	76	5.52	.73
8. Negative Affectivity	10	.92	76	2.57	1.34
9. Goal Cues	6	.81	78	4.74	.85
10. Social Cues	10	.84	78	4.69	.82
11. Task Cues	9	.84	78	4.51	.94
12. Positive Reinforcement	10	.79	78	4.70	.70
13. Negative Reinforcement and Punishment	8	.66	78	4.83	.77
14. Extinction	10	.83	78	4.62	.95
15. Learning Outcomes (from current Course)	7	.84	101	6.59	.57
16. Post-training Self-efficacy	11	.90	102	6.39	.54
17. Post-training Motivation	9	.89	102	6.32	.69
18. Transfer Intentions	11	.90	101	5.97	.82
19. Overlearning	9	.78	102	4.50	1.01
20. Fidelity	11	.78	102	5.25	.94
21. Stimulus Variability	5	.73	102	5.77	.87
22. Principles-Meaningfulness	6	.78	102	5.78	.82
23. Self-control Cues	11	.84	102	5.33	.91
24. Relapse Prevention	12	.91	102	4.53	1.19
25. Goal Setting	7	.87	102	4.36	1.24
26. Transfer Implementation	11	.87	64	5.14	.98
27. Transfer Success	1	NA	64	6.06	1.11

There were only two scales with Cronbach alphas that were below the level normally required for research studies, that is, at least .7 (Nunnally, 1978). This confirmed that even those scales that appeared to have more than one factor in the EFA still achieved acceptable Cronbach alphas when treated as an homogeneous scale. The three-item scale measuring Past Experience with Computers has a Cronbach alpha of .57, while the eight-item scale Negative Reinforcement and Punishment had a Cronbach alpha of .66. In the latter scale, there were originally ten items, two of which (Q9 and Q56) were deleted, because these items had low corrected item-total correlations (.14 and .12 respectively). The Cronbach alpha for Negative Reinforcement and Punishment increased from .63 to .66, which is only a marginal increase, and still below normally accepted levels. However, Pedhazur and Schmelkin (1991) argued that no authority can decree what level of reliability is acceptable, but that "*it is for the user to determine what amount of error he or she is willing to tolerate, given the specific circumstances of the study*" (p. 110). In this study, the Cronbach alpha for Negative Reinforcement and Punishment was considered to be acceptable, given the exploratory nature of the research.

Several other scales were modified in order to increase their Cronbach alphas, although for most of these scales the Cronbach alphas were already at acceptable levels. This was done to improve the reliability of the measures. One item (Q10) was deleted from both the Pre-training Self-efficacy and Post-training Self-efficacy scales increasing their Cronbach alphas from .92 to .94 and from .87 to .90 respectively. Two items (Q1 and Q4) were deleted from the Self-rated Learning Outcomes (from current Course) measure increasing the Cronbach alpha from .80 to .84. One item (Q33) was deleted from the scale measuring Task Cues, improving the Cronbach alpha from .81 to .84. One item (Q15) was also deleted from Overlearning, improving

the Cronbach alpha from .76 to .78. One item (Q3) was deleted from Stimulus Variability, improving the Cronbach alpha from .65 to .73. Two items (Q13 and Q60) were deleted from Self-control Cues, improving the Cronbach alpha from .81 to .84. Finally, one item (Q61) obtained a negative correlation with the scale's total score for Relapse Prevention. However, as this item was also not highly correlated with the scale's total score, it was deleted, improving the Cronbach alpha from .87 to .91.

Descriptive Statistics

The number of cases, the mean and the standard deviation for each variable were calculated based on the actual number of cases available for each variable. These are also presented in Table 3.2. The correlations between all variables based on the 104 cases that include imputed values where there was data missing in the original data file were then calculated and are presented in Table 3.3.

Table 3.5

Intercorrelations for all variables in study 2 using imputed values.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. PASTPERF	1.00													
2. PASTSAT	.57	1.00												
3. COMPSEFF	.17	.08	1.00											
4. COMPEXP	.16	.05	.81	1.00										
5. PRESEFF	.31	.36	.43	.35	1.00									
6. PREMOT	.27	.33	.37	.34	.77	1.00								
7. POSAFFEC	.34	.34	.15	.21	.52	.45	1.00							
8. NEGAFFEC	-.34	-.37	-.22	-.30	-.42	-.41	-.23	1.00						
9. GCUES	.42	.33	.19	.22	.38	.30	.33	-.21	1.00					
10. SCUES	.39	.37	.15	.19	.35	.33	.36	-.31	.79	1.00				
11. TCUES	.19	.21	-.04	-.11	.30	.18	.16	-.09	.58	.55	1.00			
12. POSREINF	.32	.27	.06	.10	.43	.43	.39	-.24	.75	.72	.48	1.00		
13. NEGREINF	.37	.31	-.01	.07	.21	.25	.11	-.47	.51	.58	.39	.43	1.00	
14. EXTINCT	.21	.25	-.04	.02	.24	.27	.14	-.44	.47	.63	.41	.48	.68	1.00
15. LEARNING	-.01	.37	.21	.24	.49	.57	.32	-.44	.06	.19	.03	.17	.13	.21
16. POSTSEFF	.14	.33	.35	.28	.66	.70	.35	-.38	.22	.19	.00	.28	.05	.11
17. POSTMOT	.06	.18	.14	.13	.43	.59	.28	-.41	.25	.23	.12	.30	.23	.24
18. INTENTS	.06	.03	.12	.23	.34	.41	.26	-.34	.39	.35	.13	.36	.27	.21
19. OVERLEAR	.08	.01	-.05	.02	.04	.05	.01	-.20	.09	.15	.05	.21	.15	.15

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
20. FIDELITY	.06	-.02	-.08	-.05	.19	.16	.05	-.11	.07	.00	.16	.08	.07	.09
21. STIMULUS	-.03	-.03	.08	.17	.36	.31	.26	-.09	.08	.09	-.05	.14	-.03	-.01
22. PRINCIPL	.11	.09	.11	.15	.50	.30	.17	-.23	.28	.23	.38	.32	.13	.18
23. FEEDBACK	.00	.06	.07	.14	.34	.39	.19	-.20	.28	.20	.23	.28	.12	.15
24. RELAPSE	-.07	.06	.15	.14	.17	.31	.09	-.11	.24	.23	.22	.17	.07	.13
25. GOALSETT	-.09	.03	.10	.17	.17	.28	.09	-.19	.26	.24	.24	.25	.13	.14
26. IMPLEMEN	-.07	.01	.02	.03	.10	.19	-.01	-.14	.10	.05	.02	.12	-.04	.01
27. TRANSFER	-.18	-.19	.09	.05	.11	.10	.02	-.02	-.13	-.15	-.38	.01	-.41	-.34

Variable	15	16	17	18	19	20	21	22	23	24	25	26	27
15. LEARNING	1.00												
16. POSTSEFF	.45	1.00											
17. POSTMOT	.39	.73	1.00										
18. INTENTS	.21	.47	.70	1.00									
19. OVERLEAR	-.03	.05	.11	.07	1.00								
20. FIDELITY	.14	.33	.24	.23	.13	1.00							
21. STIMULUS	.30	.33	.25	.25	.21	.29	1.00						
22. PRINCIPL	.23	.37	.39	.34	.35	.35	.45	1.00					
23. FEEDBACK	.32	.44	.45	.42	.32	.44	.58	.66	1.00				
24. RELAPSE	.31	.40	.43	.41	.36	.21	.32	.48	.76	1.00			
25. GOALSETT	.24	.40	.43	.48	.45	.19	.38	.47	.71	.82	1.00		
26. IMPLEMEN	-.03	.29	.13	.48	.11	.21	.07	.10	.36	.46	.54	1.00	
27. TRANSFER	-.13	.41	.13	.32	.25	.16	.21	.14	.09	.17	.29	.59	1.00

Note. N = 104. Values greater than .20 are significant at .05, greater than .25 are significant at .01, and greater than .32 are significant at .001.

For complete variable names, see Table 3.2.

Hypotheses related to the climate for transfer variables

The first hypothesis (3.1) stated that there would be two constructs underlying the climate for transfer variables. A measurement model was specified based on the work by Rouiller and Goldstein (1993) that distinguished between antecedents to, and consequences of transfer of training. Rouiller and Goldstein initially combined all of the items in the Antecedent and Consequence categories into two separate scales, each of which was found to predict transfer outcomes. They also combined all items into a single scale, which also predicted transfer outcomes. Thayer and Teachout (1995) proposed that the entire questionnaire be factor analyzed in order to determine the number of dimensions underlying climate for transfer. A previous factor analysis by Tracey et al. (1995) found only a single transfer climate factor, although their analysis used the responses of 104 managers to analyse 57 items. This ratio of cases to items is below the minimum prescribed by statisticians such as Nunnally (1978), who suggested that "a good rule is to have at least 10 times as many subjects as variables" (p. 421).

Pedhazur and Schmelkin (1991) pointed out that the situation regarding adequate sample sizes is "complex and cannot be resolved with some simple answers, let alone rules of thumb" (p. 624). Pedhazur and Schmelkin also mentioned that, "in general, larger samples are required when the data consists of single items as compared with data consisting of multi-item scales" (p. 624).

As stated above, the EM algorithm was used to impute values for those cases with missing data. One advantage of using cases with imputed data is that Amos provided several fit statistics that were then used to evaluate the fit of the specified models. Several fit indices were used to evaluate the degree to which the model fitted the sample covariance matrix. Marsh, et al. (1996) recommended using a variety of

different indices from different families of measures such as the RNI and the NNFI (or their normed counterparts, the CFI and the NTLI). Browne and Cudeck (1993) recommended that the RMSEA be used where models are very complex as it contains no penalty for model complexity. An RMSEA value below .08 would indicate a reasonable error of approximation (Browne & Cudeck). In a comparison of the CFI and the RMSEA, Rigdon (1996) suggested that use of the CFI is only appropriate in exploratory contexts due to its use of the null model as a baseline for comparison. The RMSEA is proposed as being more appropriate in confirmatory contexts, although the RMSEA does not include an adequate parsimony correction, thus favouring more saturated models.

The correlations between the six climate for transfer variables, PA, NA, and Pre-training Self-efficacy and Motivation are contained in Table 3.3. All climate for transfer variables were positively correlated (r's ranging from .39 to .79). The last two variables (Negative Reinforcement and Punishment, and Extinction) were scored so that a higher score represented lower levels of those variables. Positive Affectivity (PA) correlated significantly with Goal Cues, Social Cues, and Positive Reinforcement, all in the positive direction. Negative Affectivity (NA) correlated significantly with Goal Cues, Social Cues, Positive Reinforcement, Negative Reinforcement and Punishment, and Extinction, all in the negative direction. The correlations between NA and Negative Reinforcement and Punishment, and Extinction appeared to be much stronger than correlations with the other climate for transfer variables. Pre-training Self-efficacy and Motivation were positively correlated with PA, and negatively correlated with NA.

Therefore, the initial measurement model specified Goal Cues, Task Cues, and Social Cues as indicators of a latent construct labeled Antecedents, while Positive

Reinforcement, Negative Reinforcement and Punishment, and Extinction were specified as indicators of another latent construct labeled Consequences (see Figure 3.3). The two latent constructs were allowed to covary, as it was expected that they would be positively related.

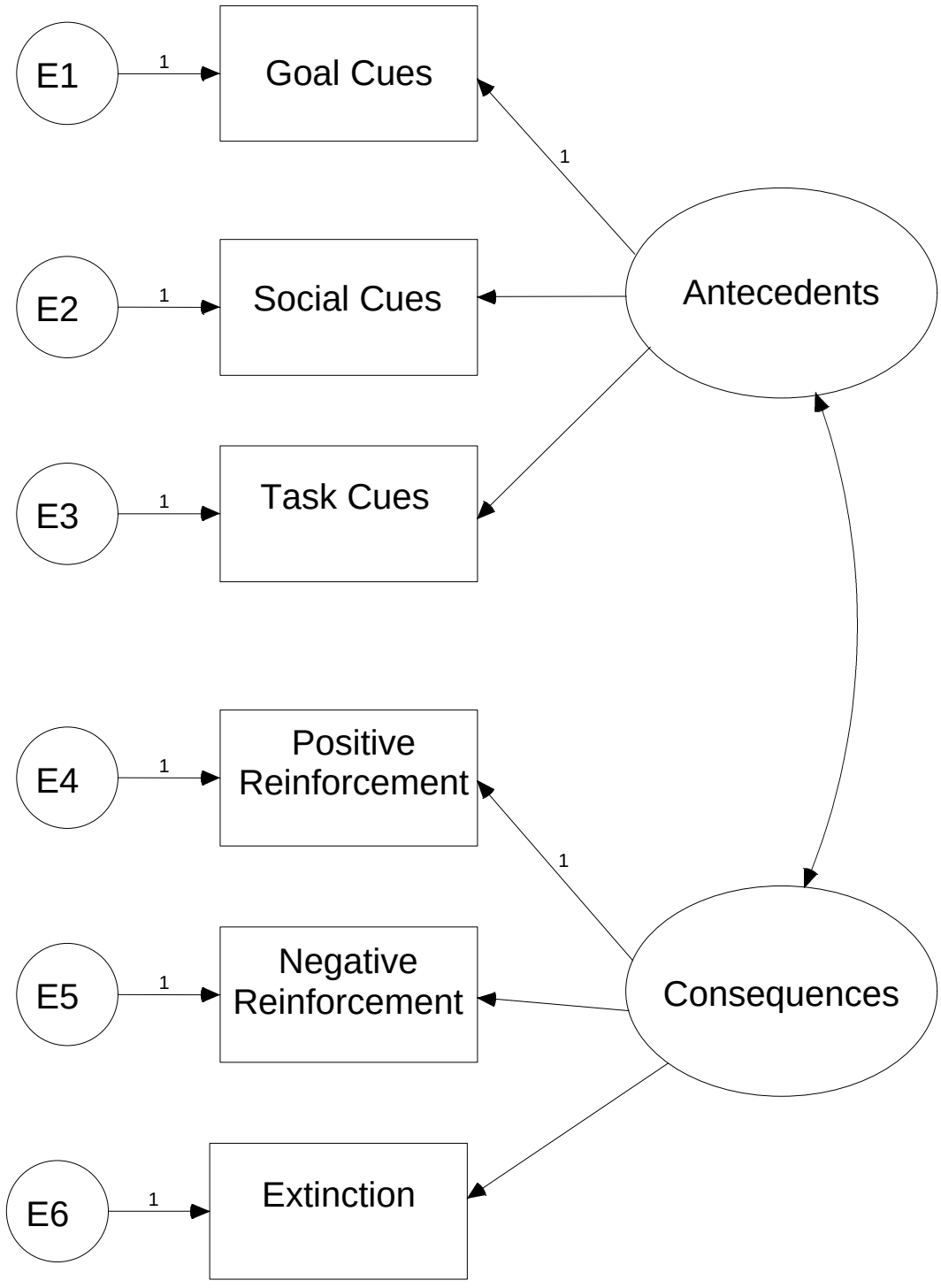

Figure 3.3. Initial measurement model specified for all climate for transfer variables.

Figure 3.4 displays the standardised regression coefficients that resulted from testing the initial model that was specified. All variables obtained high coefficients, indicating that the two underlying constructs were explaining a large percentage of the variance in the variables (from 38% for Task Cues up to 84% for Social Cues). However, this model, which conformed to the first model developed by Rouiller and Goldstein (1993), was not a good fit to the data (χ^2 = 43.57, d*f* = 8, p < 0.001, GFI = 0.88, AGFI = 0.68, NTLI = .82, CFI = .90, RMSEA = 0.21).

The extremely high correlation between the two latent constructs (.99) suggested that a model with one underlying construct would be a more parsimonious model. Another model was developed with all six variables specified as indicators of one latent construct (General transfer climate). This second model corresponded to the second model used by Rouiller and Goldstein. This model was also not a good fit to the data (χ^2 = 43.68, d*f* = 9, p < 0.001, GFI = 0.88, AGFI = 0.72, NTLI = .84, CFI = .91, RMSEA = 0.19). The results of this second analysis are not shown, in order to minimise the number of figures.

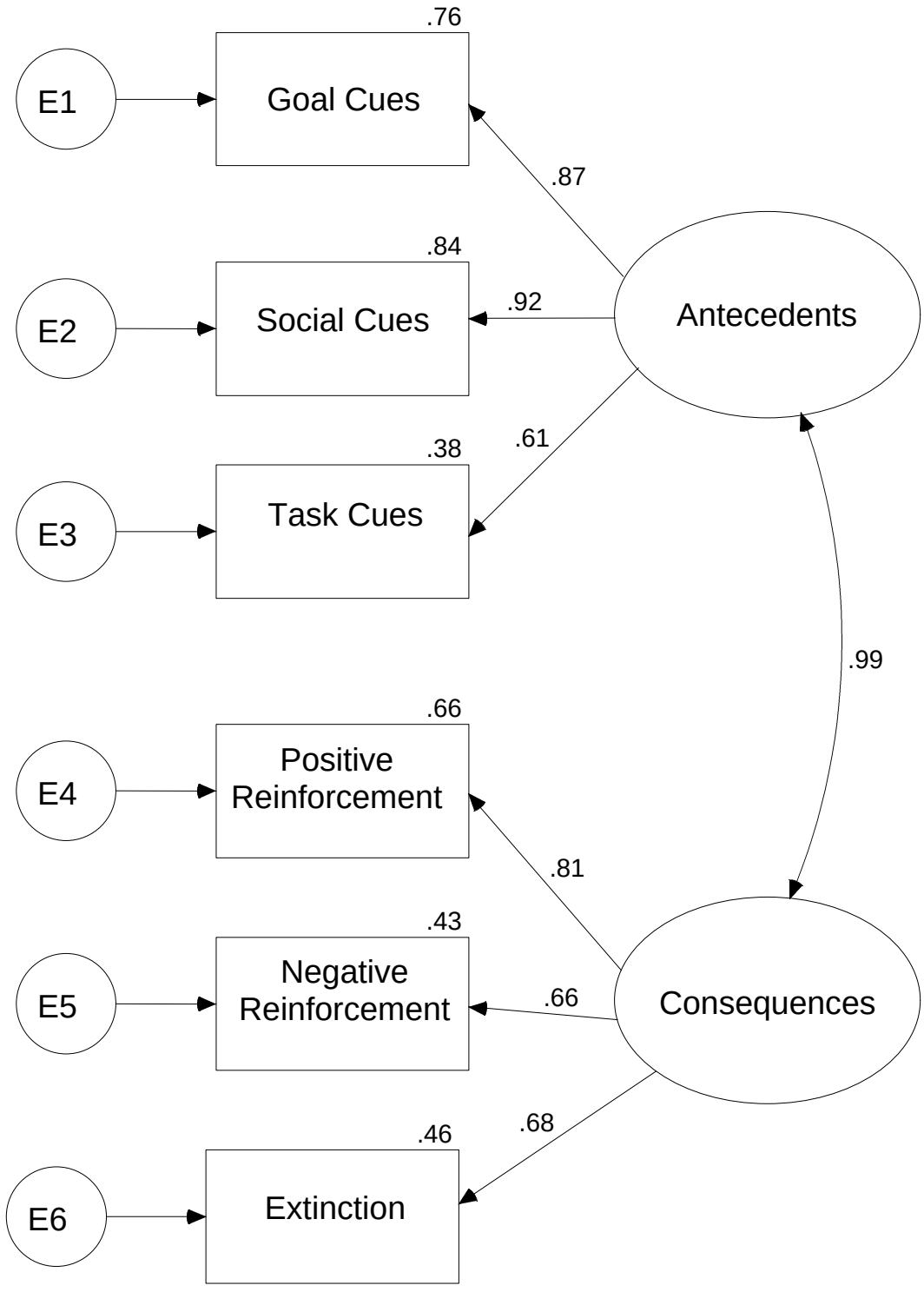

Figure 3.4. Standardised regression coefficients for the initial measurement model of climate for transfer variables.

Further consideration was then given to model respecification in order to determine the factorial structure of the climate for transfer variables. Anderson and Gerbing (1988) described various ways of respecifying models where the level of fit was not acceptable. The first of these was to relate one of the indictors to a different factor and this was the method followed in this case. The reason for this was that Positive Reinforcement was more highly correlated with the Antecedents variables, especially Goal Cues and Social Cues, than with the other Consequences variables. The measurement model was revised so that Positive Reinforcement was specified as an indicator only of the first latent construct (Antecedents). Anderson and Gerbing stated that this method of respecification has the advantage of preserving the assumption of unidimensional construct measurement. Figure 3.5 shows the standardised regression coefficients that resulted from testing the revised measurement model that specified Positive Reinforcement as an indicator of Antecedents.

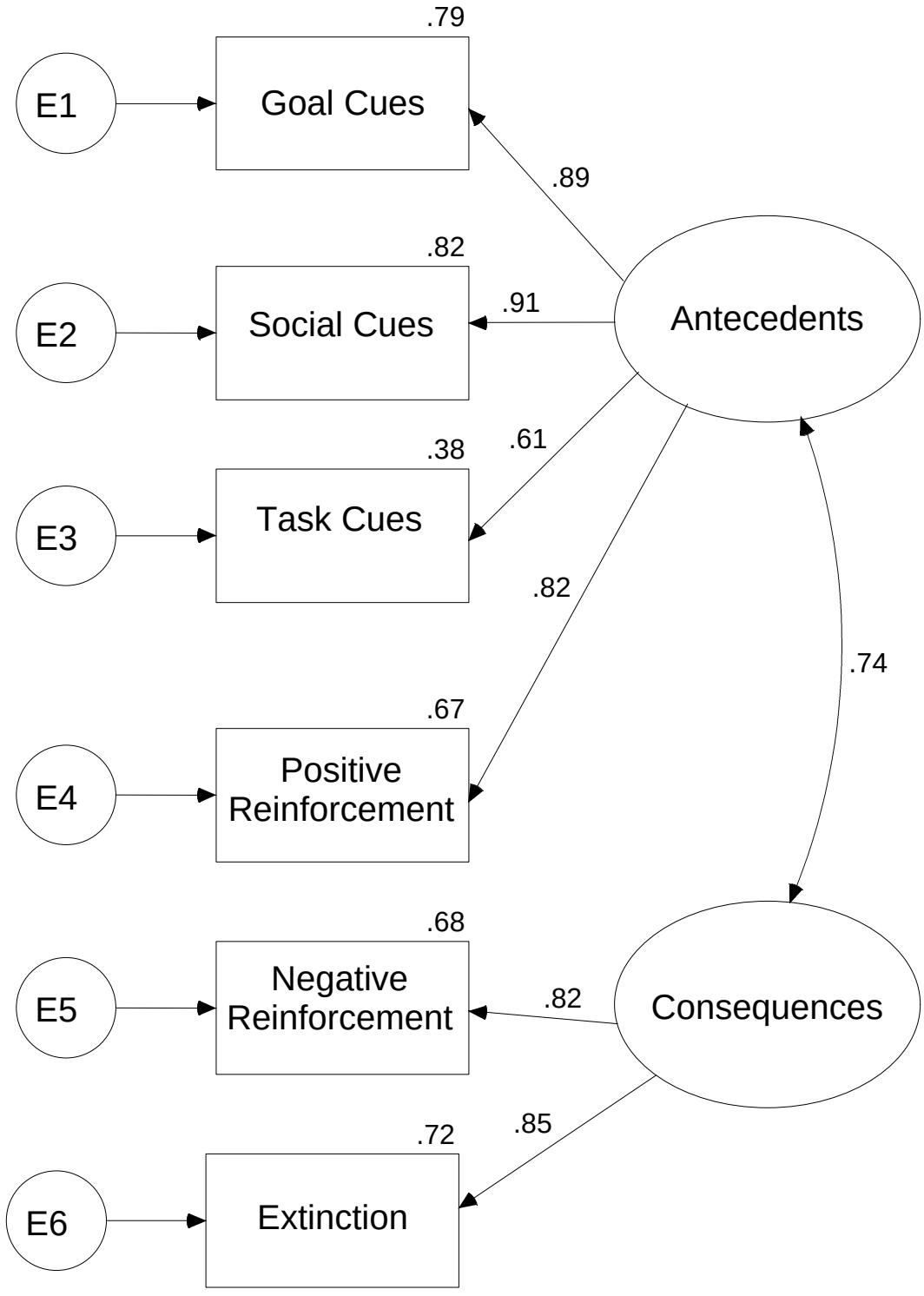

Figure 3.5. Standardised regression coefficients for the respecified measurement model of all climate for transfer variables.

All variables in the respecified model obtained high coefficients, indicating that the two underlying constructs were again explaining a large percentage of the variance in the variables (from 38% for Task Cues up to 82% for Social Cues). The results for this model showed that it was a good fit to the data (χ^2 = 15.31, d*f* = 8, p = 0.05, GFI = 0.96, AGFI = 0.88, NTLI = .96, CFI = .98, RMSEA = 0.09). In this revised model, the two latent constructs were still highly correlated (r = .74), thereby indicating that there might be a general (possibly higher order) climate-for-transfer factor.

Given that the original measurement model was not accepted, the standardised regression coefficients were then examined in order to ascertain the best interpretation of the meaning of the latent constructs. The first construct had very high loadings for three of the variables, Social Cues (.91), Goal Cues (.89), and Positive Reinforcement (.82). On the basis of these loadings, Antecedents was reinterpreted as Positive Work Climate T1. The second construct had very high loadings for both Extinction (.85), and Negative Reinforcement and Punishment (.82). Therefore, Consequences was reinterpreted as Negative Work Climate T1.

The second hypothesis (3.2) stated that the six climate for transfer variables would be positively related to Pre-training Self-efficacy and Motivation. An examination of the correlations contained in Table 3.3 confirmed that this was true for nearly all of the relationships, with only the correlation between Task Cues and Pre-training Motivation not achieving significance (r = .18, NS). Pre-training Self-efficacy was most strongly correlated with Positive Reinforcement, Goal Cues, and Social Cues (r = .43, p < .001, r = .38, p < .001, and r = .35, p < .001 respectively). Pre-training Motivation was most strongly correlated with Positive Reinforcement, Social

Cues, and Goal Cues (r = .43, p < .001, r = .33, p < .001, and r = .30, p < .001 respectively).

The third hypothesis (3.3) stated that the influence of the climate for transfer variables on Pre-training Self-efficacy and Motivation would be mediated by PA and NA. In the modified model of training transfer depicted in Figure 3.2, the path between the climate for transfer variables and Positive and Negative Affectivity is shown as a single headed arrow, although these variables were measured simultaneously. In order to test whether the influence of the two constructs (Positive Work Climate T1 and Negative Work Climate T1) on Pre-training Self-efficacy and Motivation was mediated by PA and NA, a structural model was developed that specified Pre-training Self-efficacy, Pre-training Motivation, NA, and PA as single indicators of four underlying constructs that were themselves specified as outcomes of the two work climate constructs (see Figure 3.6). However, it must be recognised that any causal models must be tentative until tested using longitudinal data.

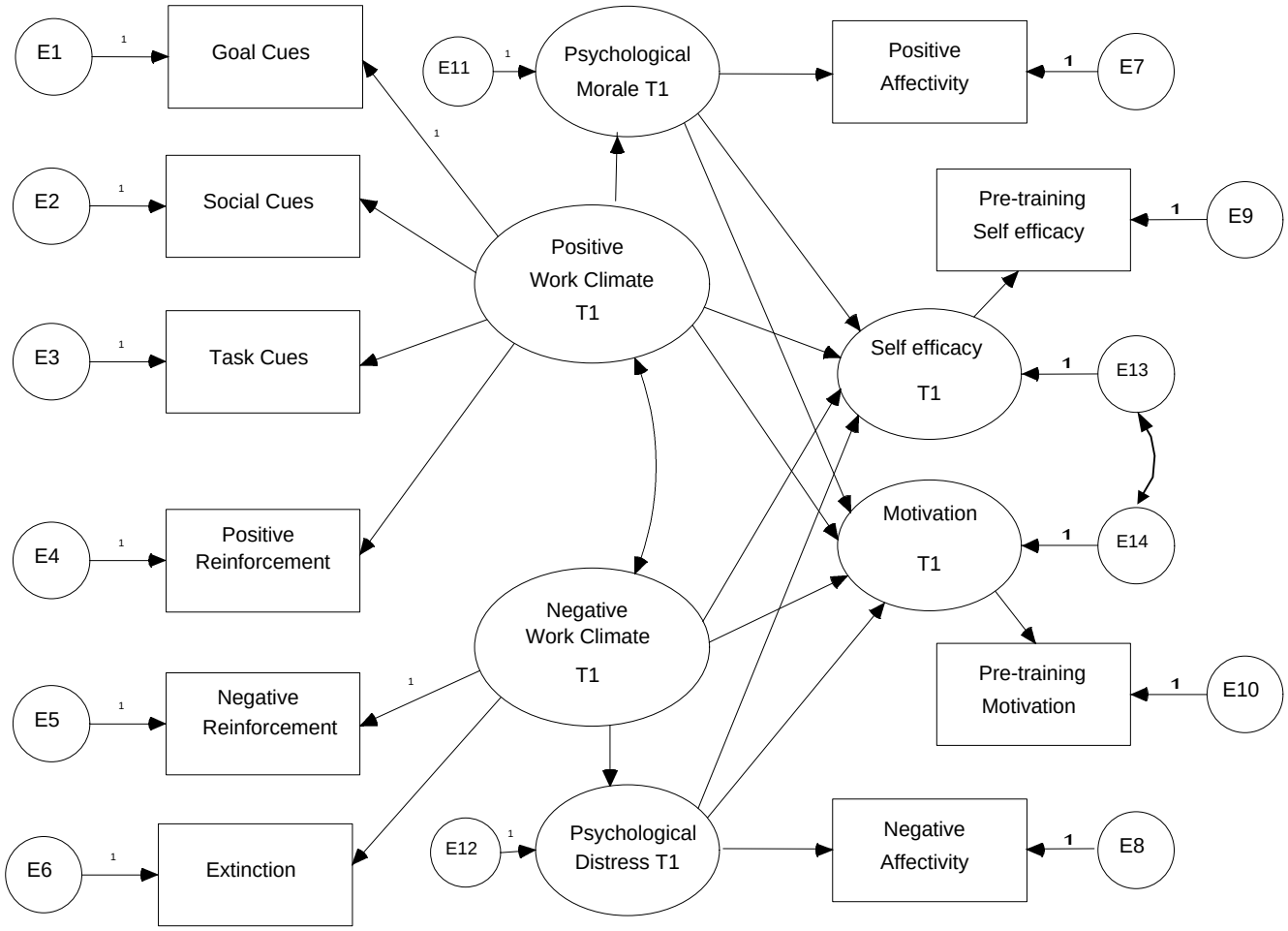

Figure 3.6. Structural model of climate for transfer variables, PA, NA, and Pre-training Self-efficacy and Motivation.

In the model portrayed in Figure 3.6, PA and NA were specified as single indicators of two underlying constructs called Psychological Morale T1 and Psychological Distress T1 respectively. Also, two additional latent constructs were created that had Pre-training Self-efficacy and Pre-training Motivation respectively specified as single indicators in order to determine the impact of the climate for transfer latent constructs on self-efficacy and motivation prior to training. Links were also added from both Psychological Morale T1 and Psychological Distress T1 to the latent constructs called Self-efficacy T1 and Motivation T1 that had Pre-training Self-efficacy and Pre-training Motivation respectively specified as single indicators. Additional links were also added from Positive Work Climate T1 to Psychological Morale T1, Self-efficacy T1, and Motivation T1, and from Negative Work Climate T1 to Psychological Distress T1, Self-efficacy T1, and Motivation T1. Finally, Pre-training Self-efficacy and Pre-training Motivation were allowed to be correlated.

In order to avoid having an unidentified model due to the latent constructs having single indicators, the procedure followed was that recommended by Frone (1998). Frone suggested that the best approach when covariance matrices are used in structural equation modeling is to constrain the loading of the indicator to be equal to one, and the variance of the error term be constrained to equal the product of the variance of the indicator variable and a term equal to one minus the reliability coefficient of the variable. Using this procedure, the unstandardised solution provides the correct unstandardised path coefficients and the standardised solution provides the correct standardised path coefficients.

Therefore, the variance of the error term for PA was constrained to be equal to .062 (i.e., $(.75)^2$*(1-.89)), while the variance of the error term for NA was constrained to be equal to .157 (i.e., $(1.40)^2$*(1-.92)). Also, the variance of the error term for Pre-

training Self-efficacy was constrained to be equal to .015 (i.e., $(.50)^2$*(1 - .94)), while the variance of the error for Pre-training Motivation was constrained to be equal to .015 (i.e., $(.44)^2$*(1-.92)). This model was not found to be a very good fit to the data based on the chi-square tests, although other fit indices are quite acceptable (χ^2 = 50.16, d*f* = 27, p = 0.004, GFI = 0.91, AGFI = 0.82, NTLI = .94, CFI = .96, RMSEA = 0.09). Figure 3.7 displays the path coefficients for this model, with the significant coefficients highlighted in bold.

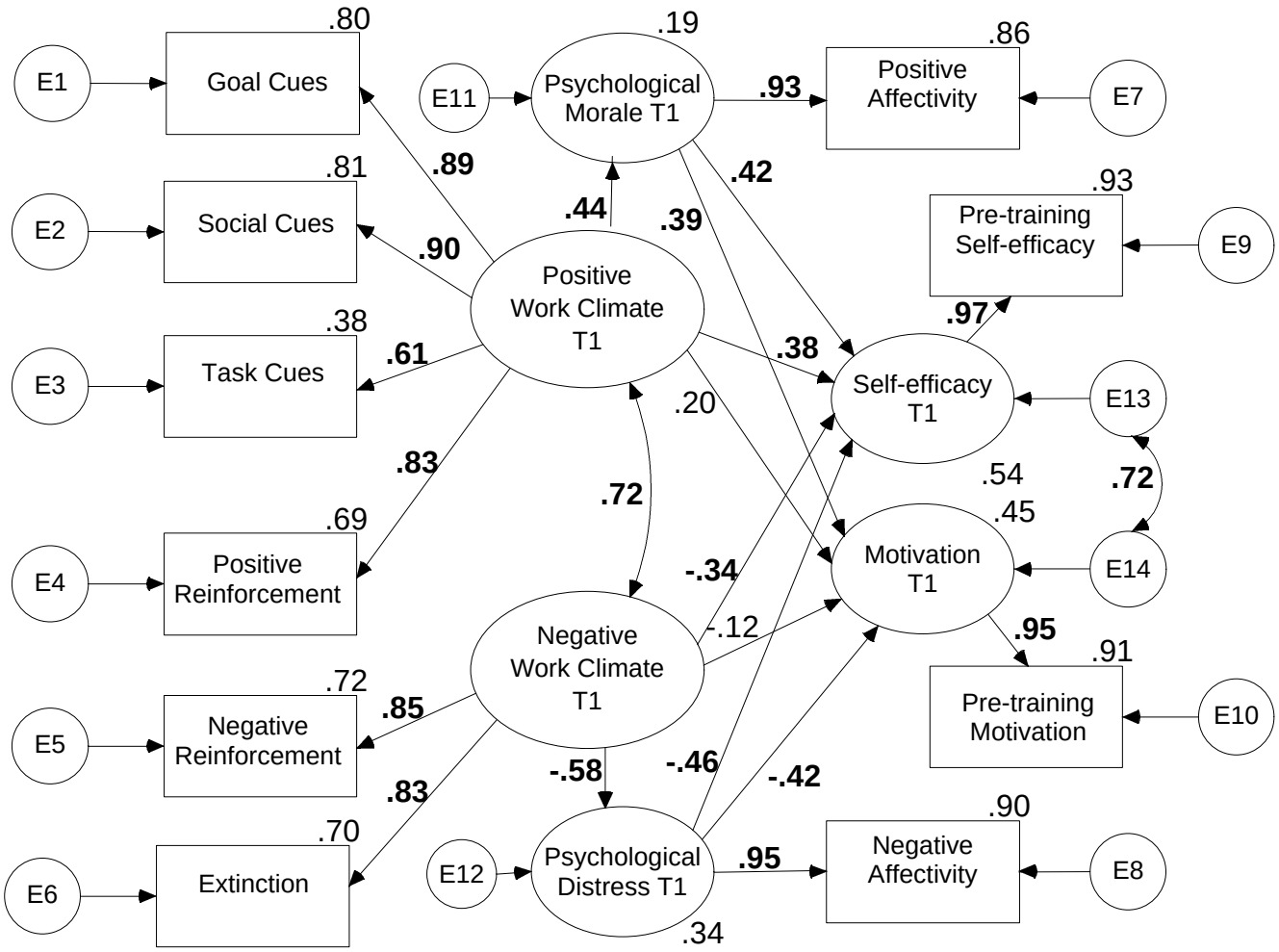

Figure 3.7. Results of initial structural model of climate for transfer variables, PA, NA, and Pre-training Self-efficacy and Motivation.

The significance of individual path coefficients in the model was determined by examining the critical ratios associated with each regression weight. Where the critical ratio was below 1.96, it was concluded that those path coefficients were not significantly different from zero and could be constrained to be zero. It is unlikely that constraining path coefficients to be equal to zero would improve the fit of the model. However, this procedure did provide additional degrees of freedom that may increase the likelihood of obtaining a non-significant chi-square test. The nonsignificant path coefficients were from Positive Work Climate T1 to Motivation T1, and from Negative Work Climate T1 to Motivation T1. A second structural model was specified in which these two paths were constrained to be zero. This second model was also not a good fit to the data based on the chi-square test (χ^2 = 51.76, df = 29, $\underline{p}$ = 0.006, GFI = 0.91, AGFI = 0.83, NTLI = .94, CFI = .96, RMSEA = 0.08). The SCDT for the second model compared to the first showed that the difference in the chi-squares values for these two models was 1.60 (i.e., 51.76 - 50.16) with two degrees of freedom (i.e., 29 - 27), and $\underline{p} > .05$. The null hypothesis for this test, which was that the second model was no worse fitting than the first, failed to be rejected. Figure 3.8 contains the path coefficients for this second model. As a result of the paths with nonsignificant path coefficients being deleted, all path coefficients are significant in this model.

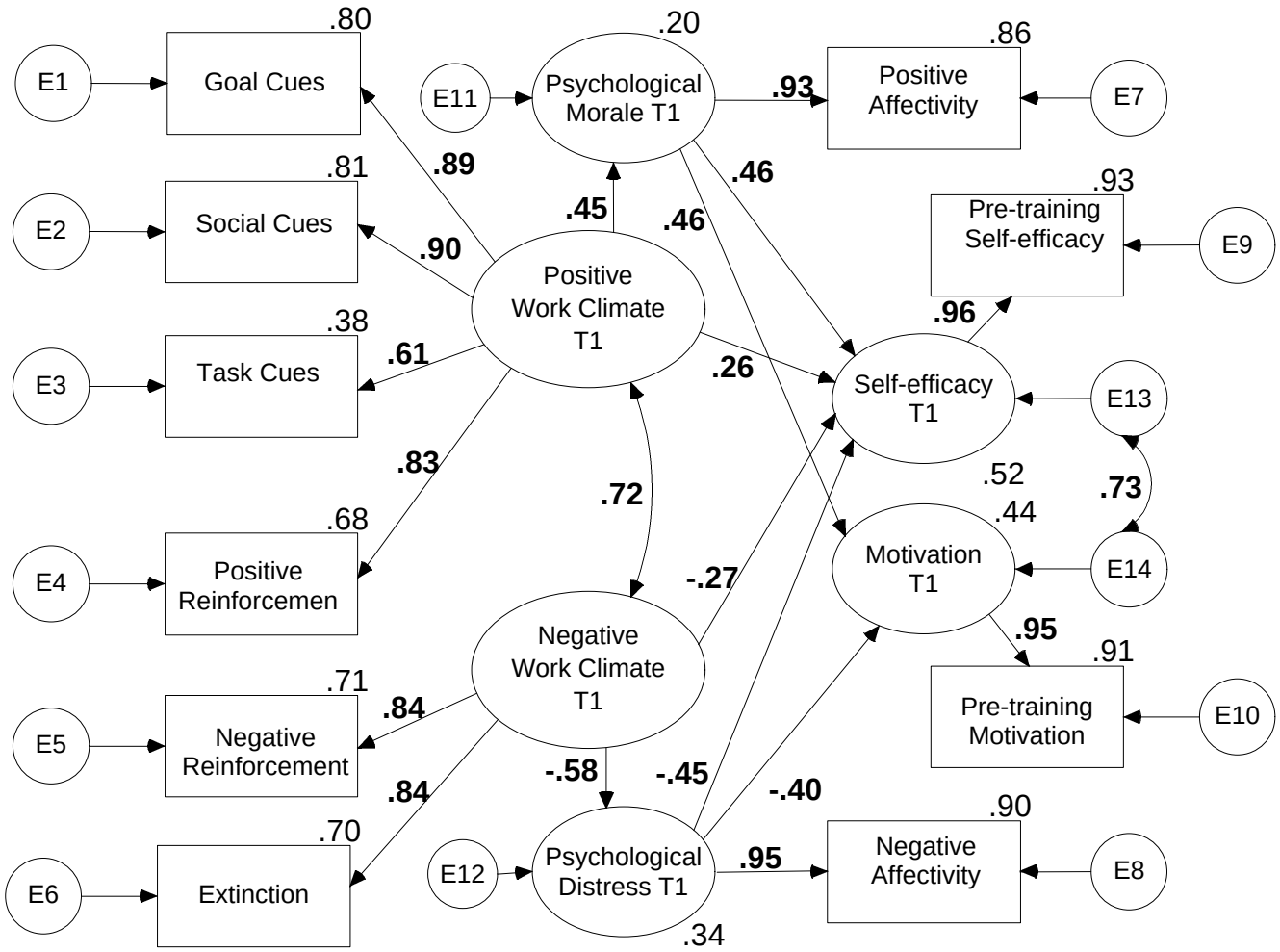

Figure 3.8. Final structural model of climate for transfer variables, PA, NA, Pre-training Self-efficacy, and Pre-training Motivation.

The structural equation model presented in Figure 3.8 showed that Positive Work Climate T1 had significant path coefficients for the paths linking it with Psychological Morale T1 (.45) and Self-efficacy T1 (.26). Negative Work Climate T1 had significant path coefficients for the paths linking it with Psychological Distress T1 (-.58) and Self-efficacy T1 (-.27). Both Psychological Morale T1 and Psychological Distress T1 obtained significant path coefficients for their links with Self-efficacy T1 (.46 and -.45, respectively) and Motivation T1 (.46 and -.40, respectively).

Respecification of the structural model (through the deletion of paths with nonsignificant path coefficients) did not improve the level of fit, although most indices were at acceptable levels. The overall chi-square test was still significant indicating that the model was not reproducing the original variance-covariance matrix. The current model gave some indication that Positive Work Climate T1 and Negative Work Climate T1 exerted a direct impact on Self-efficacy T1, although the strength of this relationship was smaller than the influence of Psychological Morale T1 and Psychological Distress T1. However, Positive Work Climate T1 and Negative Work Climate T1 were not directly related to Motivation T1. Motivation T1 was only influenced by Psychological Morale T1 and Psychological Distress T1. This result provided support for the third hypothesis.

It is worth noting that the path coefficient for the path linking Negative Work Climate T1 to Self-efficacy T1 was negative, indicating that higher levels of Negative Reinforcement and Extinction were associated with higher pre-training levels of Self-efficacy, due to the way that Negative Reinforcement and Extinction were scored. This finding supports the previous set of analyses that concluded that there are two, distinct constructs underlying the climate for transfer variables.

Hypotheses relating to the influence of self-efficacy and motivation

Hypothesis 3.4 stated that Pre-training Self-efficacy and Motivation would be positively related to Post-training Self-efficacy and Motivation, and also to the trainees' level of learning during training. This hypothesis was initially tested by examining the correlations contained in Table 3.3, which confirmed that Pre-training Self-efficacy and Post-training Self-efficacy were significantly correlated ($r = .66$, $p < .001$) as were Pre-training Motivation and Post-training Motivation ($r = .59$, $p < .001$). Learning was also positively correlated with Pre-training Self-efficacy and Pre-training Motivation ($r = .49$, $p < .001$, and $r = .57$, $p < .001$ respectively). It was concluded that Pre-training Self-efficacy and Motivation were positively related to the trainees' level of Learning during training.

Hypothesis 3.5 stated that Post-training Self-efficacy and Motivation would be positively related to the trainees' level of Learning during training, the trainees' Implementation Intentions, and the trainees' Implementation Activities. This hypothesis was initially tested by examining the correlations contained in Table 3.3. Post-training Self-efficacy and Post-training Motivation were both significantly correlated with Learning ($r = .45$, $p < .001$ and $r = .39$, $p < .001$, respectively). Post-training Self-efficacy and Post-training Motivation were also both significantly correlated with Implementation Intentions ($r = .47$, $p < .001$ and $r = .70$, $p < .001$, respectively). While Post-training Self-efficacy was significantly correlated with Implementation Activities ($r = .29$, $p < .01$), Post-training Motivation was not ($r = .13$, NS). It was concluded that Post-training Self-efficacy and Motivation were positively related to the trainees' Learning and Implementation Intentions at the end of training, but that there was only a weak relationship between Post-training Self-efficacy and Implementation Activities (measured four weeks after training).

In order to assess the causal links between Pre-training Self-efficacy, Post-training Self-efficacy, the trainees' level of Learning during training, the trainees' Implementation Intentions, and the trainees' Implementation Activities specified in the modified model of training transfer (see Figure 3.2), a structural model was subsequently specified (see Figure 3.9). Pre- and Post-training Motivation were not included in this structural model of the determinants of Implementation Activities, primarily due to concerns about multicollinearity resulting from the high correlations between Pre-training Self-efficacy and Pre-training Motivation ($\underline{r} = .77$, $\underline{p} < .001$), and between Post-training Self-efficacy and Post-training Motivation ($\underline{r} = .73$, $\underline{p} < .001$). The relationships described in the hypotheses 3.4 and 3.5 were then analysed using Amos 3.6 (Arbuckle, 1997).

Once again, the procedure recommended by Frone (1998) designed to overcome problems associated with having latent constructs with single indicators was followed. The loading of the single indicator was constrained to be equal to one, and the variance of the error term was constrained to equal the product of the variance of the indicator variable and a term equal to one minus the reliability coefficient of the variable. Therefore, the variance of the error term for Pre-training Self-efficacy was constrained to be equal to .015 (i.e., $(.50)^2*(1 - .94)$), while the variance of the error term for Post-training Self-efficacy was constrained to be equal to .029 (i.e., $(.54)^2*(1-.90)$). Also, the variance of the error term for Learning was constrained to be equal to .056 (i.e., $(.59)^2*(1 - .84)$), while the variance of the error for Implementation Intentions was constrained to be equal to .069 (i.e., $(.83)^2*(1-.90)$). Finally, the variance for the error term for Implementation Activities was constrained to be equal to .220 (i.e., $(1.30)^2*(1 - .87)$).

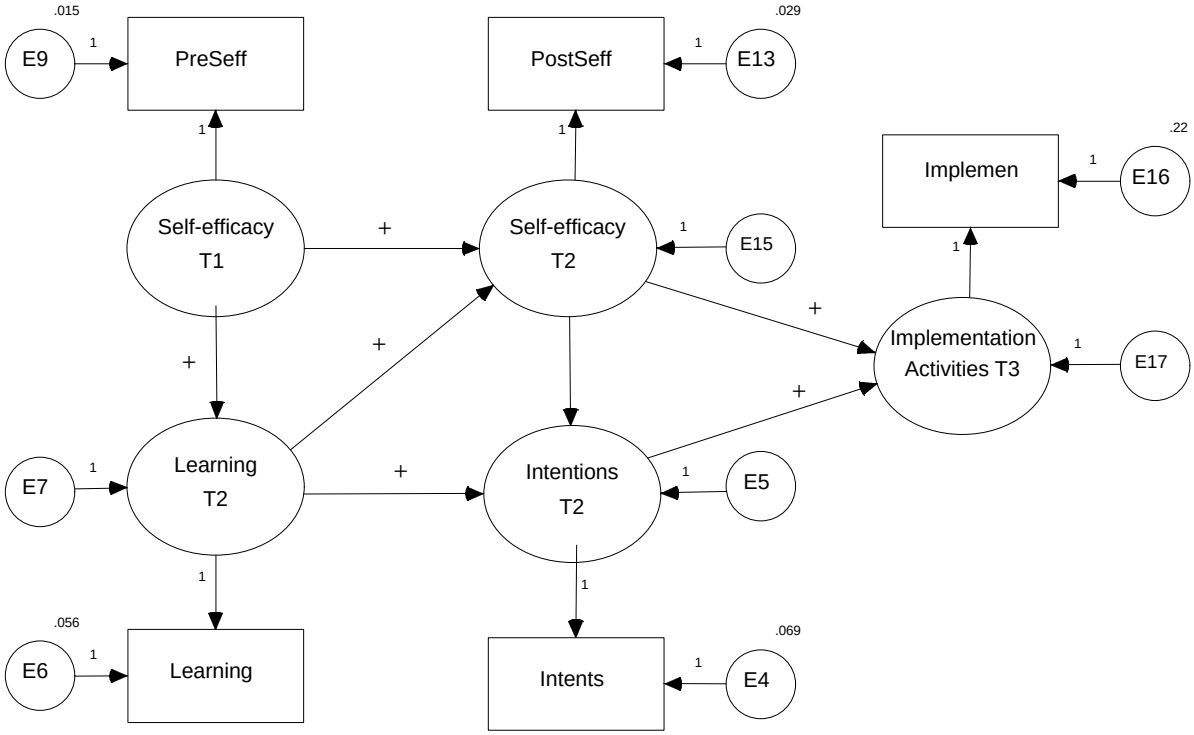

Figure 3.9. Structural model of the determinants of Implementation Activities.

The results of testing the model depicted in Figure 3.9 revealed that this model was not a good fit to the data, based on the chi-square test, although it was very close to being nonsignificant ($\chi^2 = 8.53$, d$f = 3$, $\underline{p} < .05$, GFI = .97, AGFI = .85, NTLI = .88, CFI = .97, RMSEA = .13). An examination of the standardised regression coefficients revealed that three paths coefficients were non-significant (i.e., had a critical ratio less than 1.96 indicating that those coefficients were not significantly different from zero). The significant standardised regression coefficients are highlighted in bold in Figure 3.10.

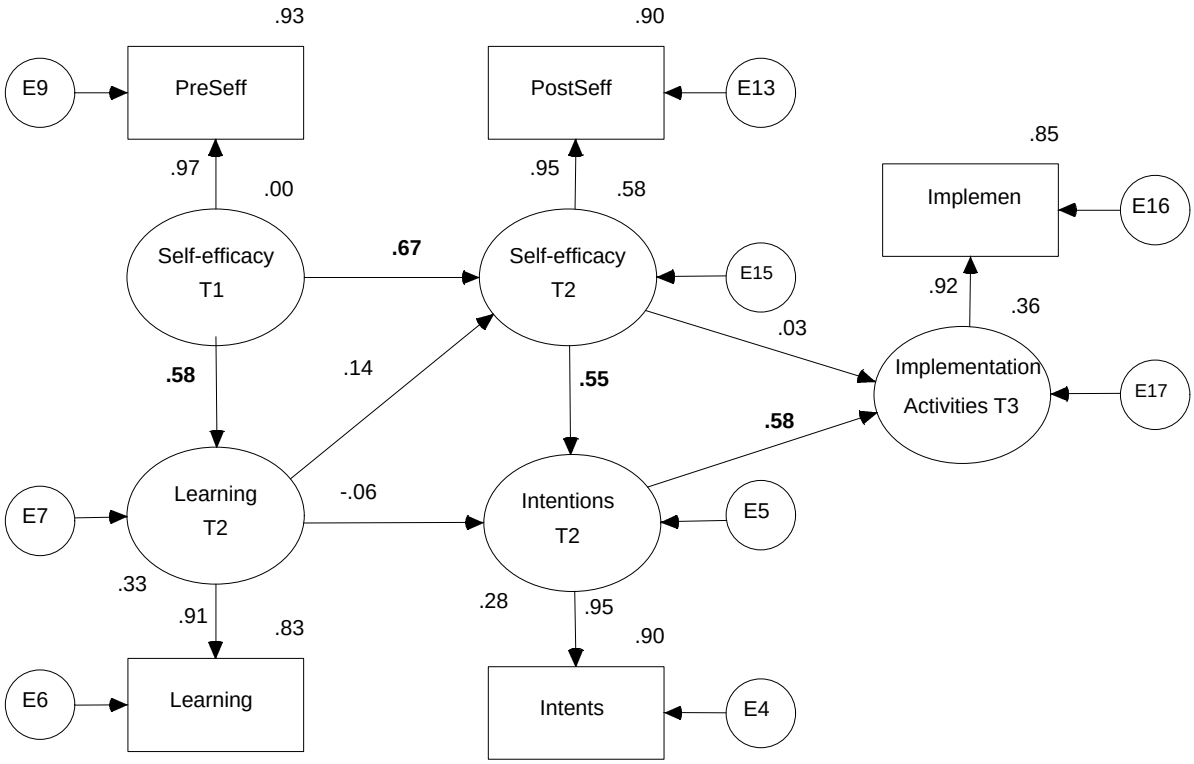

Figure 3.10. Standardised regression coefficients for the structural model of the determinants of Implementation Activities.

Three non-significant coefficients were subsequently deleted from the model following Anderson and Gerbing's (1988) recommended procedure, and the model then reestimated. In the more constrained model, the chi square test was nonsignificant, and the other fit indices were acceptable, indicating that the model was a good fit to the data (χ^2 = 10.39, d*f* = 6, NS, GFI = .97, AGFI = .91, NTLI = .95, CFI = .97, RMSEA = .08). A SCDT between the two models showed that the more constrained model was not any poorer fitting than the original theoretical model, and therefore, the null hypothesis that there is no significant difference between the two nested structural models failed to be rejected ($\Delta\chi^2$ = 1.86, d*f* = 3, NS). Figure 3.11 displays the standardised regression coefficients for the revised structural model of the determinants of transfer Implementation Activities. As a result of the paths with nonsignificant path coefficients being deleted, all path coefficients in this model are significant.

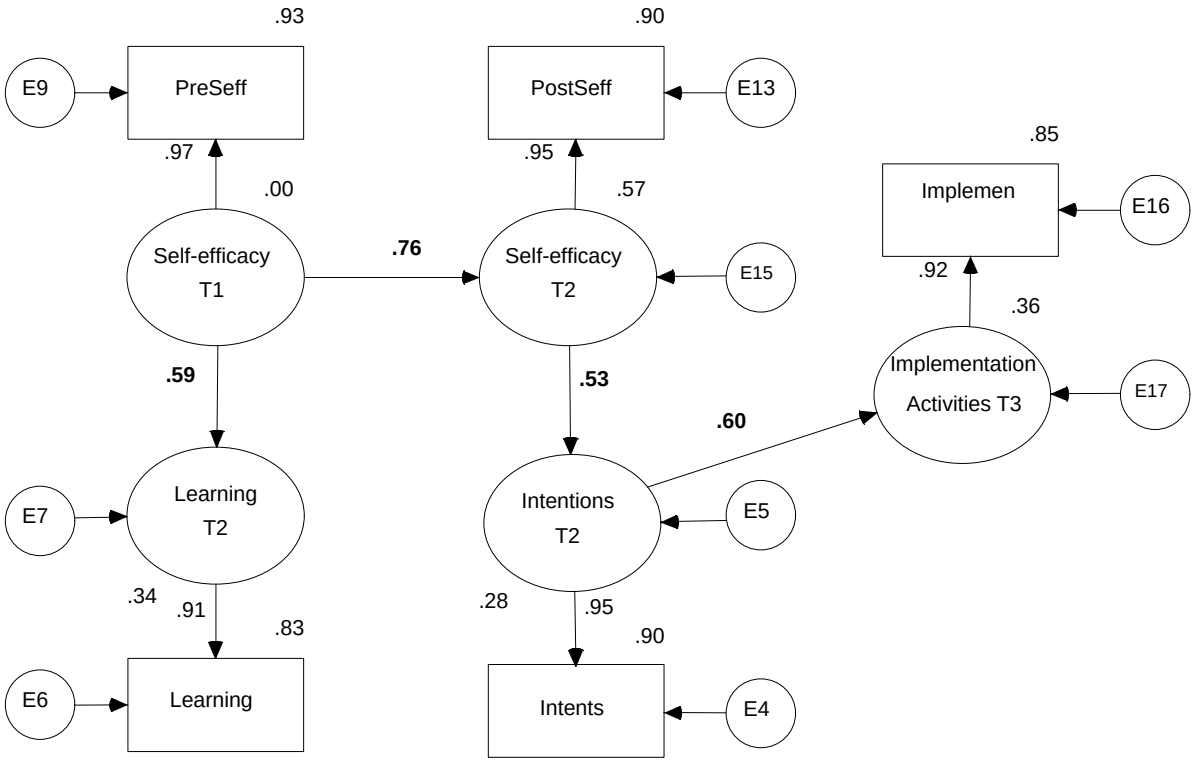

Figure 3.11. Standardised regression coefficients for the revised structural model of the determinants of Implementation Activities.

The structural equation model presented in Figure 3.11 showed that Self-efficacy T1 had significant path coefficients for the paths linking it with Learning T1 (.59) and Self-efficacy T2 (.76). Self-efficacy T2 had a significant path coefficient for the path linking it with Intentions T2 (.53). Intentions T2 obtained a significant path coefficient for the path linking it with Implementation Activities T3 (.60).

Hypotheses related to the transfer enhancing activities

Hypothesis 3.6 stated that the in-training transfer enhancing activities would be positively related to the trainees' level of Learning during training, to the trainees' Post-training levels of Self-efficacy and Motivation, to the trainees' Implementation Intentions, and to the trainees' Implementation Activities. This hypothesis was initially tested by examining the correlations contained in Table 3.3. Subsequently, structural models were specified containing each of the seven, in-training transfer enhancing activities separately. The reasons for this were to keep the ratio of variables to subjects as low as possible, and because there was no hypothesised measurement model of the in-training transfer enhancing activities. However, many of the in-training transfer enhancing activities were highly correlated with one another (r's ranged from .13 to .82) and the process of testing the variables separately did not allow assessment of the unique contribution of each of the variables. Each structural model started with the revised structural model of the determinants of Implementation Activities (see Figure 3.11), and then included one of the transfer enhancing activities. For example, in the first model, Overlearning was specified as a single indicator variable of Overlearning T2. Links were then added from Overlearning T2 to each of the three time 2 (T2) constructs, Learning T2, Self-efficacy T2, and Implementation Intentions T2, as well as to Implementation Activities T3. This model incorporated

elements from the modified model of training transfer originally displayed in Figure 3.2.

Overlearning. Overlearning was not significantly correlated with any of the other T2 variables (Learning, Post-training Self-efficacy, and Implementation Intentions) or with Implementation Activities. The structural model was specified in the manner described above. It was not expected that any paths linking Overlearning with the other variables would have significant path coefficients based on the lack any of significant correlations. The variance of the error term for Overlearning was constrained to be equal to .229 (i.e., $(1.02)^2*(1 - .78)$), as recommended by Frone (1998).The results of testing this model revealed that it was a good fit to the data (χ^2 = 10.36, df = 7, NS, GFI = .97, AGFI = .91, NTLI = .95, CFI = .98, RMSEA = .07). An examination of the standardised regression coefficients revealed that the paths from Self-efficacy T1 to Self-efficacy T2, from Self-efficacy T1 to Learning T2, from Self-efficacy T2 to Intentions T2, and from Intentions T2 to Implementation Activities T3 were all significant as expected. However, the path coefficients for all paths linking Overlearning T2 with the other four constructs were non-significant. The standardised regression coefficients are displayed in Figure 3.12.

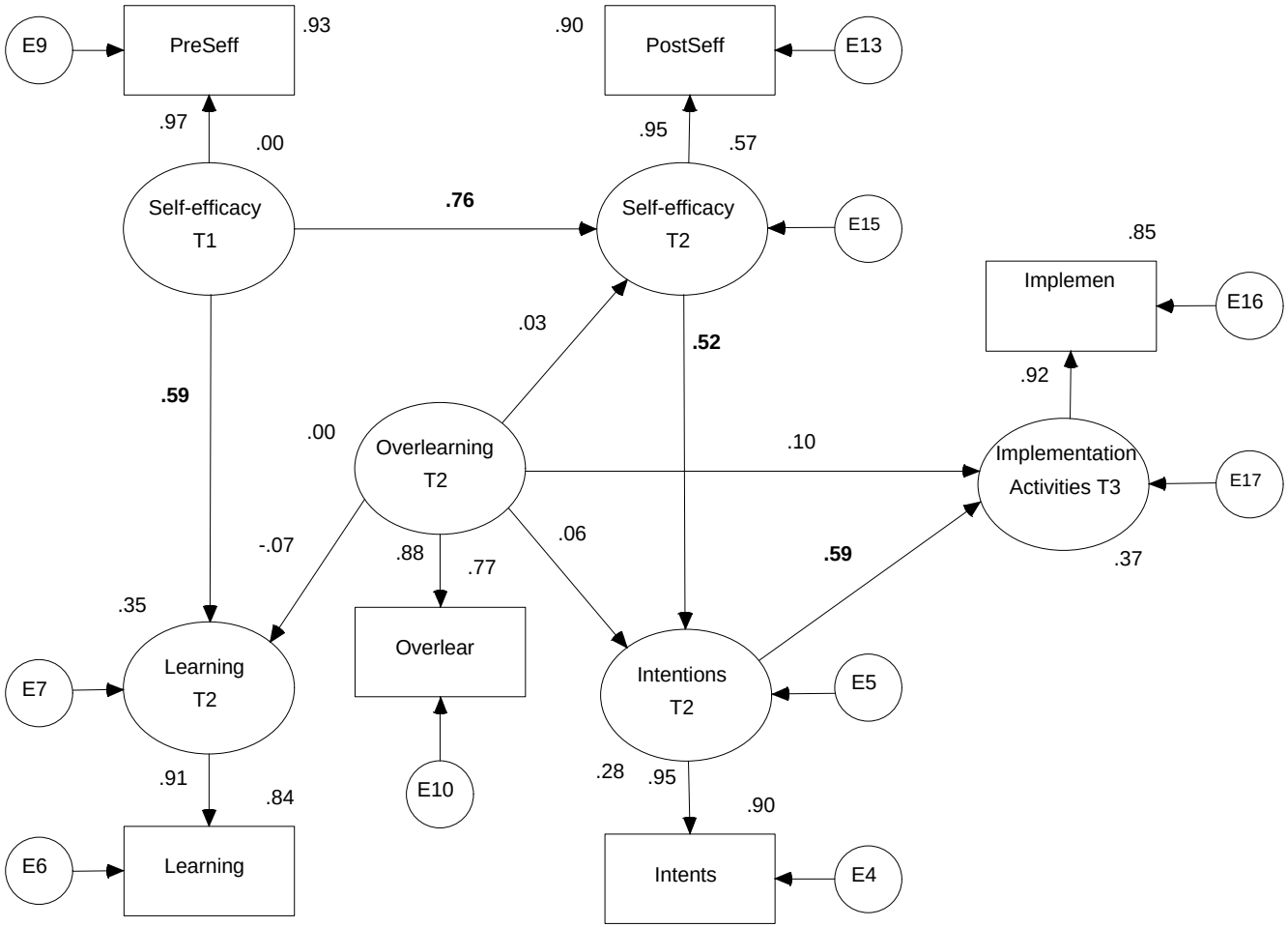

Figure 3.12. Standardised regression coefficients for the structural model of Overlearning and the determinants of Implementation Activities.

Fidelity. Fidelity was significantly correlated with Post-training Self-efficacy (r = .33, p < .001), Post-training Motivation (r = .24, p < .05), Implementation Intentions (r = .23, p < .05), and Implementation Activities (r = .21, p < .05). The structural model that was specified included links from Fidelity T2 with Fidelity specified as a single indicator variable, to each of the three time 2 (T2) constructs (Learning T2, Self-efficacy T2, and Implementation Intentions T2), as well as to Implementation Activities T3. The variance of the error term for Fidelity was constrained to be equal to .194 (i.e., $(.94)^2$*(1 - .78)), as recommended by Frone (1998).The results of testing this model revealed that it was a reasonably good fit to the data (χ^2 = 14.00, df = 7, NS, GFI = .96, AGFI = .88, NTLI = .91, CFI = .96, RMSEA = .10). An examination of the standardised regression coefficients revealed that the paths from Self-efficacy T1 to Self-efficacy T2, from Self-efficacy T1 to Learning T2, from Self-efficacy T2 to Intentions T2, and from Intentions T2 to Implementation Activities T3 were all significant as expected. Of all of the paths linking Fidelity T2 with the other variables, only the path coefficient for the path linking Fidelity T2 with Self-efficacy T2 (.25) was significant. The standardised regression coefficients are displayed in Figure 3.13.

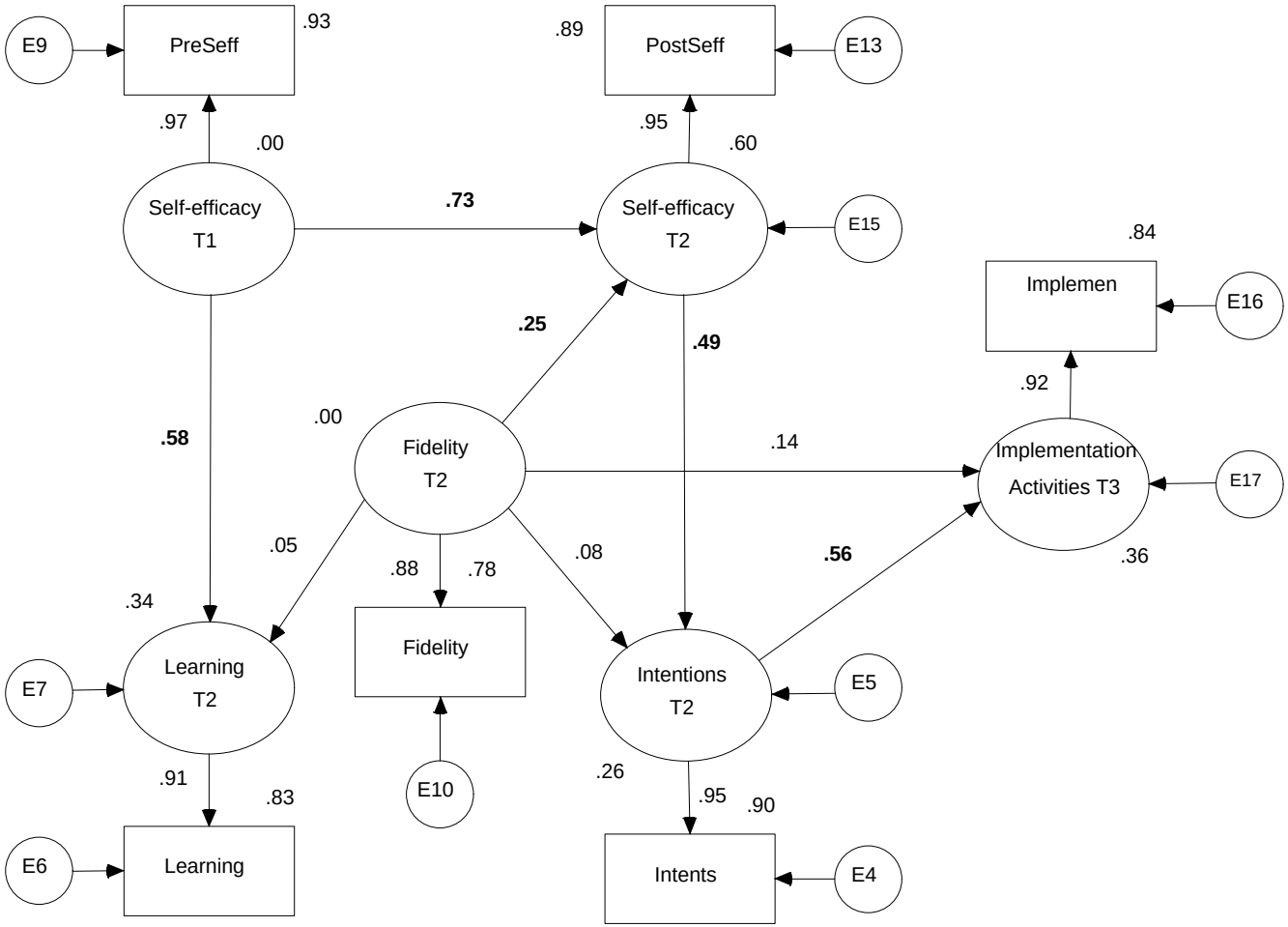

Figure 3.13. Standardised regression coefficients for the revised structural model of Fidelity and the determinants of Implementation Activities.

Stimulus Variability. Stimulus Variability was significantly correlated with Learning (r = .30, p < .01), Post-training Self-efficacy (r = .33, p < .001), Post-training Motivation (r = .25, p < .01), and Implementation Intentions (r = .25, p < .01). The structural model that was specified included links from Stimulus Variability T2 with Stimulus Variability specified as a single indicator variable, to each of the three time 2 (T2) constructs (Learning T2, Self-efficacy T2, and Implementation Intentions T2), as well as to Implementation Activities T3. The variance of the error term for Stimulus Variability was constrained to be equal to .209 (i.e., $(.88)^2*(1 - .73)$), as recommended by Frone (1998).The results of testing this model revealed that it was not a good fit to the data (χ^2 = 25.35, df = 7, p < .001, GFI = .93, AGFI = .79, NTLI = .77, CFI = .89, RMSEA = .16). Modification indices were used to identify the most likely path that, when specified in the model, would result in the greatest decrease in the chi-square value. This corresponds to the model generation approach described by Jöreskog (1993) that is commonly applied in the literature (Byrne, 1998).

A path was subsequently specified in the model from Self-efficacy T1 to Stimulus Variability T2. The results of testing this model revealed that it was a reasonably good fit to the data (χ^2 = 9.47, df = 6, NS, GFI = .97, AGFI = .91, NTLI = .95, CFI = .98, RMSEA = .08). An examination of the standardised regression coefficients revealed that the paths from Self-efficacy T1 to Self-efficacy T2, from Self-efficacy T1 to Learning T2, from Self-efficacy T2 to Intentions T2, and from Intentions T2 to Implementation Activities T3 were all significant as expected. However, none of the paths linking Stimulus Variability T2 with the other variables were significant, although the path coefficient for the path linking Self-efficacy T1 with Stimulus Variability T2 (.46) was significant. The standardised regression coefficients are displayed in Figure 3.14.

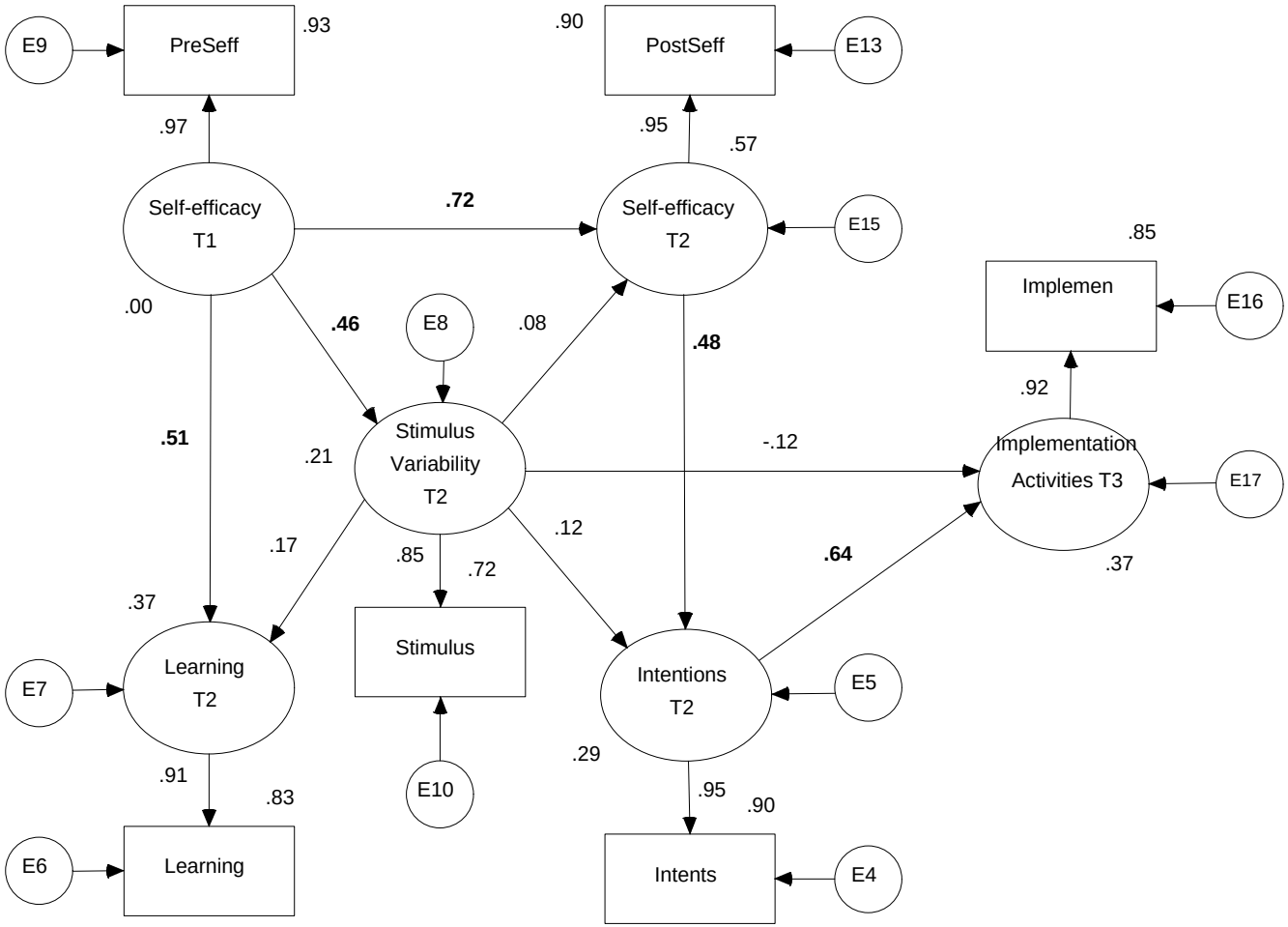

Figure 3.14. Standardised regression coefficients for the revised structural model of Stimulus Variability and the determinants of Implementation Activities.

Principles-Meaningfulness. Principles-Meaningfulness was significantly correlated with Learning (r = .23, p < .05), Post-training Self-efficacy (r = .37, p < .001), Post-training Motivation (r = .39, p < .001), and Implementation Intentions (r = .34, p < .001). The structural model that was specified included links from Principles-Meaningfulness T2 with Principles-Meaningfulness specified as a single indicator variable, to each of the three time 2 (T2) constructs (Learning T2, Self-efficacy T2, and Implementation Intentions T2), as well as to Implementation Activities T3. The variance of the error term for Principles-Meaningfulness was constrained to be equal to .152 (i.e., $(.83)^2$*(1 - .78)), as recommended by Frone (1998).The results of testing this model revealed that it was not a good fit to the data (χ^2 = 43.63, df = 7, p < .001, GFI = .89, AGFI = .68, NTLI = .58, CFI = .81, RMSEA = .23). Once again, modification indices were used to identify the most likely path that, when specified in the model, would result in the greatest decrease in the chi-square value.

A path was subsequently specified in the model from Self-efficacy T1 to Principles-Meaningfulness T2. The results of testing this model revealed that it was a reasonably good fit to the data (χ^2 = 10.39, df = 6, NS, GFI = .97, AGFI = .90, NTLI = .94, CFI = .98, RMSEA = .08). An examination of the standardised regression coefficients revealed that the paths from Self-efficacy T1 to Self-efficacy T2, from Self-efficacy T1 to Learning T2, from Self-efficacy T2 to Intentions T2, and from Intentions T2 to Implementation Activities T3 were all significant as expected. However, none of the paths linking Principles-Meaningfulness T2 with the other variables were significant, although the path coefficient for the path linking Self-efficacy T1 with Principles-Meaningfulness T2 (.62) was significant. The standardised regression coefficients are displayed in Figure 3.15.

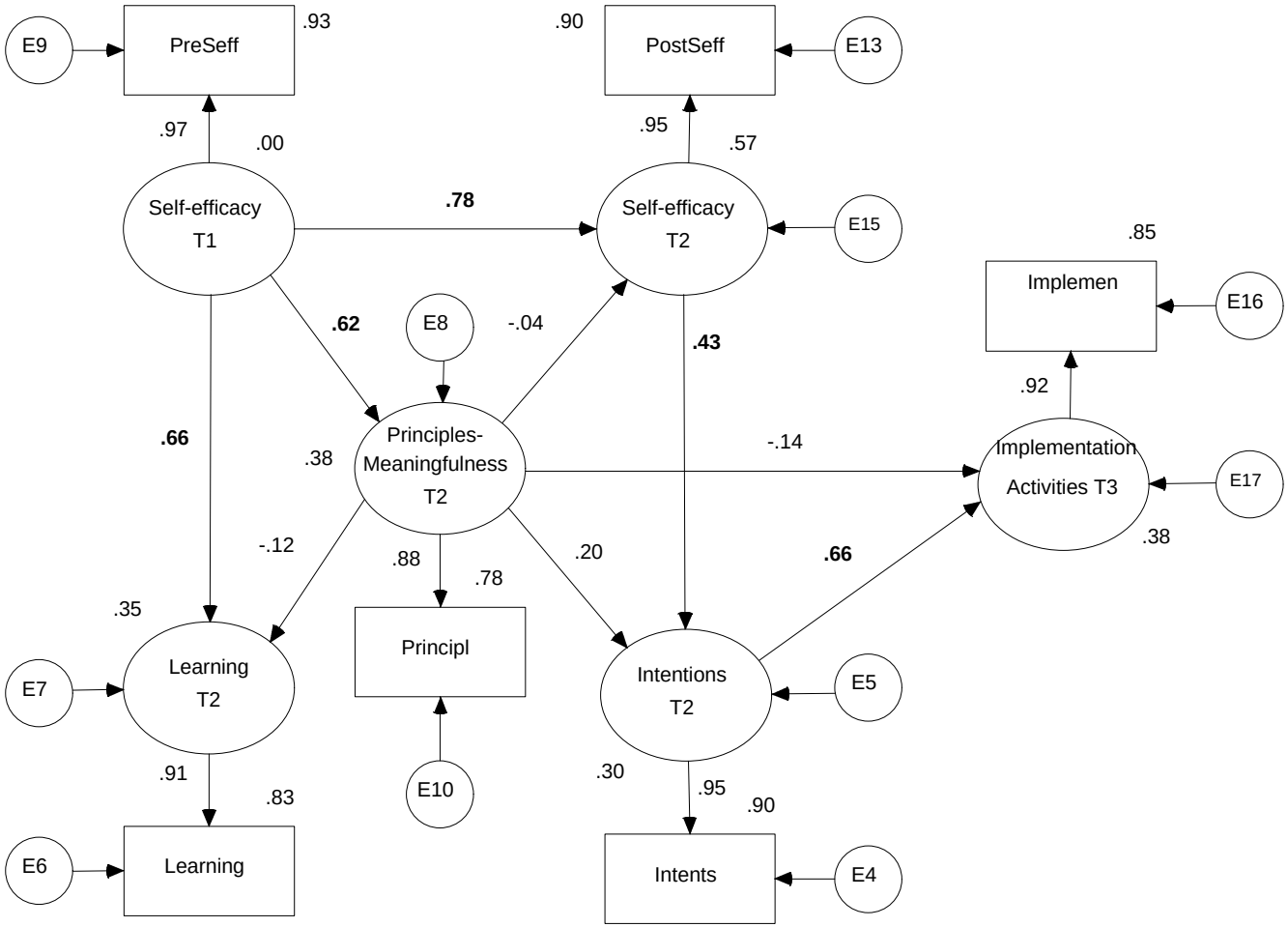

Figure 3.15. Standardised regression coefficients for the revised structural model of Principles-Meaningfulness and the determinants of Implementation Activities.

Self-control Cues. Self-control Cues (Feedback) was significantly correlated with Learning (r = .32, p < .001), Post-training Self-efficacy (r = .44, p < .001), Post-training Motivation (r = .45, p < .001), Implementation Intentions (r = .23, p < .05), and Implementation Activities (r = .42, p < .001). The structural model that was specified included links from Self-control Cues T2 with Self-control Cues specified as a single indicator variable, to each of the three time 2 (T2) constructs (Learning T2, Self-efficacy T2, and Implementation Intentions T2), as well as to Implementation Activities T3. The variance of the error term for Fidelity was constrained to be equal to .135 (i.e., $(.92)^2$*(1 - .84)), as recommended by Frone (1998).The results of testing this model revealed that it was not a good fit to the data (χ^2 = 25.89, df = 7, p < .001, GFI = .93, AGFI = .79, NTLI = .79, CFI = .90, RMSEA = .16). Once again, modification indices were used to identify the most likely path that, when specified in the model, would result in the greatest decrease in the chi-square value.

A path was subsequently specified in the model from Self-efficacy T1 to Self-control Cues T2. The results of testing this model revealed that it was a reasonably good fit to the data (χ^2 = 12.47, df = 6, NS, GFI = .97, AGFI = .88, NTLI = .92, CFI = .97, RMSEA = .10). An examination of the standardised regression coefficients revealed that the paths from Self-efficacy T1 to Self-efficacy T2, from Self-efficacy T1 to Learning T2, from Self-efficacy T2 to Intentions T2, and from Intentions T2 to Implementation Activities T3 were all significant as expected. Also, the path coefficients for the paths linking Self-control Cues T2 with both Self-efficacy T2 (.25) and Implementation Intentions T2 (.31) were significant, as was the path coefficient for the path linking Self-efficacy T1 with Self-control Cues T2 (.39). The standardised regression coefficients are displayed in Figure 3.16.

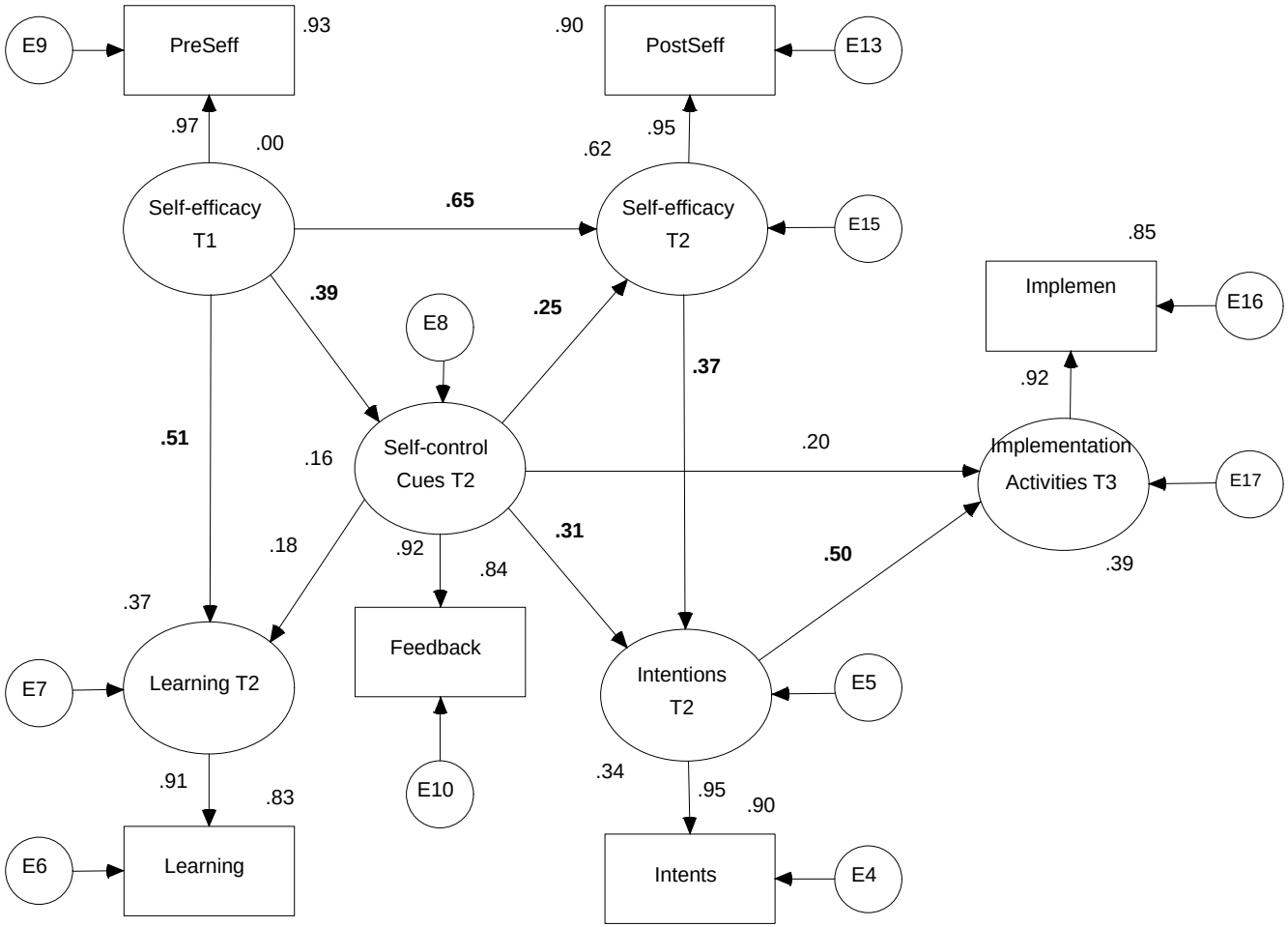

Figure 3.16. Standardised regression coefficients for the revised structural model of Self-control Cues and the determinants of Implementation Activities.

Relapse Prevention. Relapse Prevention was significantly correlated with Learning (r = .31, p < .01), Post-training Self-efficacy (r = .40, p < .001), Post-training Motivation (r = .43, p < .001), Implementation Intentions (r = .41, p < .001), and Implementation Activities (r = .46, p < .001). The structural model that was specified included links from Relapse Prevention T2 with Relapse Prevention specified as a single indicator variable, to each of the three time 2 (T2) constructs (Learning T2, Self-efficacy T2, and Implementation Intentions T2), as well as to Implementation Activities T3. The variance of the error term for Relapse Prevention was constrained to be equal to .132 (i.e., $(1.21)^2*(1 - .91)$), as recommended by Frone (1998).The results of testing this model revealed that it was not a good fit to the data (χ^2 = 16.49, df = 7, p < .05, GFI = .95, AGFI = .86, NTLI = .90, CFI = .95, RMSEA = .12). Once again, modification indices were used to identify the most likely path that, when specified in the model, would result in the greatest decrease in the chi-square value.

In this model, a path was subsequently specified from Learning T2 to Implementation Activities T2. The results of testing this model revealed that it was a good fit to the data (χ^2 = 6.13, df = 6, NS, GFI = .98, AGFI = .93, NTLI = 1.00, CFI = 1.00, RMSEA = .01). An examination of the standardised regression coefficients revealed that the paths from Self-efficacy T1 to Self-efficacy T2, from Self-efficacy T1 to Learning T2, from Self-efficacy T2 to Intentions T2, and from Intentions T2 to Implementation Activities T3 were all significant as expected. Also, the path coefficients for the paths linking Relapse Prevention T2 with Learning T2 (.26), with Self-efficacy T2 (.34), with Implementation Intentions T2 (.27), and with Implementation Activities T3 (.47) were all significant. Finally, the path coefficient for the path linking Learning T2 with Implementation Activities T2 (-.31) was also

significant, although negative. The standardised regression coefficients are displayed in Figure 3.17.

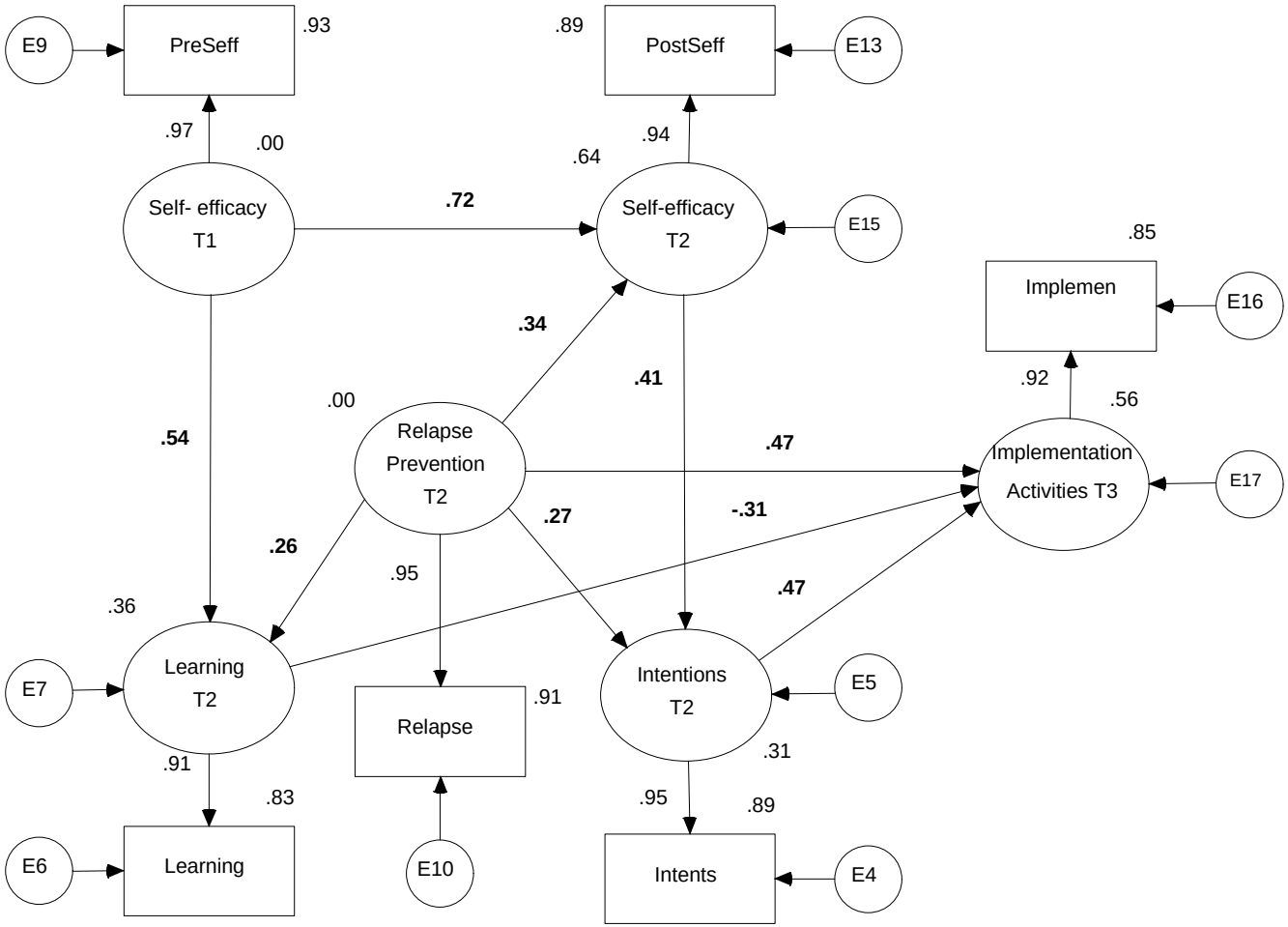

Figure 3.17. Standardised regression coefficients for the revised structural model of Relapse Prevention and the determinants of Implementation Activities.

Goal Setting. Goal Setting was significantly correlated with Learning (r = .24, p < .05), Post-training Self-efficacy (r = .40, p < .001), Post-training Motivation (r = .43, p < .001), Implementation Intentions (r = .48, p < .001), and Implementation Activities (r = .54, p < .001). The structural model that was specified included links from Goal Setting T2 with Goal Setting specified as a single indicator variable, to each of the three time 2 (T2) constructs (Learning T2, Self-efficacy T2, and Implementation Intentions T2), as well as to Implementation Activities T3. The variance of the error term for Goal Setting was constrained to be equal to .203 (i.e., $(1.25)^2$*(1 - .87)), as recommended by Frone (1998).The results of testing this model revealed that it was not a good fit to the data (χ^2 = 15.77, df = 7, p < .05, GFI = .95, AGFI = .86, NTLI = .91, CFI = .96, RMSEA = .11). Once again, modification indices were used to identify the most likely path that, when specified in the model, would result in the greatest decrease in the chi-square value.

In this model, a path was subsequently specified from Learning T2 to Implementation Activities T2. The results of testing this model revealed that it was a good fit to the data (χ^2 = 6.50, df = 6, NS, GFI = .98, AGFI = .93, NTLI = 1.00, CFI = 1.00, RMSEA = .03). An examination of the standardised regression coefficients revealed that the paths from Self-efficacy T1 to Self-efficacy T2, from Self-efficacy T1 to Learning T2, from Self-efficacy T2 to Intentions T2, and from Intentions T2 to Implementation Activities T3 were all significant as expected. Also, the path coefficients for the paths linking Goal Setting T2 with Self-efficacy T2 (.34), with Implementation Intentions T2 (.38), and with Implementation Activities T3 (.55) were all significant. Finally, the path coefficient for the path linking Learning T2 with Implementation Activities T2 (-.28) was also significant, although negative. The standardised regression coefficients are displayed in Figure 3.18.

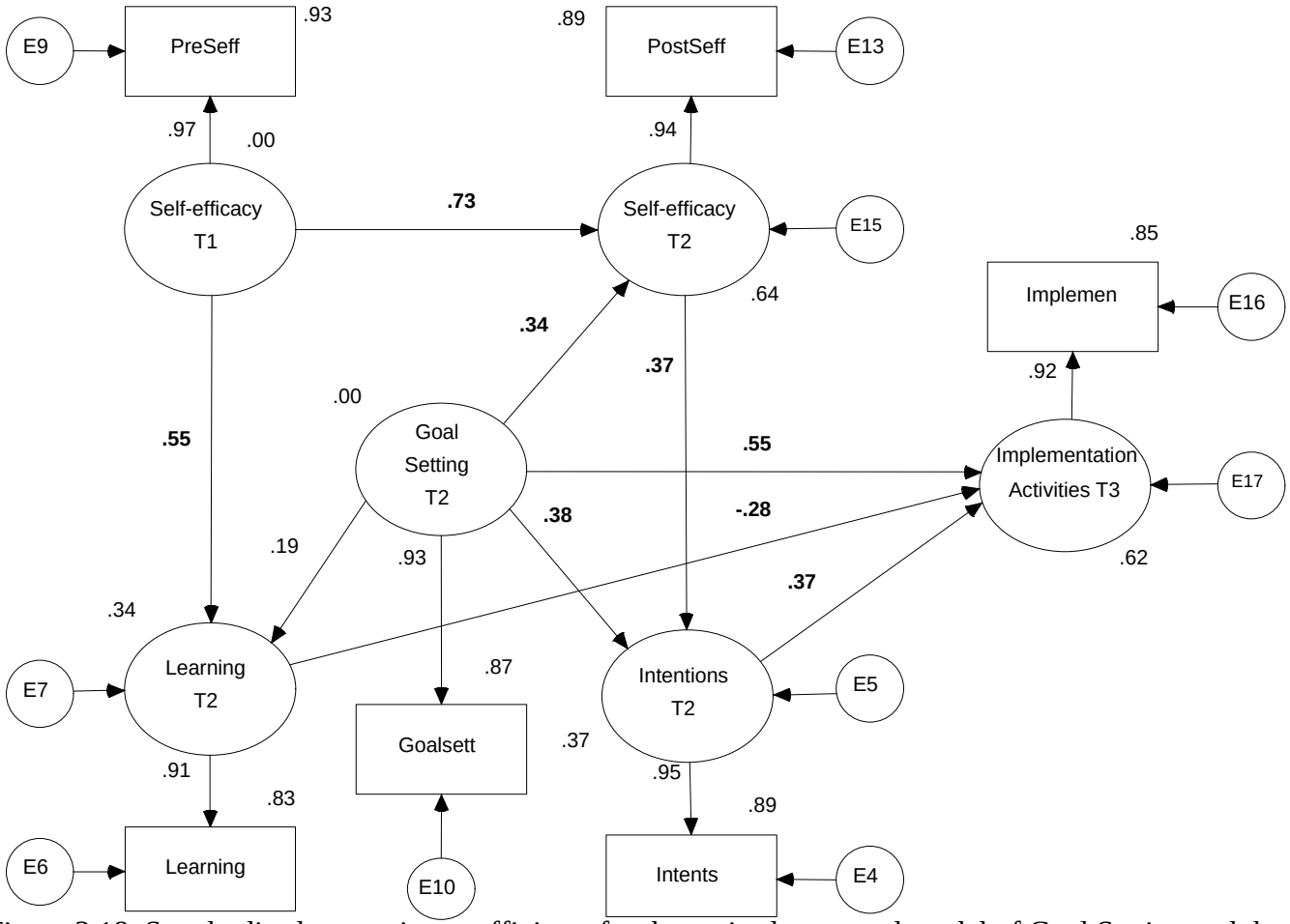

Figure 3.18. Standardised regression coefficients for the revised structural model of Goal Setting and the determinants of Implementation Activities.

Hypotheses relating to Implementation Intentions, Implementation Activities, and Transfer Success

It was hypothesised (3.8) that transfer Implementation Intentions would be positively related to Implementation Activities. The correlation contained in Table 3.3 showed that transfer Implementation Intentions was significantly and positively correlated with Implementation Activities ($r = .48$, $p < .001$). This hypothesis was also tested by the analyses in the section reporting on the hypotheses relating to the influence of self-efficacy and motivation. Figure 3.11 presented the path coefficients for the revised structural model of the determinants of Implementation Activities, and demonstrated that Implementation Intentions (Intentions T2) were a strong determinant of post-training Implementation Activities (Implementation Activities T3). Also, the analyses presented in Figures 3.12 to 3.18 confirm that Intentions T2 remained a significant predictor of Implementation Activities T3, even when the transfer enhancing activities such as Relapse Prevention and Goal Setting were found to have a significant path coefficients for their direct paths to Implementation Activities T3.

The last hypothesis (3.9) was that the Implementation Activities would be positively related to Transfer Success. The correlations contained in Table 3.3 revealed that Implementation Activities was positively correlated with Transfer Success ($r = .59$, $p < .001$).

Discussion

A number of models were developed for this study in order to tests the various hypotheses. The model that was developed to test hypothesis 3.1 was a measurement model that included the six climate for transfer variables contained in the Climate for Transfer Questionnaire (Thayer & Teachout, 1995). Hypothesis 3.1 proposed that there were two distinct constructs underlying the climate for transfer variables, that is, antecedents and consequences. The initial measurement model specified Goal Cues, Social Cues, and Task Cues as indicators of the Antecedents construct, while Positive Reinforcement, Negative Reinforcement and Punishment, and Extinction were specified as indicators of the Consequences construct. The two latent constructs were also allowed to covary, which consistent with the assumption that they would not be independent.

The initial measurement model was not a good fit to the data. Another model that subsequently specified all variables as indicators of one latent construct (General transfer climate) was also not a good fit to the data. The model was then respecified so that Positive Reinforcement became an indicator of Antecedents, and this model was a good fit to the data. Inspection of the path coefficients resulted in the Antecedent construct being reinterpreted as Positive Work Climate T1 and the Consequences construct being reinterpreted as Negative Work Climate T1. These two constructs were highly correlated (.74), although they were still able to be distinguished. Therefore, Rouiller and Goldstein's (1993) decision to combine the entire set of climate for transfer items into a general transfer climate score would not enable the separate influence of these two constructs to be determined. Future studies of the factor structure of climate for transfer

are required to replicate this finding. Interventions that could be developed to improve the climate for transfer would need to focus on both constructs.

The second hypothesis proposed that the six, climate for transfer variables would be positively related to Pre-training Self-efficacy and Motivation. The scales measuring Negative Reinforcement and Punishment, and Extinction were scored so that a higher score represented lower levels of that construct. Pre-training Self-efficacy was positively and significantly correlated to all climate for transfer variables, although the strongest correlations were with Positive Reinforcement, Goal Cues, and Social Cues. Pre-training Motivations was positively and significantly correlated to five of the climate for transfer variables, although the strongest correlations were with Positive Reinforcement, Social Cues, and Goal Cues. This result provided support for the hypothesised influence that pre-training perceptions of the transfer climate have on pre-training self-efficacy and motivation. The nature of these relationships will be discussed in the next section dealing with the third hypothesis.

The model that was developed to test hypothesis 3.3 was a structural model based on the modified model of training transfer (see Figure 3.2) that attempted to specify the relationships between the climate for transfer variables, PA, NA, and Pre-training Self-efficacy and Motivation. This model examined whether Positive Work Climate T1 (with Goal Cues, Social Cues, Task Cues, and Positive Reinforcement specified as indicators) and Negative Work Climate T1 (with Negative Reinforcement and Punishment and Extinction specified as indicators) were able to directly influence Self-efficacy T1 (with Pre-training Self-efficacy specified as a single indicator) and Motivation T1 (with Pre-training Motivation specified as a single indicator).

The analysis revealed that the model supported the proposal that Psychological Morale T1 and Psychological Distress T1 (with Positive and Negative Affectivity respectively specified as single indicators) were mediators of influence of Positive Work Climate T1 and Negative Work Climate T1 on Self-efficacy T1 and Motivation T1. Psychological Morale T1 was found to positively influence both Self-efficacy T1 and Motivation T1, while Psychological Distress T1 was found to negatively influence both Self-efficacy T1 and Motivation T1. The direct influence of Positive Work Climate T1 on Self-efficacy T1 (.26) was smaller than the influence of both Psychological Morale T1 (.46) and Psychological Distress T1 (-.45). The direct influence of Negative Work Climate T1 on Self-efficacy T1 (-.27) was also smaller than the influence of both Psychological Morale T1 (.46) and Psychological Distress T1 (-.40). The negative path coefficient linking Negative Work Climate T1 with Self-efficacy T1 was unexpected, and suggested that higher levels of Negative Reinforcement and Punishment, as well as higher levels of Extinction contribute to higher levels of Pre-training Self-efficacy.

The above result expands on the research that has demonstrated that a more positive transfer climate can facilitate the transfer of training (Rouiller & Goldstein, 1993). Mathieu and Martineau (1997) suggested that the influence of the work environment might operate as either a direct influence on transfer outcomes, or, more likely, as an indirect influence through the trainees' levels of self-efficacy and motivation. In this study, both Positive Work Climate T1 and Negative Work Climate T1 were found to directly influence the pre-training levels of self-efficacy, but not the pre-training levels of motivation. Positive Work Climate T1 and Negative Work Climate T1 were found to indirectly influence the pre-training levels of self-efficacy and motivation by influencing

the levels of morale and distress that the trainees experience. Positive Affectivity was positively related to three aspects of the transfer climate (Goal Cues, Social Cues, and Positive Reinforcement), while Negative Affectivity was strongly negatively related to Negative Reinforcement and Extinction, and weakly negatively related to Goal Cues, Social Cues, and Positive Reinforcement. While it was concluded that the transfer climate was a determinant of the trainees' affective state, the relationship between affect and work climate might also be in the opposite direction, or reciprocal in nature. Spector et al. (in press) discussed this issue in great depth, and clearly further research is needed to unravel the complex relationship between the work environment and affective states. This study has shown that both positive and negative affective states are related to pre-training levels of self-efficacy and motivation.

The fourth hypothesis proposed that pre-training levels of self-efficacy and motivation would be positively related to post-training levels of self-efficacy and motivation, and also to the trainees' level of learning during training. The results revealed that Pre-training Self-efficacy and Pre-training Motivation were both strongly positively correlated with their corresponding time 2 (T2) variables, and positively correlated with Learning.

The next hypothesis (3.5) proposed that post-training levels of self-efficacy and motivation would be related to the trainees' level of Learning during training, the trainees' Implementation Intentions, and the trainees' Implementation Activities. The results showed that Post-training Self-efficacy and Post-training Motivation were both positively and significantly correlated to Learning and Implementation Intentions, while

only Post-training Self-efficacy was significantly correlated with Implementation Activities.

Foxon (1997) developed an intervention designed to promote transfer that included an action planning component. It was anticipated that this intervention would assist trainees through enhancing their motivation to transfer their training, and by helping them to anticipate the barriers they would face in the work place to applying their training. However, Foxon found that those trainees who prepared action plans actually reported lower levels of motivation, and there were no differences between those in the action planning condition and trainees who had not prepared an action plan on any of the transfer measures. This issue is quite important, as it seems that asking trainees to predict the areas in which they might have difficulty transferring their skills dampens their motivation to transfer those skills. Further investigation is required into the impact of motivation to transfer ones training on the actions taken to implement ones training.

A structural model was then developed, specifying the relationships between Pre-training Self-efficacy, Post-training Self-efficacy, Learning, Implementation Intentions, and Implementation Activities, based on the modified model of training transfer displayed in Figure 3.2. This model was not initially a good fit to the data, but acceptable levels of fit were achieved after three non-significant paths were deleted. The revised structural model of the determinants of Implementation Activities showed that Self-efficacy T1 (i.e., Pre-training Self-efficacy) was a strong determinant of Self-efficacy T2 (i.e., Post-training Self-efficacy), which in turn influenced Intentions T2 (i.e., Implementation Intentions). Intentions T2 was a strong determinant of Implementation Activities T3. Learning T2 had no significant path coefficients for the paths linking it

with Self-efficacy T2 and Intentions T2, although it was strongly influenced by Self-efficacy T1.

As mentioned, the structural model described above was based on the modified model of training transfer presented in Figure 3.2. The results suggested that self-efficacy levels prior to training were an extremely important determinant of the self-efficacy levels at the end of training, which strongly influenced the level of transfer intentions. While the structural model omitted Pre-training Motivation and Post-training Motivation from the model, the high correlations of these variables with their companion measures of self-efficacy indicates that motivation may play a similar role in determining transfer intentions. The model described above can also be linked with the earlier model depicting the influence of the climate for transfer variables, PA, and NA on Pre-training Self-efficacy and Motivation. The earlier model demonstrated that a more positive climate for transfer does influence self-efficacy and motivation prior to the commencement of training. The result of higher levels of pre -training self-efficacy is that trainees learn more from their training, and also have higher post-training levels of self-efficacy, which in turn are beneficial in promoting stronger transfer intentions. These results provide strong support for the modified model of training transfer presented at the start of this study (see Figure 3.2).

The sixth hypothesis proposed that the in-training transfer enhancing activities would be positively related to the trainees' level of Learning during training, to the trainees' Post-training levels of Self-efficacy and Motivation, to the trainees' Implementation Intentions, and to the trainees' Implementation Activities. The results were presented separately for each of the seven scales in the Transfer Enhancing

Activities Questionnaire (Thayer & Teachout, 1995). However, the results can be summarised as follows. Overlearning was not significantly correlated with any of the other variables mentioned above. Fidelity had significant positive correlations with Post-training Self-efficacy, Post-training Motivation, Implementation Intentions, and Implementation Activities. Stimulus Variability was significantly correlated with Learning, Post-training Self-efficacy, Post-training Motivation, and Implementation Intentions, but not with Implementation Activities. Principles-meaningfulness was significantly correlated with Learning, Post-training Self-efficacy, Post-training Motivation, and Implementation Intentions, but again, not with Implementation Activities. Self-control Cues was significantly correlated with Learning, Post-training Self-efficacy, Post-training Motivation, and Implementation Intentions, and with Implementation Activities. Relapse prevention was significantly correlated with Learning, Post-training Self-efficacy, Post-training Motivation, and Implementation Intentions, and with Implementation Activities. Finally, Goal Setting was significantly correlated with Learning, Post-training Self-efficacy, Post-training Motivation, and Implementation Intentions, but not with Implementation Activities.

The seventh hypothesis extended the analysis of the previous hypothesis by proposing that four of the transfer enhancing activities (Overlearning, Fidelity, Stimulus Variability, and Principles-meaningfulness) would have weaker relationships with the trainees' Implementation Intentions and the trainees' Implementation Activities than the other three transfer enhancing activities. This hypothesis was tested by developing a series of seven structural models based on the modified model of training transfer (see Figure 3.2), each of which contained one of the transfer enhancing activities, as well as

Self-efficacy T1 (i.e., Pre-training Self-efficacy), Self-efficacy T2 (i.e., Post-training Self-efficacy), Learning T2 (i.e., Learning), Intentions T2 (i.e., Implementation Intentions), and Implementation Activities T3. The analyses did not attempt to determine the unique contributions of each of the in-training transfer enhancing activities.

The structural model containing Overlearning confirmed the conclusions drawn from the previous paragraph describing the correlational analyses. Overlearning did not have any significant path coefficients for any of the paths linking it with any of the other variables. The structural model containing Fidelity T2 (i.e., Fidelity) had one significant path coefficient for the path linking it with Self-efficacy T2. The structural models containing Stimulus Variability T2 (i.e., Stimulus Variability) and Principles-Meaningfulness T2 (i.e., Principles-Meaningfulness) were similar in that they both had one significant path coefficient for the paths that involved those variables, but in both cases this was for the path linking Self-efficacy T1 with that transfer enhancing activity. The general conclusion that can be drawn from the analyses involving the first four transfer enhancing activities is that they were not influential in determining either the trainees' Implementation Intentions or the trainees' Implementation Activities. This result stands in contrast to the conclusion that was made based on the correlational analyses. Even though the four transfer enhancing had significant correlations with Post-training Self-efficacy and Implementation Intentions, the standardised regression coefficients reveal that these paths were nonsignificant. The most likely explanation is that the paths that were drawn linking Self-efficacy T1 with two of the transfer enhancing variables, and Self-efficacy T2 with another one, accounted for the correlations that these variables had with Post-training Self-efficacy and Implementation Intentions.

The analyses of the structural models for the other three transfer enhancing activities revealed a different picture. The structural model containing Self-control Cues T2 (i.e., Self-control Cues) had significant path coefficients for the paths linking it with Self-efficacy T2, and Intentions T2. It also had a significant path coefficient for the path linking Self-efficacy T1 with Self-control Cues T2. The structural model containing Relapse Prevention T2 (i.e., Relapse Prevention) had significant path coefficients for the paths linking it with Learning T2, Self-efficacy T2, Intentions T2, and Implementation Activities T3. However, it also had a significant negative path coefficient for the path linking Learning T2 to Implementation Activities T3. The results for Goal Setting were similar. The structural model containing Goal Setting T2 (i.e., Goal Setting) had significant path coefficients for the paths linking it with Self-efficacy T2, Intentions T2, and Implementation Activities T3. It also had a significant negative path coefficient for the path linking Learning T2 to Implementation Activities T3. The general conclusion drawn from the analyses involving the last three transfer enhancing activities is that they were all influential in determining the trainees' levels of Post-training Self-efficacy and Implementation Intentions. Relapse Prevention and Goal Setting also were found to significantly influence Implementation Activities. The similarity between the results for Relapse Prevention and Goal Setting is not surprising because the extremely high correlation between the two variables ($\underline{r}$ = .82) indicates that they are almost identical.

The results of the last set of analyses demonstrated that, as was expected, the transfer enhancement activities that involved self-management, relapse prevention, and goal setting activities were far stronger determinants of transfer implementation intentions and implementations activities after training than the four other transfer

enhancement activities. These results are consistent with literature on the efficacy of self-management, relapse prevention, and goal setting in enhancing transfer of training. These result lend support to Latham and Seijts's (1999) proposal that proximal goals assist trainees to identify specific activities and opportunities they will use to transfer their training. Murtada and Haccoun (1996) have commented that relapse prevention is even more effective at enhancing the transfer of training than goal setting. However, in this study, the unique contributions of each of the activities was not assessed. It was concluded that the relapse prevention and goal setting strategies were equally effective.

In the two structural models containing Relapse Prevention and Goal Setting, Learning T2 was found to be a negative path coefficient for the path linking it with Implementation Activities T3, although the correlation between Learning and Implementation Activities was nonsignificant ($\underline{r}$ = -.03, NS, respectively). Therefore, it was concluded that Learning and Implementation Activities were not related, and the negative path coefficient was a statistical anomaly such as a suppressor effect.

The eighth hypothesis proposed that transfer Implementation Intentions would be positively related to Implementation Activities. The results confirmed that Implementation Intentions was positively correlated with Implementation Activities. The ninth hypothesis proposed that Implementation Activities would be positively related to Transfer Success, and this was also found to be the case. These results also provided strong support for the modified model of training transfer presented at the start of this study (see Figure 3.2).

Contribution of Study 2

The current study attempted to overcome some of the deficits of the first study, especially in the measurement of different aspects of the transfer climate rather than one overall measure of situational constraints. It also included measures of components of the training course that impact on the transferability of the skills learnt, thereby expanding the number of elements in the model and allowing a better understanding of the transfer process (Holton, 1996). The previous study did not attempt to explain how training-related variables such as overlearning, fidelity, stimulus variability, principles-meaningfulness, self-management activities, and relapse prevention impact on the development of transfer intentions.

The current study also expanded the concept of transfer intentions and transfer implementation activities to include a number of different activities that assist in transferring ones training. This is an area that has not been carefully studied, and further research is needed to clarify what types of post-training activities are most beneficial in promoting transfer success. The dimensionality of the transfer intentions and transfer implementation measures also needs to be clarified.

Study 2 also used the Expectation Maximisation (EM) procedure that imputed the data that was missing from the raw data set, and this data set was then analysed using a structural equation modeling package (Amos 3.6: Arbuckle, 1997). This procedure provided better estimates of the relevant parameters than the traditional techniques such as pairwise or listwise deletion of cases with missing data, mean substitution, or regression-based impution.

Limitations of Study 2

Weaknesses remain in the design of the current study, particularly in the reliance on self-reports of post-training behaviour and transfer success. It is important that multiple measures of training performance and post-training behaviour be collected in order to differentiate between the different learning outcomes possible (Ford, 1997; Kraiger, et al., 1993; Kraiger & Jung, 1997). In particular, measures of adaptive expertise need to be developed, longer periods of time allowed before transfer outcomes are assessed, and multiple levels of analysis included (Ford & Weissbein, 1997).

Kozlowski and Salas (1997) have also commented that the impact of the work environment on transfer of training needs to include a multi-level framework that recognises that transfer of training at the individual level is dependent on organisational factors that operate at a higher level of analysis. Transfer at the team level is dependent on organisational factors that operate at the departmental or organisational level. Therefore, if the transfer environment has only been examined at the individual level, as was done in this study, it is possible that important environmental influences have been ignored.

Finally, the unique impact of the in-training transfer enhancing activities needs to be considered. The approach adopted in this study was to analyse the impact of each transfer enhancing activity separately. This approach had the disadvantage of appearing to compare variables such as Relapse Prevention and Goal Setting that were essentially the measuring the same thing.

Conclusions

The results of the current study supported the findings of the first study. Goal setting during training seems to be an effective means of encouraging trainees to develop specific plans about how they are going to implement what they have learned after they return from their training. Therefore, study 2 has contributed to our understanding of the process of transfer of end-user computer skills training to the workplace.

CHAPTER FOUR: CONCLUSIONS

This chapter will present an overview of the main research questions that were addressed in each of the studies. In addition, a number of the theoretical models of training transfer will be presented and the results of the studies will be discussed in relation to these theoretical models. Following this discussion, the major limitations of the studies will be mentioned, and areas for future study will be described.

Summary of the Research Questions

The two studies that are reported in this dissertation addressed three main research questions that were examined in the literature review in chapter one. The first main research question concerned the process by which trainees' motivation and self-efficacy influenced the training and transfer outcomes. Study 1 examined the influence that post-training self-efficacy and motivation to transfer one's training had on trainees' self-set goals for transfer of training, and their commitment to those goals. Study 2 examined the impact of trainees' post-training levels of motivation and self-efficacy on trainees' implementation intentions and implementation activities.

The second main research question concerned the process by which transfer climate factors influenced the training and transfer outcomes. The first study examined the impact of situational constraints on the trainees' self-set goals for transfer and commitment to those goals as well as on transfer success. The second study examined the impact of organisational climate for transfer on trainees' pre-training self-efficacy and motivation, as well as the mediating influence of trainees' affective states.

The third question concerned the impact of various transfer enhancing activities occurring during training on the training and transfer outcomes. While the first study was focused on the impact of goal setting, the second study included measures of goal setting, relapse prevention, and self-control techniques, as well as overlearning, fidelity, stimulus variability, and use of general principles. These research questions were based on several models of transfer of training that were reviewed in the literature. These models will be reviewed before the results of the studies are summarised.

Models of Factors Influencing the Transfer of Training

The first study used a model of training transfer that was influenced by Baldwin and Ford (1988). Baldwin and Ford proposed that training transfer depended on different types of training-input factors, such as the design of training, the characteristics of the trainee, and work-environment characteristics. All three training input factors were viewed as directly affecting the training outputs of learning and retention, which in turn influenced training transfer. The model also proposed a direct effect of trainee characteristics and work-environment characteristics on training transfer.

Cannon-Bowers et al. (1995) later suggested that individual characteristics such as trainee expectations, desires, and motivation were important determinants of the training outcomes and transfer of training. Organisational and situational variables were proposed as having both direct effects on the transfer of training and indirect effects through their influence on the trainees' expectations and motivation. Finally, Wofford et al.(1992) found that the influence of personal and situational factors on goal achievement and performance was mediated through personal goal level and goal commitment. These personal and situational factors were the same variables that were proposed as

determinants of transfer of training (Baldwin & Ford, 1998). Therefore, it was expected that these factors would combine to influence the achievement of transfer goals.

The second study was based on a model developed by Thayer and Teachout (1995) that focused on two aspects of the training process that might impact on transfer: the climate for transfer of training, and the transfer-enhancing activities that occur during the training program. Two types of transfer climate constructs were proposed: Antecedents, such as goal cues, social cues, and task cues, and Consequences, such as positive and negative reinforcement, punishment, and extinction. The in-training, transfer-enhancing activities included: overlearning, fidelity, varied practice, principles-meaningfulness-learning points, cues to monitor one's own performance, relapse prevention training, and goal setting.

Thayer and Teachout (1995) recognised that there were a number of other variables that also impacted on the effectiveness and outcomes of a training program. These included individually-oriented variables such as: trainee ability, trainee self-efficacy, previous knowledge and skill, reactions to training, and the level of understanding. Other variables that might impact on the learning process included: locus of control, job involvement, and career attitudes. The proposed relationships between the climate for transfer, the in-training, transfer-enhancing activities, the other influences on learning and the key outcomes of learning, transfer and results were presented in Figure 1.1. A modified model of the determinants of training transfer was developed and presented in Figure 3.2.

Mathieu and Martineau (1997) suggested there were two separate mechanisms through which the work environment might impact on transfer of training. The first

mechanism they proposed operated through the level of support that trainees experienced after they completed their training, and the number of opportunities that trainees receive to implement their training. This second mechanism offered a better explanation of how the process of transfer occurred. Mathieu and Martineau proposed that the work environment might influence the trainees' pre-training levels of motivation and self-efficacy, which in turn would influence training and transfer outcomes. This model was the basis for modifying the Thayer and Teachout (1995) model of the determinants of training transfer to show the climate for transfer variables as influences of the trainees' pre-training self-efficacy, and the trainees' levels of positive and negative affect.

Results of Study 1

Study 1 developed and tested two *a priori* structural models, the first of which included variables measured prior to the training program (T1) and variables measured at the end of the training program (T2). The second model included variables measured at the end of the training program (T2) and variables measured one week after the training had finished (T3).

One hypothesis relating to the first structural model proposed that self-efficacy and motivation to learn would positively influence the level of self-set training goals and achievement of training performance goals. Only the paths linking Self-efficacy T1 with Training Performance Goal T1 and Training Goal Achievement T2 were significant. Another hypothesis proposed that Training Goal Achievement T2 would positively influence Self-efficacy T2, Motivation to Transfer T2, Training Reactions T2, Training Transfer Goal T2, and Transfer Goal Commitment T2. However, only the path linking Training Goal Achievement T2 with Self-efficacy T2 was significant. It was also

hypothesised that self-efficacy and motivation to transfer would be determinants of reactions to training, personal goals for transfer, and transfer goal commitment. It was discovered that these relationships were as predicted, although the path from Self-efficacy T2 to Training Transfer Goal T2 was not significant. Also, the paths from Training Reactions T2 to both Training Transfer Goal T2 and Transfer Goal Commitment T2 were non-significant.

There were also a number of hypotheses relating to the second structural model. One hypothesis predicted that the paths linking Situational Constraints T2 with Training Transfer Goal T2 and Transfer Goal Commitment T2 would have negative path coefficients. However, contrary to what was predicted, the path from Situational Constraints T2 to Training Transfer Goal T2 was non-significant. As expected, the path from Situational Constraints T2 to Situational Constraints T3 had a positive path coefficient. Also as was predicted, both paths from Training Transfer Goal T2 and Transfer Goal Commitment T2 to Transfer Goal Achievement T3 were found to have positive path coefficients. A complementary hypothesis predicted that the paths from Self-efficacy T2, Motivation to Transfer T2, and Training Reactions T2 to Transfer Goal Achievement T3 would all have non-significant path coefficients. This was confirmed and was regarded as support for the model that depicted the influence of Self-efficacy T2 and Motivation to Transfer T2 on Transfer Goal Achievement T3 as being mediated by Training Transfer Goal T2 and Transfer Goal Commitment T2. The path from Situational Constraints T3 to Transfer Goal Achievement T3 did not have a negative path coefficient as was predicted. This indicated that a better measure of the work-related variables that

might impact on the transfer of training was required. The path from Transfer Goal Achievement T3 to Self-efficacy T3 was not significant.

A more general conclusion from study 1 was that individuals who had lower post-training self-efficacy or lower motivation to transfer were more likely to set lower goals for transfer of their training and have lower commitment to those goals, thereby resulting in less success at achieving their goals for transferring their skills learnt during training. This result was consistent with the model showing the influence of personal and situational factors on performance as being mediated through personal goal level and goal commitment (Wofford et al., 1992).

These results strongly supported the importance of transfer intentions in the transfer process. The use of single items to reflect trainees' transfer goals and commitment to those goals was questioned, and it was argued that a better representation of trainees' goal implementation intentions was required. Gollwitzer (1993) argued that the achievement of specific goals may at times be impeded, especially during the initiation or successful execution of goal-directed behaviours and, at this point, implementation intentions become crucial. Therefore, one of the aims of study 2 was to develop a more elaborate assessment of trainees' implementation intentions at the end of training.

Results from Study 2

Study 2 also tested an *a priori* structural model (see Figure 3.2), although this model was modified from Thayer and Teachout's (1995) model of the determinants of training transfer. The modified model focused on the determinants of implementation

intentions and actual implementation activities, and included variables measured prior to the training program (T1), variables measured at the end of the training program (T2), and variables measured four weeks after the training had finished (T3).

In Thayer and Teachout's (1995) model, the climate for transfer variables and the in-training transfer enhancing activities were depicted as impacting on transfer outcomes (for both the former and latter variables) and the trainees level of learning during training (only for the latter variables). Given that study 2 was designed to test the influence of climate for transfer on pre-training levels of self-efficacy and motivation, the Climate for Transfer Questionnaire (CTQ) was administered prior to training commencing. The Transfer Enhancing Activities Questionnaire (TEAQ) was administered at the end of training, along with measures of the trainees' transfer implementations.

Once again, a number of separate models were developed in order to tests the various hypotheses. The first model assessed the factorial structure of the climate for transfer variables. The initial measurement model specified Goal Cues, Social Cues, and Task Cues as indicators of one construct, while Positive Reinforcement, Negative Reinforcement and Punishment, and Extinction were specified as indicators of the second construct. The final model that was obtained consisted of two constructs labeled Positive Work Climate T1 and Negative Work Climate T1. These were highly correlated, but displayed different patterns of relationships with Positive and Negative Affectivity and Pre-training Self-efficacy and Motivation.

The second model that was developed examined whether Positive Work Climate T1 (with Goal Cues, Social Cues, Task Cues, and Positive Reinforcement specified as indicators) and Negative Work Climate T1 (with Negative Reinforcement and

Punishment and Extinction specified as indicators) were able to directly influence Self-efficacy T1 and Motivation T1. Positive Affectivity and Negativity Affectivity were included in this model as possible mediators of the relationships between the climate for transfer variables and self-efficacy and motivation described above. Positive Work Climate T1 was found to directly influence Self-efficacy T1, but not the pre-training levels of Motivation T1. Negative Work Climate T1 also influenced Self-efficacy T1, although the path coefficient was negative. Positive Work Climate T1 and Negative Work Climate T1 were found to indirectly influence the pre-training levels of self-efficacy and motivation by influencing the levels of morale (positive affect) and distress (negative affect) that the trainees experience. Therefore, this study found that both positive and negative affective states are related to pre-training levels of self-efficacy and motivation.

The third model that was developed included Pre-training Self-efficacy, Post-training Self-efficacy, Learning, Implementation Intentions, and Implementation Activities, and was based on the modified model of training transfer displayed in Figure 3.2. After a number of non-significant paths were deleted, a revised structural model of the determinants of Implementation Activities showed that Self-efficacy T1 was a strong determinant of Self-efficacy T2, which in turn influenced Implementation Intentions T2. Implementation Intentions T2 was a strong determinant of Implementation Activities T3. Self-efficacy T1 was also a strong determinant of Learning T2.

Seven, separate but related structural models were then developed and tested. Each of these models contained the previous model of the determinants of Implementation Activities T3, as well as one of the seven transfer enhancing activities

contained in the TEAQ (Thayer & Teachout, 1995). The conclusion that was drawn from the analyses involving the first four transfer enhancing activities (i.e., Overlearning, Fidelity, Stimulus Variability, and Principles-Meaningfulness) is that they were not influential in determining either the trainees' Implementation Intentions or the trainees' Implementation Activities. The conclusion that was drawn from the analyses involving the last three transfer enhancing activities was that they were all influential in determining the trainees' levels of Post-training Self-efficacy and Implementation Intentions. Relapse Prevention and Goal Setting were also found to significantly influence Implementation Activities, although the correlation between these Relapse Prevention and Goal Setting ($\underline{r}$ = .82) indicated that they were essentially identical.

It was concluded that self-efficacy levels prior to training were an extremely important determinant of the self-efficacy levels at the end of training, which strongly influenced the level of transfer intentions. One of the earlier models demonstrated that a more positive climate for transfer influenced self-efficacy and motivation prior to the commencement of training. The result of higher levels of pre -training self-efficacy is that trainees learn more from their training, and also have higher post-training levels of self-efficacy, which in turn are beneficial in promoting stronger transfer intentions. These results provided strong support for the modified model of training transfer described above (see Figure 3.2) and the theoretical models that proposed that transfer climate affects training and transfer outcomes through its effect on trainees' motivation and self-efficacy (Mathieu & Martineau, 1997; Quiñones, 1997). The results also supported the importance of several transfer enhancing activities (e.g., Relapse Prevention and Goal Setting) in influencing implementation intentions and activities (Haccoun & Saks, 1998).

Limitations of Studies 1 and 2

There are several limitations that apply to these studies. First of all, both studies relied on self-reports of attitudes and behaviour. This meant that there was an unknown amount of common method variance in the measures of association between the variables. Secondly, the studies used relatively small sample sizes for the type of analyses that were reported, especially for structural equation modeling. This may have resulted in non-significant path coefficients in cases where the magnitude of the coefficient was large enough to signify that a substantial amount of variance was being explained. The third limitation concerned the use of a self-report transfer implementations activities scales without attempting to independently verify the trainees' use of those activities. The self-report measures may not be reflecting the trainees actual use of those activities. Another issue concerned the relatively short periods of time that were allowed before the trainees rated their transfer outcomes. Where transfer outcomes are measured soon after training is completed, the researcher may fail to differentiate those factors which promote longer-term transfer (Hesketh, 1997a, 1997b). Ford and Weissbein (1997) recommended that researchers in this area should develop new measures of adaptive expertise, that transfer outcomes should be measured after longer periods of time had elapsed, and that studies include multiple levels of analysis.

Missing data was a major concern in the second study, as the proportion of trainees who had provided complete data across the three times was quite low (28%). The traditional techniques that have been used to deal with missing data such as pairwise or listwise deletion of those cases where data is missing have been shown to cause either biased parameter estimates, a decrease in the level of statistical power, or do both (Roth,

1994). Therefore, the second study used the Expectation Maximisation (EM) algorithm which is based on the full-information maximum likelihood approach (FIML) to generate a covariance matrix based on 104 trainees, and this data set was subsequently input into Amos (Arbuckle, 1997) for further analysis.

Another deficit of the first study that the second study attempted to overcome was in the measurement of different aspects of the transfer climate. Rather than one overall measure of situational constraints, construct-based scales were used and the factorial structure of these was assessed. A number of components of the training course were also included, thereby expanding the number of elements in the model and allowing a better understanding of the transfer process. The model of training transfer developed by Thayer and Teachout (1995) was used as the basis for the second study and the two instruments that they developed to assess climate for transfer and the various in-training transfer enhancing activities were crucial in allowing predictions from their model to be tested. The second study also measured individual's levels of positive and negative affect in order to determine whether they were related to trainees' perceptions of workplace constraints.

Areas Requiring Further Research

One theme that has clearly emerged from the training research is the need to design training that provides trainees with the opportunity to develop the requisite processes that underlie the transfer of that training to the workplace. These processes include: the formation of detailed and well-developed knowledge structures (Ford, 1997; Smith et al., 1997); the ability to monitor and control one's own learning and behaviour

(Ford, 1997; Smith et al., 1997); the formation of specific goals or plans for the implementation of newly acquired knowledge and/or skill (Gollwitzer, 1999; Haccoun & Saks, 1998); a high level of self-efficacy for dealing with post-training barriers or constraints to the transfer of one's training (Latham & Seijts, 1997, 1999; Saks, 1997); and an understanding of how training outcomes at the individual level contribute to team or unit performance and the achievement of organisational goals (Kozlowski & Salas, 1997).

The current studies have also included an examination of the role of the broader organisational climate factors and positive and negative affective states in determining the trainees' levels of pre-training self-efficacy and motivation. Positive and negative affectivity (PA and NA respectively) have been portrayed as largely independent mood states, although Russell and Carroll (1999) suggested that this conclusion may be an artefact of measurement error, the timeframe over which affect is measured, the multi-dimensional nature of affect, and the choice of item response format. The current studies were not designed to resolve this issue, but it was established that PA had a stronger relationship to positive aspects of the work climate, while NA was more strongly related to the other two climate for transfer scales assessing negative aspects of the work climate. This result indicates that the two constructs (PA and NA), whatever their nature, are measuring different processes, and that these processes are related in different ways to positive and negative aspects of the organisational climate.

The conclusion that the positive and negative aspects of the organisational climate are related in different ways to the trainees' affective states was made on the basis of cross-sectional data. Therefore, the direction of the relationship between aspects of the

work climate and trainees' affective states may be in the opposite direction, or there may be a non-recursive (reciprocal) relationship between them. This issue should be addressed in further research studies. Spector et al. (in press) concluded that affective states (especially NA) may have an important substantive role to play in explaining the impact of organisational stressors on individual and organisational outcomes. It now appears that both PA and NA play an important role in mediating the impact of aspects of the work climate that related to transfer of training on trainees' pre-training self-efficacy and motivation.

Haccoun and Saks (1998) recommended that training interventions should be accompanied by interventions at the organisational level such as encouraging supervisors to support the use of training. Also, they recommend that training only be provided for those areas that are supported by organisational changes. While these suggestions are useful, it is obvious that training will continue to be provided in many cases where there is little or no support for the transfer of that training. Therefore, research is required that focuses on further developing the range of transfer enhancement procedures and specifying the conditions under which they are most beneficial for trainees.

Various researchers (e.g., Ericsson & Charness, 1994) have suggested that high levels of expertise are only developed over a long period of time, and yet organisations usually require trainees to demonstrate evidence of adaptive expertise after training. Ford (1997) recommended that researchers develop comprehensive taxonomies of the specific behaviours which reflect increases in adaptive expertise, as well as the range of different situations in which trainees are expected to demonstrate their newly acquired knowledge and/or skills. Ford suggested several possible indicators of adaptive expertise such as

evidence of new adaptive behaviour appearing after training, evidence of behaviour indicating proficiency occurring more frequently, improvements in the time taken to complete work tasks, or a reduction in errors made during completion of a task. The trainees use of implementation activities could be one kind of evidence that trainees were beginning to develop adaptive expertise. Other measures that might be collected include trainees' reports of the results of their attempts to implement their training, the range of situations in which they have attempted to implement their training, and the difficulties or barriers they faced in implementing their training. Further research is needed to clarify whether the actual implementation activities that trainees engage in after training are a useful, initial indication of whether trainees are developing a level of adaptive expertise.

When trainees are implementing their training in a team environment, particular attention must be paid to the mechanisms by which individual knowledge and/or skills are transformed into team performance. The term "vertical transfer" has been coined to describe the process whereby individual performance outcomes combine to determine higher level outcomes such as team/unit outcomes, or organisational performance (Brown, Weissbein & Kozlowski, 1998). Where individual performance is combined additively across individuals such as in a typing pool, the process is known as composition (Rousseau, 1985). In this situation, any one individual has a small impact on the group's overall performance. However, when the performance of the team depends on a minimum contribution from one or more members such with an aircraft crew, the process is know as compliation. In this situation, each individual's transfer of their training is critical for team performance. Cannon-Bowers and Salas (1998) described how transfer of training to team settings may require a better understanding in several areas.

They suggested that further research was required to identify and establish techniques for analysing team tasks. Another area requiring research involved further exploration of the issues associated with team cognition. A final area involved developing a better understanding of ways to foster a continuous learning environment in teams.

There are also several difficulties that face researchers who are working on understanding the process of transfer of training in the working. Further discussion will focus on gaining access to subject cohorts in organisational settings, collecting appropriate outcome measures reflecting changes in knowledge, skills, and/or attitudes, and assessing the impact of training on organisational outcomes.

Organisations are gradually starting to appreciate the contribution that industrial and organisational psychologists can make towards understanding what makes training effective, for whom training is most effective, and the conditions under which training is most effective (see Tannenbaum & Yulk, 1992). This promising development may assist researchers to overcome the difficulties they have faced in convincing organisations to grant access to their employees, particularly over extended periods of time. The dynamic processes underlying the transfer of training to the workplace requires that researchers undertake well-designed longitudinal investigations. One recent study (Venkatesh & Speier, 1999) reported on the short- and long-term effects of mood manipulations on training and transfer outcomes for workers undertaking computer skills training. Venkatesh and Speier were able to able to assess trainees prior to training commencing, at the completion of training, and then after 6 and 12 weeks of continual skill use. Their study highlighted the value in including a number of follow up measures so that transfer

of training could be assessed over longer time periods. Organisations benefit greatly from using work practices that are demonstrably effective.

A second difficulty in conducting research on transfer of training in organisational settings concerns the type of outcome measures that are used. A number of authors (e.g., Kraiger, et al., 1993; Kraiger & Jung, 1997) have recommended that a range of outcome measures be collected, including measures of knowledge acquisition, knowledge structures, mental models, skills compilation, automaticity, goal orientation, self-efficacy, and motivation. These are generally outcomes that are not observable, and hence researchers have used various techniques such as self-reports, tests of factual knowledge, and reports of observable behaviours. While there have been promising developments in techniques that allow cognitive structures, procedural skills, and affective states to be measured in laboratory settings, these are rarely used in organisational settings. However, the growing reliance on computer-based work systems may allow researchers to begin to collect some of these other kinds of outcome measures. For example, Venkatesh and Speier (1999) reported the actual usage behaviour of employees in an accounting firm obtained from system files that logged each user's queries to the computer system. While a greater number of queries may indicate better use of the system, it might also be able indicate the user's understanding of the training process if the queries are poorly formed. The use of computer-generated outcome measures will immensely benefit training research, especially in workplaces that rely on computerised work systems.

The last difficulty that will be discussed involves assessing the impact of training on organisational outcomes. Haccoun and Saks (1998) concluded that there is limited value in the current application of Utility theory and Human Capital Theory to assessing

organisational outcomes of training. Where training has focused on specific skills that have observable outcomes, the linkages to the organisational outcomes are less difficult to establish. However, many types of training aim to enhance skills such as teamwork, leadership or self-management, and these are not as easily linked to organisational performance measures, as the links may be indirect or the effects delayed for long periods. Therefore, researchers face a considerable challenge in specifying the relationship between training outcomes and organisation results.

Haccoun and Saks (1998) surveyed the current state of training research at the end of the 20th century and noted that all of the literature they reviewed had been published in the last 10 years, and most of it in the last five. They concluded that factors such as the initial motivational state of the trainee, the transfer enhancing activities occurring during training, and the ability of the organisation to support the transfer of training were crucial in determining the success of any training program. These factors were the focus of the two studies that were reported in this dissertation which has contributed, in a small way, to understanding the process of transfer of training in the workplace.

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APPENDIX A

Queensland Police Service

POLARIS Pre-Training Questionnaire

This questionnaire is designed to gather information about how the skills you learn during training are transferred back to your job. It should be completed prior to the start of your training programme. Work quickly through each section in the correct order. Do not spend too much time considering each separate question. Try to answer as honestly as you can.

There are several sections to this questionnaire, covering:

- Your learning outcomes from your previous training,
- Your computer experience,
- Your goals for your training,
- Your normal emotional level and
- Your perceptions of the transfer climate in your district.

Your questionnaire must be posted back prior to attending the course or taken with you to the course.

When the results of this questionnaire are analysed, only the results of all trainees as a group will be reported. No individual's results will be identified in the analysis or reported. All information will be kept in the strictest confidence and not used for any other purpose, apart from the evaluation of this training programme. Please complete your personal details and sign in the space below to acknowledge that you are aware of these procedures for safeguarding your results and are willing for the information to be used as outlined.

Name (please print)
Rank
Phone number
Location
Current duties (generally speaking)
What skills do you expect to gain from this course?
How do these skills relate to your present duties?
List any “formal” training qualifications e.g. “Train the trainer”
List any courses that you have attended on “training”
Describe any training courses you have conducted in QPS
How did you become a POLARIS “Level 3” trainer?
Signature
Today's Date

Part 1 - Your learning outcomes from previous training

The following statements are designed to assess your learning outcomes from your last training course. Use the scale below as a guide:

Please complete the box with a number from the scale below, that best describes your response.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree

I was able to master the content of the training course	
I was able to develop a good understanding of the material	
I performed satisfactorily on the training course	
I was successful at solving problems I encountered during the training course	
I was able to meet the objectives of the course	
My performance during training reflected my abilities in this area	
I coped with the demands of the course	
The training course was suited to my level of experience in the area	
The content of the training course was relevant to the skills required to perform satisfactorily in my job	
I was satisfied with the level of skill I developed during training	
The training course was enjoyable	
The training course was interesting	
The training course assisted me in improving my overall job performance	
The training course exceeded my expectations	

Please go onto the next section ⇒

Part 2 - Your Computer Experience

The following statements are designed to assess your experience using computers. Use the following scale as a guideline:

Please complete the box with a number from the scale below, that best describes your response.						
1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree

I feel confident working on a computer	
I feel confident using the user's guide when help is needed	
I feel confident that I understand terms and words relating to computer hardware	
I feel confident that I understand terms and words relating to computer software	
I feel confident learning to use a variety of programs (software)	
I feel confident learning advanced skills within a specific program (software)	
I feel confident using the computer to analyse number data	
I feel confident writing simple programs for the computer	
I feel confident describing the function of computer hardware (keyboard, monitor, disk drives, CPU)	
I feel confident that I understand the three stages of data processing: input, processing, output	
I feel confident getting help for problems in the computer system	
I feel confident explaining why a program (software) will or will not run on a given computer	
I feel confident using the computer to organise information	
I feel confident troubleshooting computer problems	
I have a great deal of experience working with computers	
I have used a computer often in the last 12 months	
I regularly use the QPS system	
I have completed the POLARIS awareness training	
I have trained others to use computers before	

Please go onto the next section ⇒

Part 3 - Your goals for your training

These questions are designed to assess your goals for your training and for using the skills learned during training. Use the following scale as a guide:

Please complete the box with a number from the scale below, that best describes your response.

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree

I am confident that I can master the content of the training course	
I am confident that I can perform satisfactorily on the training course	
I am confident that I can effectively utilise the skills which I learn during training	
I am confident that I will be successful at solving problems I encounter during the training course	
I am confident that I will benefit from this training course	
I am confident that I will learn as much as I can from this training course	
I am confident that I will meet the objectives of the course	
I am confident that I will cope with the demands of the course	
I am confident that I will understand what I am supposed to do when I return to my job	
I am confident that I will receive recognition for performing well during training	
I am confident that I will benefit from the skills which I learn during training	
I am confident that the training course will help me to perform my job satisfactorily	
I am committed to learning all of the required skills during training	
It is important for me to perform satisfactorily during training	
It will be satisfying for me to do well during training	
I will exert a great deal of effort in order to learn the required skills during training	
I aim to maintain and improve the skills which I learn during training	
I aim to utilise all of the skills which I learn during training	
I aim to master all of the required skills during training	
I aim to develop expertise in using the skills which I learn during training	
I feel that more computer skills training will assist me in my job	

Please go onto the next section ⇒

Part 4 - Job Affect Scale

The following statements describe different feelings and emotions you may feel. Please indicate to what extent on average, YOU have felt this way over the past SIX weeks using the scale below as a guide:

Please complete the box with a number from the scale below, that best describes your response.						
1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree

I have felt interested	
I have felt distressed	
I have felt excited	
I have felt upset	
I have felt strong	
I have felt guilty	
I have felt scared	
I have felt hostile	
I have felt enthusiastic	
I have felt proud	
I have felt irritable	
I have felt alert	
I have felt ashamed	
I have felt inspired	
I have felt nervous	
I have felt determined	
I have felt attentive	
I have felt jittery	
I have felt active	
I have felt afraid	

Please go onto the next section ⇒

Part 5 - Transfer Climate Questionnaire

Each statement below describes an aspect of the work environment which may determine how effectively you are able to use the skills learned during formal training received off the job in your organisation. Please indicate whether you agree or disagree with each statement using the scale below as a guide:

Please complete the box with a number from the scale below, that best describes your response.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree

Supervisors give employees the chance to try out their training on the job immediately	
Supervisors at this location oppose the use of techniques learned in training that staff bring back to their jobs	
Employees have so little chance to use some of the skills learned in training, that they probably couldn't perform them later	
Supervisors pay only lip service to the value and usefulness of training	
Supervisors appreciate employees who do their jobs as taught in training	
Supervisors give poor performance reports to those who do the job the way it is taught in training instead of his/her way	
Work at this location is designed so that employees can do the work the way they were trained	
Supervisors help employees set realistic goals for performing their work as a result of their training	
When employees fail to use their training, they can expect to be reprimanded	
Supervisors commend employees publicly when they return from training	
Employees could do a better job if someone would tell them what's going on	
There is never enough time to do the job the way we are taught in training	
Job aids are available on the job to support what employees learned in training	
Tools/equipment needed to do the job the way we were taught in training are usually available	
Employees can count on getting answers from supervisors to questions about the use of training on the job	
Supervisors don't tell employees whether they're doing their job correctly or incorrectly	
Supervisors couldn't care less whether employees use their training	
Supervisors expect employees to use their training on the job	
Supervisors meet regularly with employees to work on problems they may have in trying to use their training	
Employees' jobs are more interesting because of their training	
When employees arrive from training, supervisors encourage them to share what they've learned with other employees	
Supervisors know how employees are taught to do the job in training	
In this district, following the procedures and policies taught in training results in employees being told they are not performing correctly	

Fellow employees appreciate employees who do their jobs as they were taught in training	
When employees use their training, jobs are easier	
The materials needed by employees to use what they learned in training are readily available	
Supervisors don't care if employees use their training, as long as they get the job done	
Supervisors meet with employees to set goals following training	
Supervisors at this location do not notice employees who use their training	
When employees arrive from training, there is usually a pile of work to catch up on before they can try to use what they learned in training	
Employees at this location help each other resolve difficult problems relating to the use of training on the job	
The equipment here is the same as we are trained on in training	
Employees could do their jobs better if there weren't so many interruptions	
The employees at this location do the job the way they are taught in training	
More experienced employees ridicule the use of methods taught in training	
Doing the job the way they are trained helps employees in their careers with this organisation	
The equipment at this location allows employees to use the skills gained in training	
Senior staff are made aware of employees who do not use techniques taught in training	
Supervisors at this location refuse to accept statements or actions from employees that are different from those learned in training	
Supervisors set goals for new employees that encourage them to use their training	
Supervisors pay no attention to how employees do their jobs	
Employees at this location expect new employees to do the job the way they it was done in training	
Employees who use their training are given preference for promotion at this location	
Supervisors at this location don't seem to care whether employees use their training	
Employees are not aware of the contribution of training to their advancement at this location	
When supervisors tell employees how to do something, they do it the same way it was done in training	
Other employees at this location have the technical knowledge to help new employees use what they learned in training	
Supervisors set performance goals for new employees consistent with their training	
Supplies needed to do the job the way we were taught in training are usually available	
Employees won't get promoted unless they do the job the training way	
Supervisors treat employees better when they use their training	
When new employees use the techniques taught in training, experienced employees at this location think they are being ineffective	
Supervisors use the same terminology as used in training	
Supervisors praise employees when they use their training	
Supervisors at this location let new employees know that they are doing a good job when they use what they were taught in training	
If employees do the job their own way rather than the training way, other employees get angry with them	

APPENDIX B

Queensland Police Service

POLARIS Post-Training Questionnaire

This questionnaire is designed to gather information about how the skills you learn during training are transferred back to your job. It should be completed at the end of your training programme. Work quickly through each section in the correct order. Do not spend too much time considering each separate question. Try to answer as honestly as you can.

There are several sections to this questionnaire, covering:

- Your reactions to the training,
- Your intentions for utilising your training,
- Effectiveness of the training, and
- Your evaluation of how much you have learned.

Your questionnaire must be completed before you leave the course.

When the results of this questionnaire are analysed, only the results of all trainees as a group will be reported. No individual's results will be identified in the analysis or reported. All information will be kept in the strictest confidence and not used for any other purpose, apart from the evaluation of this training programme.

Name (please print)

Are there any comments

you wish to make about

the training?

Signature

Today's Date

Part 1 - Your reactions to the training

The following questions are designed to assess your reactions to the training you have received. For each question, choose a number from 1 to 7 using the scale below as a guide:

Please complete the box with a number from the scale below, that best describes your response.						
1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree

I was able to master the content of the training course	
I can effectively use the skills which I have learned during training	
I performed satisfactorily on the training course	
I was successful at solving problems I encountered during the training course	
I was able to meet the objectives of the training course	
I learned as much as I could from this training course	
I was able to cope with the demands of the training course	
I have benefited from this training course	
I understand what I am supposed to do when I return to my job	
I will receive recognition for using the skills which I have learned during training	
I will benefit from using the skills which I have learned during training	
The training course will help me to perform my job satisfactorily	
I am committed to utilising the skills which I have learned during training	
It will be satisfying for me to utilise the skills which I have learned during training	
It is important for me to utilise the skills which I have learned during training	
The skills I have learned during training will assist me to improve my job performance	
I will exert a great deal of effort so that I do not forget the skills which I have learned during training	
I aim to maintain and improve the skills which I have learned during training	
I have mastered all of the required skills during training	
I aim to utilise all of the skills which I have learned during training	
I aim to develop greater expertise in using the skills which I have learned during training	

Please go onto the next section ⇒

Part 2 - Your intentions for using your training

These questions are designed to assess your intentions for using the skills you have learned during training. The questions are in two parts. After you have decided your rating for the first part of each question, you are also asked to rate your level of commitment for that item. For the first part of each question, choose a number from 1 to 7 using the following scale as a guide:

Please complete the first box with a number from the scale below, that best describes your response.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree

For the second part, rate your level of commitment from 1 to 100, where:
1 = none, 50 = moderate and 100 = complete commitment.

	Part A (1-7)	**Part B (1-100)**
I will discuss with my supervisor ways to develop the skills which I have learned		
I will discuss with my co-workers ways to develop the skills which I have learned		
I will spend time thinking about how to use the skills which I have learned		
I will evaluate how successfully I can use the skills which I have learned		
I will look for opportunities to use the skills which I have learned		
I will review course materials in order to develop the skills which I have learned		
I will practice using the skills which I have learned		
I will set specific goals for maintaining the skills which I have learned		
I will seek expert help/advice in order to maintain the skills which I have learned		
I will examine my work environment for potential barriers to using the skills which I have learned		
I will monitor my success at using the skills which I have learned		

Please go onto the next section ⇒

Part 3 - Training Effectiveness Questionnaire

Each statement below describes an aspect of the training you have received which may determine how effective that training is for you. For each question, choose a number from 1 to 7 using the following scale as a guide:

Please complete the box with a number from the scale below, that best describes your response.						
1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree

During training, we had to go over everything again and again	
The problems we learned to solve during training are similar to those on the job	
During training, we had the chance to work on a variety of problems that required the same knowledge and skill	
During training, the instructors had us study so hard that we practically had all the material memorised	
During training, the instructors talked about the importance of setting goals for using our training on the job	
During training, we talked about how to develop good work habits, so we would remember what we were taught	
During training, the instructors explained why things worked the way they did	
During training, the instructors warned us about the need to remain calm and do our jobs as trained when a crisis occurred on the job or out in the field	
During training, the instructors taught us how to check our own work to make sure we were doing things right	
During training, we talked about a situation that might prevent us using our new skills and ways to deal with it	
Job aids are available on the job to support what we learned in training	
During training, the instructors kept making us use our new skills on different problems	
During training, we weren't taught how to identify mistakes as we made them	
To help us to remember things, we were given some memory aids, such as check lists, colour-coded diagrams, etc	
During training, there was never enough time to really learn a skill	
During training, if you didn't get it the first time, there was no time allowed to learn it later	
The training we received really made it clear why it was necessary to do things a certain way	
The procedures taught in training are the same ones we use on the job	
During training, we practiced using the skills to us taught over and over	
During training, we made plans for applying our new skills on the job	
The instructors urged us during training to share the goals for using our skills with our supervisors	
During training, the instructors clearly explained why it was necessary to do things a certain way	
The training we received really made things clear as to why things worked the way they did	
During training, we worked out plans to resolve problems that might prevent us from later using our training	
During training, we were taught how to gradually use the new techniques and ideas on the job	
During training, the instructors made us sit down and make plans for using our training on the job	

During training, we were made to practice the skills taught until we could do them without thinking	
During training, the instructors taught us rules that applied to lots of different problems	
During training, we couldn't tell whether or not we made mistakes	
During training, the instructors warned us about the need to practice if we're to keep our skills at a high level	
During training, we discussed problems we might encounter on the job when we first use our training	
The tools and materials used on the job differ from those used in training	
During training, there was always an opportunity to practice whatever we learned	
During training, we talked to each other about the goals we set for using our training on the job	
During training, the instructors went so fast that we never has a chance to try things out	
During training, the instructors taught us things to look for to make sure we were doing the job correctly	
During training, the instructors taught us check-points so that we could be sure we are doing the job correctly	
The equipment we used during training is the same as what we use on the job	
During training, we were taught how to recognise our mistakes as we made them	
During training, we went over things again and again, so we won't forget them later on the job	
During training, the instructors never told us why, just what to do	
During training, we discussed how other employee's attitudes toward training might affect our job performance	
Equipment is usually available to do the job the way we were taught in training	
During training, the instructors always told us whether we were doing the job correctly	
During training, we talked about what to do if others tell us to do the job a different way	
During training, we practiced the skills taught until we could do them without a mistake	
The procedures followed on the job are very different from what we were taught in training	
During training, we never had the chance to try our new skills on a number of different problems	
During training, we were taught to work with crisis situations on the job	
During training we discussed how our supervisors' attitudes toward our training might affect our job performance	
During training, we were prepared for the reaction of other employees to the use of our training on the job	
During training, the instructors gave us a lot of different problems to work on	
During training, we set goals for using our new skills on the job	
During training, we were allowed to practice handling real and relevant problems	
During training, we were told about problems we might have on the job in using what we learned	
The environment that we were trained in was very similar to the location we work in	
During training, we never had the chance to try more challenging tasks that required advanced knowledge and skill	
Our jobs are designed so that we can do the job the way we have been trained	
During training, we learned how to handle any mistakes we might make later on the job	
During training, it was impossible to tell when we made mistakes	
During training, the instructors discussed the possibility of no supervisory support for using our training on the job	

During training, we had the chance to try our new skills on a variety of problems

The instructors warned us that if we didn't set some specific goals for using our new skills that they would get rusty

The equipment on the job doesn't operate the way it did in training

During training, we practiced techniques and methods that are different from those used on the job here

During training, the instructors gave us lists of steps to follow so we won't forget anything

Please go onto the next section ⇒

Part 4 - Your evaluation of what you have learned

Please rate your level of understanding for each of the following questions as it was at the beginning and at the end of your training using the following scale:

Please complete the box with a number from the scale below, that best describes your response.						
1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree

I understand the QPS computer systems better at the end of training than I did at the beginning of training	
I understand the POLARIS system better at the end of training than I did at the beginning of training	
I understand the reasons for changing the warrant system and the legislation better at the end of training than I did at the beginning of training	
I understand the reasons for not having a GUI (Graphical User Interface) better at the end of training than I did at the beginning of training	
I understand how to use POLARIS better at the end of training than I did at the beginning of training	
I understand how to train others in the use of POLARIS better at the end of training than I did at the beginning of training	
I understand the different gateways for accessing other databases e.g. TRAILS and NEPI better at the end of training than I did at the beginning of training	
I understand the consequences of accessing the various databases	
I understand the limitations of POLARIS (the need to switch between the QPS Mainframe and POLARIS) better at the end of training than I did at the beginning of training	

Thank you for completing the questionnaire.
Please ask if you have any questions.

APPENDIX C

Queensland Police Service

POLARIS Follow Up Questionnaire

This questionnaire is designed to gather information about how successful you have been at transferring the skills learned during training back to your job.

When the results of this questionnaire are analysed, only the results of all trainees as a group will be reported. No individual's results will be identified in the analysis or reported. All information will be kept in the strictest confidence and not used for any other purpose, apart from the evaluation of this training programme.

Name (please print)

Location & District

Signature

Today's Date

Part 1 - Your success at using your training

These questions are designed to assess your success at using the skills you learned during training. Choose a number from 1 to 7 using the following scale as a guide:

Please complete the first box with a number from the scale below, that best describes your response.						
1 Strongly Disagree	**2** Moderately Disagree	**3** Slightly Disagree	**4** Neither Agree nor Disagree	**5** Slightly Agree	**6** Moderately Agree	**7** Strongly Agree

	Answer (1-7)
I have discussed with my supervisor ways to develop the skills which I learned	
I have discussed with my co-workers ways to develop the skills which I learned	
I have spent time thinking about how to use the skills which I learned	
I have evaluated how successfully I am using the skills which I learned	
I have looked for opportunities to use the skills which I learned	
I have reviewed course materials in order to develop the skills which I learned	
I have practised using the skills which I learned	
I have set specific goals for maintaining the skills which I learned	
I have sought expert help/advice in order to maintain the skills which I learned	
I have examined my work environment for potential barriers to using the skills which I learned	
I have monitored my success at using the skills which I learned	

Please go onto the next section ⇒

Part 2 - Open-ended Questions

Q1. What feedback have you received about your level of skill at using the POLARIS system? Who provided this feedback?

Q2. In what way have you utilised the practice training environment? With which staff? How beneficial was the practice environment?

Q3. What aspects of the POLARIS system are the most difficult to understand/learn to use? What strategy (strategies) have you used to assist trainees to learn these parts of the system?

Q4. What has been the effect of the training you received on your job performance? How important is understanding POLARIS to effectively performing your job?

Q5. Describe the factors in your work environment which have had the most influence on how successful you have been at applying your training? (Begin with the most influential)

Thank you for completing this questionnaire.