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SELF-REGULATED LEARNING AND TRAINING EFFECTIVENESS

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"Knowing is not enough; we must apply. Willing is not enough, we must do."

Johann Wolfgang von Goethe

Acknowledgements

As wisely stated by the Austrian philosopher Ludwig Wittgenstein, “knowledge is in the end based on acknowledgement”. Therefore, I would like to begin by dedicating some words to those who, in one way or another, helped me completing my dissertation.

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Abstract

In the last years, training has shifted towards a more learner-centred perspective. In parallel, given the rapidly changing workplaces, employees are required to engage in self-regulatory processes regarding their learning and performance, in order be professionally well-succeeded.

However, and despite abundant evidence suggesting the critical role of processes like self-efficacy or metacognition to learning and transfer, little is known about the role of self-regulated learning to training effectiveness in the workplace. This dissertation aims to address this gap through two studies.

Study one describes the construction and validation of an innovative instrument to measure self-regulated learning in training. Departing from Zimmerman's (2000a) cyclical model of self-regulated learning and through a sample of 230 individuals, results indicate that this new instrument is reliable and valid.

In study two, a theoretical model in which self-regulated learning plays a central role in training evaluation is proposed and validated. The relationships among self-regulated learning, training climate, transfer motivation and training evaluation are examined using the structured equations method with a sample of 137 individuals. Study findings indicate that self-regulated learning mediates the relationship between training climate and both transfer motivation and training evaluation.

These findings support the introduction of the concept of self-regulated learning in training research and offer new insights into the way organisations can improve training effectiveness. Implications for research are practice are explored.

Key Words: Self-regulated Learning, Metacognition, Transfer Motivation, Training Transfer, Training Evaluation

JEL Classification System:

M12 – Personnel Management

M53 – Training

Resumo

Nos últimos anos, a formação mudou no sentido de uma perspetiva mais centrada em quem aprende. Paralelamente, dada a rápida mudança nos locais de trabalho, os trabalhadores são chamados a participar em processos de auto-regulação relativos à sua aprendizagem e ao seu desempenho, para que possam ser bem-sucedidos profissionalmente.

Porém, e apesar da abundante evidência que sugere que processos como a auto-eficácia ou metacognição têm um papel crítico na aprendizagem e transferência, pouco se sabe sobre o papel da auto-regulação da aprendizagem para a eficácia da formação no local de trabalho. Esta dissertação tem por objetivo abordar esta lacuna através de dois estudos.

O primeiro estudo descreve a construção e validação de um inovador instrumento de medição da auto-regulação da aprendizagem em formação. Tendo como ponto de partida o modelo cíclico de auto-regulação da aprendizagem de Zimmerman (2000a), e através de uma amostra de 230 indivíduos, os resultados indicam que este novo instrumento é fiável e válido.

No segundo estudo, é proposto e validado um modelo teórico no qual a auto-regulação tem um papel central na avaliação da formação. As relações entre auto-regulação da aprendizagem, clima de formação, motivação para a transferência e avaliação da formação são analisadas utilizando o método das equações estruturadas com uma amostra de 137 indivíduos. Os resultados do estudo sugerem que a auto-regulação da aprendizagem atua como mediador da relação entre o clima de formação e quer a motivação de transferência, quer a avaliação da formação.

Estes resultados dão suporte à introdução do conceito da auto-regulação da aprendizagem na investigação da formação e oferecem novas perspetivas sobre como as organizações podem aumentar a eficácia da formação. São analisadas as implicações para a teoria e para a prática.

Palavras-chave: Auto-regulação da aprendizagem, metacognição, motivação para a transferência, avaliação da formação

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1. Introduction

1.1 Research objectives and structure

Organisations invest many resources to enhance their employees' knowledge and skills (e.g. Aguinis & Kraiger, 2009). This investment only is rewarded if employees actually apply the newly acquired knowledge in their work (e.g. Hutchins, Burke & Berthelsen, 2010). Many have studied about the importance of external factors like supervisor and social support or training design to promote high training transfer (Grossman & Salas, 2011; Homklin, Takahashi & Techakanont, 2014; Velada, Caetano, Michel, Lyons & Kavanagh, 2007), but still little is known about how individuals regulate their learning in the workplace (Margaryan, Littlejohn & Milligan, 2013) and if this regulation has an impact in training transfer.

The present study expands upon training research in two ways: by presenting a new instrument to measure self-regulated learning in training and by proposing a new theoretical model that integrates self-regulated learning and training variables.

First, we develop and validate of a new and, to our knowledge, unique instrument to evaluate self-regulated learning in training context. There are many validated measurement instruments of self-regulated learning, metacognition and self-efficacy in academic contexts (e.g. MSLQ, Pintrich, Smith, Garcia & McKeachie, 1991; MAI, Schraw & Dennison, 1994; LSQ, Warr & Downing, 2000; OSLQ, Barnard-Brak, Lan & Paton, 2010), but few interest has been put in the development of such instruments to measure the very same variables in the workplace.

Secondly, our study features a new, innovative theoretical model that integrates the concept of self-regulated learning with training context and outcome variables. It has been discussed in the last decades that there is a problem with training transfer in organisations, because most of the times only a small portion of what individuals visiting a training learn is actually transferred to their job (Baldwin & Ford, 1988; Ford & Weissbein, 1997; Grossman & Salas, 2011). This fact suggests that not all factors that contribute to successful transfer are being activated by organisations.

We believe that individual's engagement in self-regulated learning may be one factor that promotes transfer motivation and training effectiveness. As a matter of fact, many studies have shown the critical impact of isolate self-regulatory processes for training's effectiveness

(e.g. Bell & Kozlowski, 2008; Dierdorff et al., 2010), especially when training aims to develop more adaptive skills (Kozlowski & Bell, 2006).

But the innovative characteristic of the model we propose is that self-regulated learning is validated as a single variable that plays a role in mediating the relationship between context variables, such as supervisor support or organisational climate, and both transfer motivation and training effectiveness, which has never been studied. We believe that our findings may contribute to a better understanding of the importance of intrapersonal processes to effective learning and training transfer, adding an important contribution to existing consolidated learning transfer systems (Baldwin & Ford, 1988; Holton, Bates & Ruona, 2000).

To meet the goals of our dissertation, we will start by making a comprehensive literature review of the main concepts studied, bringing together different research areas. Research efforts regarding learning in organisations have often been dispersed. As stated by Margaryan *et al.* (2013: 256), *"... future research should break free from interdisciplinary boundaries, by bringing together the workplace learning, educational psychology and organizational psychology literatures, which have been developing in parallel but which can usefully learn from each other."* Therefore, we aim to build on the existing knowledge from different disciplines, namely by making an integrative literature review using a heuristic approach.

Then, based on previous contributions and existing instruments (e.g Pintrich *et al.*, 1991; Schraw & Dennison, 1994; Warr & Downing, 2000; Barnard-Brak *et al.*, 2010; Fontana, Milligan, Littlejohn & Margaryan, 2015), we develop a questionnaire that aims to measure self-regulated learning in the context of work-related training courses. This endeavour is, to our knowledge, pretty unique, since the existing instruments were developed for academic context. The only exception we know is the instrument presented by Fontana *et al.* (2015), which measures self-regulated learning in the workplace, but is directed to informal workplace learning, and therefore does not fit training contexts.

Following, with the means of a structured equations model, we aim to confirm our hypothesised model, in which self-regulated learning plays a mediating role between context variables and motivation to transfer contents to the workplace, as well as between transfer motivation and training outcomes.

To conclude, we discuss the results obtained and their implications both for research of training in organisations and for human resource management practice. Here, we propose a

series of procedures for organisations to foster self-regulated learning amongst their employees.

We seriously hope to successfully achieve the objectives of our study and provide you a fresh and fruitful insight into the role of self-regulated learning in training effectiveness.

1.2 Literature review

1.2.1 A new paradigm in training: the growing role of intrapersonal factors

There has been a major shift in education and learning in the last decades, with a trend towards more self-guided learning (Kraiger, 2014). For instance, today's computer-based training programmes offer participants an unprecedented degree of control over their learning (Bell & Kozlowski, 2002; Brown, 2001).

Not only the nature of training evolved, but also the demands of transfer and task performance are significantly different from the past. Over time, work has become progressively more complex and knowledge-centric, requiring employees to adapt to changing job demands (Bell & Kozlowski, 2008), which puts greater emphasis on cognitive skills (Kozlowski, Gully, Brown, Salas, Smith & Nason, 2001). Therefore, training transfer is increasingly being defined as the generalisation of knowledge, i.e. the adaptation of trained knowledge and skills to a more difficult and complex task situation (Ford, Smith, Weissbein, Gully & Salas, 1998), either than a mere direct transfer of training contents to day-to-day routines.

Additionally, the complexity of tasks individuals are confronted with nowadays in the workplace requires adaptation of behaviour to new information and situations (Johnson, Shull & Wallace, 2011). Therefore, employees have to take charge of their own development to meet the requirements of their organisations and evolve in their career (Bandura, 2001). In this context, metacognitive and self-regulatory competencies become increasingly important, so that individuals' ability to self-regulate may very well be their most essential asset (Porath & Bateman, 2006).

Contradictorily, while the importance of contextual factors for training effectiveness has been extensively studied and significantly contributed to advancement in training research (Grossman & Salas, 2011; Kraiger, 2014), little is known about how professionals regulate their learning (Margaryan *et al.*, 2013). This aspect is particularly worrying, knowing that learners are often poor evaluators of their own learning (DeRouin, Fritzsche, & Salas, 2004) and need support throughout the training process (Kraiger, 2014).

In our study, we aim to help filling this gap in the literature. In following chapters, we start by defining self-regulation and self-regulated learning and showing its role in workplace learning, as well as to training transfer.

1.2.2 Self-regulated learning: foundations, definitions and models

1.2.2.1 Theoretical foundations of self-regulation

Self-regulation refers to the capacity to guide one's activities over time and across changing circumstance (Kanfer, 1990), which enable individuals to guide their goal directed activities over time, including the modulation of affect, cognition, and behaviour (Karoly, 1993). Self-regulation is designed to maximise the long-term best interest of an individual, resulting in people controlling their impulses and looking out for their well-being (Kanfer & Karoly, 1972; Muraven & Baumeister, 2000). Higher levels of self-regulation have shown to lead to higher leadership effectiveness and team performance (Yeow & Martin, 2013). Self-regulation can be classified as *"... a meta-competency (i.e. an ability to develop or to obtain task-relevant and knowledge, skills and abilities)."* (Yeow & Martin, 2013: 625).

Social cognitive theory preconised by Albert Bandura (1977), which emerged from the field of clinical psychology, played a major role in the development of the concepts of self-regulation and self-regulated learning. As depicted in Figure 1, social cognitive theory adopts an agentic perspective toward human development, adaptation, and change, stating that human functioning is a product of reciprocal interplay of intrapersonal, behavioural and environmental determinants (Bandura, 1986, 2001). An underlying assumption of this theory is that people are self-regulating agents, rather than just a product of their circumstances, because they are by nature self-organizing, proactive, self-regulating, and self-reflecting (Bandura, 2006).

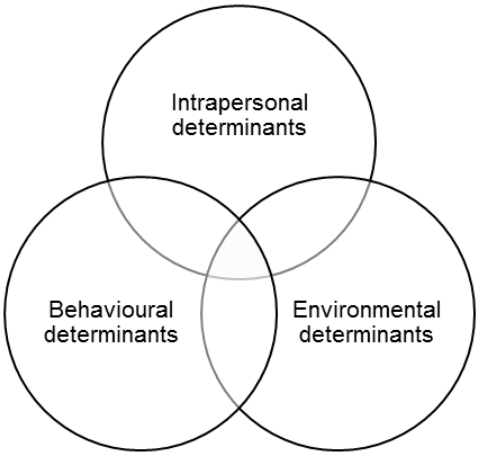

Figure 1 – Triadic interaction that produces human functioning (adapted from Bandura, 2006).

According to Bandura (2006), the four core properties of human agency are intentionality (people form intentions and derive action plans), forethought (people anticipate outcomes), self-reactiveness (people are agents of action) and self-reflectiveness (people are self-examiners of their own functioning). These properties have been especially influential for most self-regulated learning theories, playing a particularly explicit role in cyclical model of self-regulated learning depicted by Zimmerman (2000a).

Other theories originated in the organisational psychology have also influenced the conceptualisation of self-regulation and, ultimately, of self-regulated learning. Goal setting theory (Latham & Locke, 1991; Locke & Latham, 2006), provided important contributions to the understanding of the mechanisms through which goals operate. On the other hand action regulation theory (Frese & Zapfer, 1994), stressed the importance of learning through action. It is the only self-regulation theory to discuss training transfer (Sitzman & Ely, 2011). It also underlines the importance of learning from errors as part of self-regulatory processes during learning experiences (Ivancic & Hesketh, 2000; Keith & Frese, 2005). Both theories add important insights to the understanding of self-regulated learning, as it will be discussed later.

1.2.2.2 Defining self-regulated learning

Self-regulation draw increasing attention in the field of educational psychology in the 80's (Zimmerman, 1989). Self-regulated learning emerged as a concept when a series of researchers (e.g. Bandura & Schunk, 1981) started investigating the self-regulatory processes, such as goal-setting or imagery, on academic learning. The goal of these first studies consisted mainly on finding out whether the students that most used this processes were more effectively in terms of mastery attainment. The same question applies to learning in workplace training, which is why are more "talented" workers often not the ones that are most successful on acquiring new knowledge and applying it on their daily work.

Self-regulation research has revealed those who proactively define motivating goals, monitor their learning, select learning strategies and adapt them according to received feedback, master learning contents faster and keep their motivation to learner more often (Zimmerman, 2013). It can be defined as the degree to which students *"... are metacognitively, motivationally, and behaviourally active participants in their own learning processes."* (Zimmerman, 1989: 329). Similarly, Boekaerts (2002: 595) defines SRL as *"... students' attempts to attain personal goals by systematically generating thoughts, actions, and feelings at the point of use, taking account of the local conditions."* More recently, it has been defined

as *"... the ability to control and influence one's learning processes positively"* (Nückles, Hübner & Renkl, 2009: 259). In other words, self-regulated learners become masters of their own learning.

Three elements are common to all these definitions: self-regulated learning regards the regulation of cognition, behaviour and motivation towards learning goals. This three-dimensionality is what differentiates SRL from some other closely related constructs, for example metacognition, which only regards one of the three elements. Authors have considered that a metacognitive view of self-regulation is limiting (Dinsmore, Alexander & Loughlin, 2008). In other words, a learner with a satisfactory level of metacognition would say "I plan, monitor and evaluate my learning processes" in opposition to a broader definition of SRL, in which the learner would state „I monitor and regulate not only my cognitive processes, but also my learning motivation, concentration and my feelings".

Although some authors argue that self-regulated learning strategies correlate with personality dimensions and SRL has therefore personality underpinnings (Bidjerano & Dai, 2007), many studies have showed that SRL is not an unchangeable individual characteristic, but can be developed (Cleary & Zimmerman, 2004; Schmitz & Wiese, 2006; Nückles *et al.*, 2009; Sitzmann & Ely, 2010). This finding brings the concept of self-regulated learning to a higher level of practical interest, because it turns self-regulated learning into a variable that can potentially be positively influenced in order to enhance learning outcomes.

Self-regulated learning is, by many definitions, limited to students in academic contexts, since this was this concept was originally tested and developed in the context of formal education. However, recent studies (e.g. Margaryan *et al.*, 2013) have tried to apply this concept to other contexts of learning, for example informal learning in the workplace. As stated by Kaplan (2008: 480), *"... by its definition, self-regulated learning can occur wherever learning – academic or otherwise (e.g., youth movements, professional training, leisure activities) – takes place."*.

The concepts of metacognition, self-regulation, and self-regulated learning have been growing in dominance in educational theory, research, and practice (Dinsmore *et al.*, 2008; Kaplan, 2008). Though metacognition, self-regulation, and self-regulated learning share common characteristics, such as self-awareness and regulatory action (Kaplan, 2008) they are independent constructs. Give the interrelation between these concepts, it is legitimate to

hypothesise that, if self-regulation and metacognition-related concepts show a relationship with training transfer to the workplace, self-regulated learning may be also be associated to such outcomes.

1.2.2.3 Theoretical models of self-regulated learning

The field of research on college and university student motivation and learning is quite diverse and there are many different models and perspectives (Pintrich, 2004). There are a number of closely related models of self-regulated learning (Puustinen & Pulkinnen, 2001), but we highlight only three of them, namely the ones developed by Butler & Winne (1995), Zimmerman (2000a), Pintrich (2004) since they are the ones that got most support by empirical studies in the literature.

Butler & Winne (1995) developed one of the first phase models of self-regulated learning. According to this model, further developed by Winne (1996) and Winne & Hadwin (1998), self-regulated learning includes four distinct stages. First, during task definition, learners generate perceptions about the learning task. Secondly, learners plan and set goals. In the third stage, learners put in practice the tasks and strategies defined in the previous stage. In the last phase, learners critically evaluate the previous phases and metacognitively adapt their learning strategies for future learning tasks. Outside the processes that occur in learner's cognitive system, there is performance, that results from self-regulated learning, and the external feedback that is originated by learner's performance and will in turn affect task definition of the next learning challenge. Therefore, the model depicts a cyclical process (Figure 2).

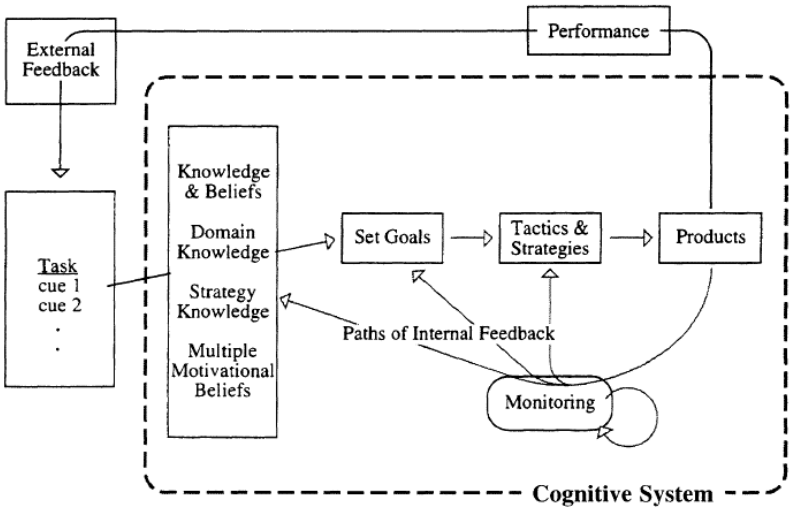

Figure 2 – Self-regulated learning model (Butler & Winne, 1995).

Zimmerman's (2000a; 2008; 2013) social cognitive model of self-regulation is based, as its name indicates, on Bandura's (1986) social cognitive theory. According to Zimmerman & Campillo (2003) self-regulation is cyclical in nature. Zimmerman's (2000a) model (Figure 3) postulates that self-regulated learning processes are divided into three cyclical phases: forethought, performance and self-reflection. First, forethought processes precede a learning task and prepare the learner for it. Performance phase processes occurs during learner's efforts to solve the learning task. Lastly, self-reflection takes place after the task has been completed and is a response to the solutions used. The processes of self-reflection, in turn, influence forethought of the next task, which explains cyclical nature of the model.

Forethought processes fall into two categories: those relative to task analysis (i.e. goal setting and strategic planning) and those relating to self-motivation beliefs (i.e. self-efficacy, outcome expectations, intrinsic motivation, task/interest and value and goal orientation).

The performance phase encompasses two kinds of processes, namely self-control and self-observation and self-observation. Self-control refers to the processes through which learners use cognitive strategies, such as self-instruction, imagery, attention focusing and task strategies) to optimise their learning efforts. Self-observation refers to metacognitive strategies to trace one's learning performance, and include metacognitive monitoring and self-recording.

The last phase, self-reflection, contains two categories of processes quite analogous to the ones of performance phase. First, self-judgement is parallel with self-observation, because it also consists in self-evaluating learning performance, but now with a retrospective view, including sub-processes of self-evaluation and causal attribution. Secondly, beyond judging one's performance, the learner engages in a self-reaction process, that includes perceptions of satisfaction (or dissatisfaction) and affect regarding performance, and adaptive or defensive responses about what strategies will be adopted in the future.

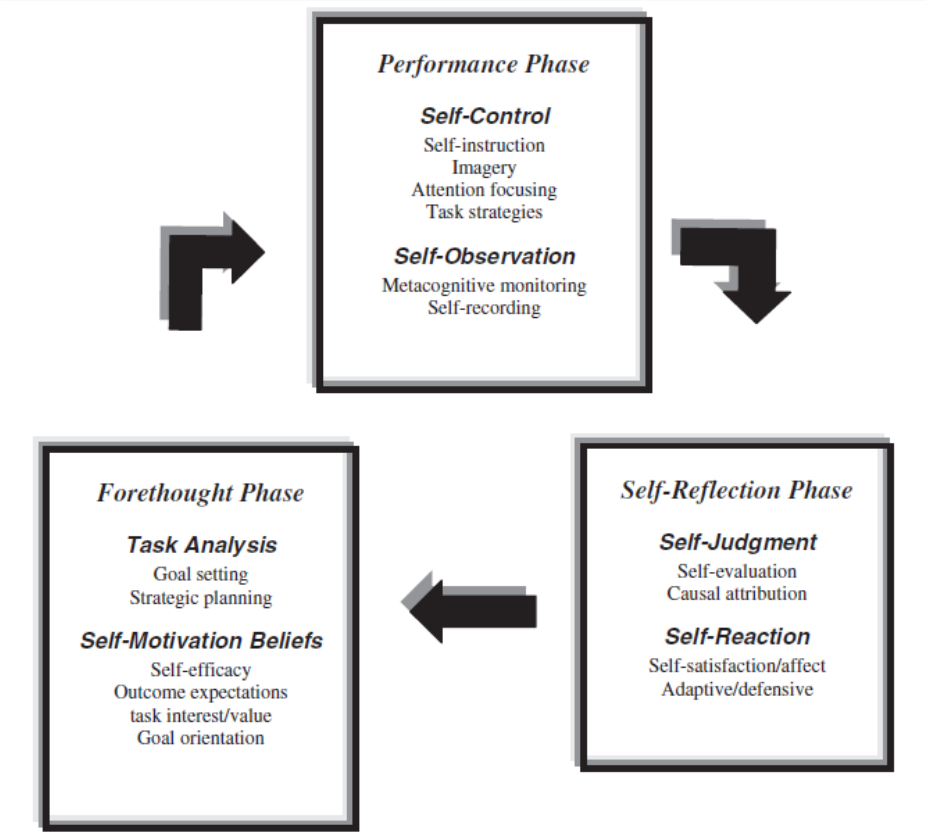

Figure 3 – Cyclical model of self-regulated learning (adapted from Zimmerman, 2000a).

Pintrich (2004) developed a framework model (Table 1), according to which self-regulated learning is composed of four phases, namely forethought, monitoring, control and reflection. The model has a matricial presentation, since, for each phase, self-regulatory activities are listed in four separate areas: cognitive, motivational/affective, behaviour and context.

The first phase concerns planning, goal setting and activation of perceptions and knowledge of the task and context, the activation of metacognition and perceptions of self-efficacy. The second phase involves monitoring of cognition, motivation, affect, time use and context. The third phase refers to the selection of strategies and efforts to control and regulate different motivational, cognitive and affective aspects, as well as the context. The fourth and last phase represents various kinds of reactions, judgements and reflections on the task and context.

Phases and relevant scales	Areas for regulation: Cognition	Motivation/Affect	Behavior	Context
Phase 1				
Forethought, planning, and activation	Target goal setting	Goal orientation adoption	Time and effort planning	Perceptions of task
	Prior content knowledge activation	Efficacy judgments	Planning for self-observations of behavior	Perceptions of context
	Metacognitive knowledge activation	Perceptions of task difficulty Task value activation Interest activation		
Phase 2				
Monitoring	Metacognitive awareness and monitoring of cognition	Awareness and monitoring of motivation and affect	Awareness and monitoring of effort, time use, need for help Self-observation of behavior	Monitoring changing task and context conditions
Phase 3				
Control	Selection and adaptation of cognitive strategies for learning, thinking	Selection and adaptation of strategies for managing, motivation, and affect	Increase/decrease effort	Change or renegotiate task
			Persist, give up Help-seeking behavior	Change or leave context
Phase 4				
Reaction and reflection	Cognitive judgments	Affective reactions	Choice behavior	Evaluation of task
	Attributions	Attributions		Evaluation of context
Relevant MSLQ Scales	Rehearsal Elaboration Organization Critical Thinking Metacognition	Intrinsic Goals Extrinsic Goals Task Value Control Beliefs Self-Efficacy Test Anxiety	Effort Regulation Help-Seeking Time/Study Environment	Peer Learning Time/Study Environment

Table 1 – Framework of self-regulated learning (Pintrich, 2004).

As summarised in Table 2, the three models share some key elements, even if the terminology varies from one model to another. First, they are all phase models, assuming that there is some sort of chronological sequence in the processes. Secondly, as presented in Table 2, the processes depicted in all models can be sorted in three stages, before, during and after task performance. Thirdly, with the exception of Pintrich's model (2004), they assume self-regulated learning has cyclical nature, with the last phase influencing the first phase in the next learning challenge.

	SRL processes		
Author(s)	Before learning task	During learning task	After learning task
Butler & Winne (1995)	Task definition, goal setting and planning	Applying tactics and strategies	Adapting metacognition
Zimmerman (2000a)	Forethought (task analysis, self-motivation)	Performance (self-control, self-observation)	Self-reflection (self-judgement, self-reaction)
Pintrich (2004)	Forethought, planning, activation	Monitoring, control	Reaction and reflection

Table 2 – Overview over three theoretical models of self-regulated learning.

We have decided that the work reported in our study would be fundamentally guided by Zimmerman's three-phase model of self-regulated learning, based on three main arguments: the growing empirical support for this model (Zimmerman, 2008); the fact that it has successfully provided a theoretical basis to the development of several measurement instruments (e.g. Barnard-Brak *et al.*, 2010; Fontana *et al.*, 2015); the balance between motivational and strategic elements (Puustinen & Pulkkinen, 2001).

However, we also use some theoretical insights of Pintrich's model (2004), since it encompasses additional processes that enrich the conceptualisation of self-regulated learning, such as help-seeking or critical thinking, and has also been the base of the probably most widely used measurement instrument in the field of self-regulated learning, the Motivated Strategies for Learning Questionnaire (MSLQ), originally developed by Pintrich *et al.* (1991), whose theoretical structure has been broadly supported (Credé & Phillips, 2011).

1.2.3 Self-regulation and workplace learning

For more than 20 years, self-regulated learning has been extensively studied in the context of formal education (e.g. Pintrich & De Groot, 1990; Cleary & Zimmerman, 2004; Schmitz & Wiese, 2006; Sontag & Stoeger, 2015). In contrast, few authors studied the concept of self-regulated learning in the workplace and little is known about how professionals regulate their learning (Margaryan *et al.*, 2013). This lack of research is inconsistent with the fact that workplace is a context where learning not only is applied (Holton *et al.*, 2000; Enos, Kehrhahn, &, 2003; Culpin, Eichenberg, Hayward & Abraham, 2014), but actually takes place (Harteis & Billett, 2008).

Additionally, results presented in some studies may not reflect learners' behaviour in real live situations, as research of self-regulation is often conducted under laboratorial conditions (Margaryan *et al.*, 2013). By involving real employees in our study and asking them to reflect about past learning experiences, we try to shed some light on self-regulatory processes during workplace learning experiences.

In the one hand, research of self-regulated learning in workplace learning is still in its infancy, as "*… further studies are also needed to develop our understanding of the precise nature of self-regulation of learning in the workplace."* (Fontana *et al.*, 2015: 46). One of the limitations of existing literature on self-regulated learning is that studies were usually conducted with academic students (e.g. Zimmerman & Clearly, 2004; Schmitz & Wiese,

2006), a fact that limits transferability to other contexts, since college students have characteristics that differentiate them from general population, such as higher cognitive ability (Bell & Kozlowski, 2008).

In the other hand, organisational psychology has approached the topic self-regulation in the workplace mostly focusing the relationship with performance variables, such as task performance (e.g. Cellar et al, 2011; Johnson et al., 2012), job performance (e.g. Porath & Bateman, 2006), team effectiveness (e.g. Dierdorff & Ellington, 2012), or leadership effectiveness (e.g. Yeow & Martin, 2013).

There is some research, however, that studied self-regulated learning in the context of work-related training focused on the training of school and college teachers (e.g. Nitsche, Dickhäuser, Dresel & Fasching, 2013; Van Eekelen, Boshuizen, & Vermunt, 2005; Tillema & Kremer-Hayon, 2002). However, since teachers' professional activity is focused in learning processes, we believe the results of the studies conducted with teacher training cannot be generalised to other employee groups.

In recent years, though, there have been finally some attempts to better understand how professionals self-regulate their learning at the workplace. One of the first studies focusing on self-regulated learning in the workplace was made by Schulz & Roßnagel (2010), who adapted the Motivated Strategies for Learning Questionnaire (MSLQ), originally developed by Pintrich *et al.* (1991) for academic students, to fit a workplace context. The authors concluded that individual's regulatory skills of learning competence were positively associated with perceived informal learning.

Similarly, Wan, Compeau & Haggerty (2012) found out that the level of self-regulated learning of employees attending an e-learning training was positively associated with learning satisfaction, as well as with perceived knowledge acquisition and skill development. However, the authors also concluded that the majority of professionals, especially those with less work, lacked on self-reflection skills, which in turn affected perceived learning. This finding suggests that organisations should promote self-regulated learning skills among their employees to enhance learning outcomes.

On the other hand, Margaryan *et al.* (2013) have conducted an exploratory qualitative study based on semi-structured interviews. Consistent with previous findings of Wan *et al.* (2012), these authors found out that employees lack on deliberate, systematic self-reflection on

informal learning. Additionally, there were three main findings regarding goal-setting: learning goals are mostly short-term oriented, aimed at work tasks rather than at long-term personal development, and were influenced by individual's perceptions of their career potential.

Very recently, Fontana *et al.* (2015) designed an instrument, called Self-Regulated Learning at Work Questionnaire (SRLWQ) to measure of self-regulated learning behaviours in informal workplace learning among knowledge workers, using as theoretical framework the cyclical model depicted by Zimmerman (2000a). Although these authors make an important contribution to the introduction of self-regulated learning in the field of organisational psychology, the instrument would not fit our study's purposes, since we aim to measure the self-regulatory processes associated with training, and not with informal learning.

Other studies have explored the impact of specific processes of self-regulated learning, such as goal setting or metacognition, in learning and transfer to the workplace. This body of research is discussed in the next chapter.

Summing up, some promising findings were made in the last few years. However, these advancements were made either with specific target groups, like teachers (e.g. Nitsche *et al*., 2013, Van Eekelen *et al*., 2005; Tillema & Kremer-Hayon, 2002) or knowledge workers (Fontana *et al.*, 2015), or on the basis of special methods, like e-learning training (Wan *et al.*, 2012) or informal learning (Fontana *et al.*, 2015; Margaryan *et al.*, 2013; Schulz & Roßnagel, 2010). Therefore, no research was found to measure and analyse self-regulated learning across employee groups and simultaneously being applicable to formal work-related training. It is our goal with this study to fill this gap in the literature, as it will be described below.

1.2.4 Self-regulated learning and training transfer

Training transfer can be defined as the application to the job of the knowledge, skills and attitudes gained in a training (Baldwin & Ford, 1988). Transfer is positively related with job performance (Arthur, Bennett, Edens & Bell, 2003), contributing, ultimately, to organisational performance (De Grip & Sauermann, 2013; Saks & Burke-Smalley, 2014).

The concept of transfer has evolved in the last years. Ford *et al.* (1998) distinguish two facets of training transfer: skill maintenance and generalisation. Maintenance refers to the reproduction of trained skills in a new setting, while generalisation refers to the adaptation of trained knowledge and skills to a more difficult and complex task situation. Similarly, Ivancic

& Hesketh (2000) identify two types of transfer: analogous and adaptive. Analogical transfer refers to transfer to situations that are analogous to the ones taught in a training, whereas adaptive transfer refers to applying knowledge to solve a new problem (Ivancic & Hesketh, 2000).

With a rapidly evolving work environment, adaptive transfer becomes more important, since not all potential work-related problems and solutions can be taught during training (Kozlowski *et al.*, 2001). As a matter of fact, given the task complexity in today's workplaces, individuals are required to adapt behaviour to changing situations and new information (Johnson *et al.*, 2011).

This shift stresses the trainee's role in the process of transfer to the workplace. According to Baldwin & Ford (1998), there are three training-input factors that influence transfer of training: trainee characteristics, training design and work environment. In meta-analysis of existing literature on the topic of transfer, Blume, Ford, Baldwin & Huang (2010) found that trainees' cognitive ability showed the strongest positive relationship with training transfer. In parallel, there is a body of evidence indicating that self-regulated learning predicts knowledge acquisition and skills development (Berthold, Nückles & Renkl, 2007; Hübner, Nückles & Renkl, 2010; Wan *et al.*, 2012).

If self-regulation predicts achievement in so many different fields of human behaviour, it would be expected that it also predicts successful transfer of training. If processes like motivation and self-efficacy are key elements of self-regulated learning (Zimmerman, 2000a; Pintrich, 2004) contributing a more effective knowledge acquisition (Zimmerman, 2013), this should also be the case after training is completed in transferring new behaviours to the work environment. We propose that self-regulated learning after trainees return to the job is fundamental to actual change in behaviours.

In this line of thought, Zimmerman (2013) called researchers to better understand the relationship between self-regulation of learning processes and self-regulation of performance processes, as there has been little integration of these two lines of research. We hope that, by proposing that self-regulated learning plays a role in successful adoption of new behaviours in the workplace after training we help addressing this gap contribute to a better understanding of self-regulatory processes in workplace learning as a whole.

The hypothesised relationship between self-regulation and transfer is not completely new. The topic of transfer is addressed by action learning theory of self-regulation (Frese & Zapf, 1994), which served as theoretical basis to several experimental studies, in which learners received training in self-regulation to enhance training transfer (Keith & Frese, 2005; Perels, Gürtler & Schmitz, 2005; Bell & Kozlowski, 2008).

However, we are not aware of any theories that address how engaging in self-regulated learning after returning to the job enhances training transfer. That is, what is the role of self-regulated learning after leaving the training environment in determining whether trainees transfer knowledge and skills learned in training to the job?

Though we found no direct evidence of the relationship between self-regulated learning and positive learning outcomes in the workplace in the existing research, literature review clearly shows two key facts that support our research model. First, a wide range of self-regulated learning processes are positively related not only with learning outcomes, but also with learner's transfer performance. Secondly, these processes, such metacognition and self-efficacy (e.g. Ford *et al.*, 1998), were highly interrelated, which suggests the existence of a second-order latent variable that encompasses all self-regulatory processes of learning. Each self-regulated learning process is individually discussed below.

1.2.4.1 Self-efficacy

Bandura (1977) formally defined perceived self-efficacy as personal judgments of one's capabilities to organize and execute courses of action to attain designated goals. Efficacy beliefs are among the most widely documented predictors of achievement in many areas. A specific form of self-efficacy that is related with learning experiences is referred to as learning self-efficacy (Fisk & Warr, 1996; Potosky & Ramakrishna, 2002).

Converging evidence from diverse methodological and analytic strategies verifies that perceptions of one's learning capabilities is critical to motivation, affecting how individuals approach new learning challenges and ultimately enhancing performance attainments (Bandura & Locke, 2003; Grohmann, Beller & Kauffeld, 2014). Also, beliefs of personal efficacy play a key role in occupational development and pursuits (Bandura, 2001; Lent, Brown & Hackett, 1994). Similarly, self-efficacy beliefs have shown convergent validity in influencing such key indices of academic motivation as choice of activities, level of effort, persistence, and emotional reactions (Zimmerman, 2000b).

Self-efficacy and self-regulated learning are closely related concepts (Zimmerman, 2000b). Self-efficacy beliefs have shown to be positively influence a series of self-regulated learning processes, namely goal setting (Bandura & Cervone, 1986; Zimmerman, Bandura, & Martinez-Pons, 1992), self-monitoring (Bouffard-Bouchard, Parent, & Larivee, 1991), self-evaluation (Zimmerman & Bandura, 1994) and use of learning strategies (Zimmerman & Martinez-Pons, 1990). As a result, the greater motivation and self-regulation of learning of self-efficacious students produces higher academic achievement according to a range of measures (Multon, Brown, and Lent, 1991).

Consistent with social cognitive theory, training research has shown a positive relation between self-efficacy and training transfer (Gegenfurtner, Veermans & Vauras, 2013). More specifically, the motivational relationship between self-efficacy and transfer performance was evident even after controlling for the level of knowledge and skill obtained (Ford *et al.*, 1998). Additionally, a longitudinal study of Dierdorff *et al.* (2010) concluded that higher levels of self-efficacy support learning outcomes and that self-efficacy is an important factor for successful transfer of training, partially mitigating the negative effects of other variable in training transfer.

1.2.4.2 Goal orientation

Another construct closely related with self-regulation is goal orientation. As we have seen in the model of Zimmerman (2000a) goal setting is a crucial component of forethought in the cycle of self-regulation of learning.

Like self-efficacy, goal orientation is known to positively affect performance in training situations in general (Ford *et al.*, 1998; Gist, Stevens & Bavetta, 1991; Payne, Youngcourt & Beaubien, 2007; Tannenbaum, Mathieu, Salas & Cannon-Bowers, 1991). Ford *et al.* (1998) found that mastery orientation was positively related to knowledge acquisition and skilled performance at the end of training, which in turn were related to performance on the transfer task within a training environment. Another result of the study was the strong relationship between metacognition and self-efficacy. The authors therefore called future research to further develop conceptualisations of learning strategies in order to contribute to a better understanding of how goal orientation influences self-efficacy during training.

Similarly, Kozlowski *et al.* (2001) found that mastery goals, by focusing self-regulation on key learning objectives, contributed to the development of knowledge. In addition, and

consistent with the findings of Ford *et al.* (1998), mastery goals positively influenced self-efficacy, that is, by setting goals that promoted self-regulation toward specific learning objectives, the development of individual's self-perceived ability to deal with task challenges was promoted.

More recently, Dierdorff *et al.* (2010), found evidence that learning goal orientation was beneficial to both learning and transfer outcomes. Again, self-efficacy showed a great interaction with goal orientation, moderating the negative effects of specific types of goal orientation.

1.2.4.3 Intrinsic motivation

Intrinsic motivation describes the innate propensity to pursue novelty and challenge to extend one's skills and foster growth (Deci & Ryan, 2000). It has been found that intrinsically motivated learners show higher levels of task persistence and are more committed with learning tasks (Hardre & Reeve, 2003).

Though there is mixed evidence regarding the role of intrinsic motivation in learning and transfer systems, it has been concluded by several authors that this variable predicts higher learning outcomes. In a longitudinal study, Cesaroli & Ford (2014) found a strong relationship between intrinsic motivation and academic performance, mediated by mastery goal orientation, because intrinsic motivation fuelled the duration and intensity of performance behaviours.

On the other hand, Bell & Kozlowski (2008) suggest that it is mastery orientation that promotes intrinsic motivation, which in turn related to learning and transfer performance. In this study, intrinsic motivation, along with self-efficacy, emerged as key predictors of basic knowledge acquisition and analogical transfer.

1.2.4.4 Error management

Errors used as enhancers of learning lead to better organisational performance (Dormann and Frese, 1994). Error learning is defined by Rybowiak et al., 1999 as the ability to prevent errors in the long term by learning from them, planning, and changing work processes. It was found to be correlated with self-efficacy, plan-orientation, need for achievement, readiness to change, and initiative (Rybowiak et al., 1999).

Self-regulated learning interventions typically ask learners to proactively identify their errors and solve them (e.g. Zimmerman, Moylan, Hudesman, White, & Flugman, 2011). Self-regulated learners engage in error management strategies, by attributing their errors to ineffective strategies, making adaptive inferences for errors and modifying learning strategies accordingly (Zimmerman, 2013).

Keith & Frese (2005), found that trainees who participated in an error management training demonstrated higher levels of adaptive transfer. The authors concluded that this finding suggests that encouraging trainees to make and learn from their errors can aid in the development of adaptive transfer.

In another study, Bell & Kozlowski (2008), an error encouragement framing had a positive effect on adaptive transfer performance and interacted with cognitive ability and goal orientation to influence trainees' metacognition.

1.2.4.5 Metacognition

Metacognition can be simply defined as *"... thinking about thinking..."* (Miller, Kessel & Flavell, 1970: 613). It refers to how individuals monitor or think about their own perceptions. Many researchers have noted the importance of metacognition for supporting active learning (e.g., Schmidt & Ford, 2003; Pintrich, 2002). In addition, research has concluded that metacognitive skills promote adaptive transfer, because they enable learners to recognise changes in task, develop new solutions and self-evaluate the effectiveness of the devised learning strategies (Ivancic & Hesketh, 2000).

Ford *et al.* (1998) tried to determine how exactly metacognitive activity was related to multiple learning outcomes and transfer. The authors concluded that metacognition was the most important learning strategy, as it was positively associated with knowledge measured in a test, final training performance and self-efficacy. These three elements, in turn, significantly predicted performance in a more complex transfer task. In other words, individual's ability to monitor their learning and adjust their behaviour accordingly not only predict superior knowledge, but also led to greater transfer performance.

In a study designed to examine the impact of an error management training in adaptive transfer, Keith & Frese (2005), found the relationship error management training and adaptive transfer was fully mediated by metacognition, highlighting the benefits of self-regulation during training, accordingly with educational theory (e.g. Zimmerman, 1990).

More recently, Bell & Kozlowski (2008), demonstrated that self-evaluation activity positively influenced strategic knowledge and that strategic knowledge and exhibited a positive relationship with adaptive transfer.

1.2.4.6 Planning

Though prominent self-regulated learning theories (Pintrich, 2000; Zimmerman, 2000a) consider planning as a key component of self-regulation of learning experiences, planning is one of the least frequently researched components of self-regulated learning (Sitzmann & Ely, 2011).

One of the few studies, conducted by Sitzmann & Johson (2012) concluded that creation of learning plans by trainees enhanced learning and reduced attrition, but only when paired with other self-regulatory prompts that promoted self-evaluation or when trainees followed through on their plans. This finding suggests that in order to planning to have impact on learning outcomes, other processes of self-regulated learning need to be activated.

1.2.3.7 Emotion control

Kanfer, Ackerman, and Heggestad (1996: 186) defined emotion control as *"… the use of self-regulatory processes to keep performance anxiety and other negative emotional reactions (e.g., worry) at bay during task engagement"*. Emotion regulation is an important aspect of self-regulation (Boekaerts & Cascallar, 2006).

Keith & Frese (2005) found that emotional self-regulation acted as full mediator between training and adaptive transfer, along with metacognition. Similarly, Bell & Kozlowski (2008), found that trainees who reported higher levels of state anxiety early in training had lower levels of self-efficacy at the end of training and that the emotion-control learning strategy served as an effective tool for lowering learners' anxiety and sustained trainee's motivation and performance.

1.2.4.8 Summary

As presented before, numerous constructs that compose self-regulated learning according to the main theories of self-regulated learning (Zimmerman, 2000a; Pintrich, 2004) are shown to be positively related with indicators of training effectiveness, namely learning or knowledge acquisition, and transfer and task performance (Table 3).

Self-regulated learning process	Relationship with other SRL processes	Impact on learning / knowledge	Impact on transfer / performance
Self-efficacy	Goal setting (e.g. Zimmerman, Bandura, & Martinez-Pons, 1992), self-monitoring (Bouffard-Bouchard, Parent, & Larivee, 1991), self-evaluation (Zimmerman & Bandura, 1994), learning strategies (Zimmerman & Martinez-Pons, 1990)	Multon, Brown & Lent (1991) Kozlowski *et al.* (2001) Dierdorff *et al.* (2010)	Dierdorff *et al.* (2010)
Goal orientation	Metacognition (Ford *et al.*, 1998), self-efficacy (Kozlwoski *et al.*, 2001; Dierdorff *et al.*, 2010)	Ford *et al.* (1998) Kozlowski *et al.* (2001) Dierdorff *et al.* (2010)	Ford *et al.* (1998) Dierdorff *et al.* (2010)
Intrinsic motivation	Mastery goal orientation (Cesaroli & Ford, 2014), self-efficacy (Bell & Kozlowski (2008)	Bell & Kozlowski (2008) Cesaroli & Ford (2014)	Bell & Kozlowski (2008)
Error framing	Goal orientation, metacognition (Bell & Kozlowski, 2008) Self-efficacy, plan-orientation (Rybowiak *et al.*, 1999)	Keith & Frese (2005)	Bell & Kozlowski (2008) Keith & Frese (2005)
Metacognition	Self-efficacy (Keith & Frese, 2005)	Ford et al. (1998)	Ivancic & Hesketh (2000) Ford *et al.* (1998) Keith & Frese (2005)
Planning	Self-evaluation (Sitzman & Johnson, 2012)	Sitzman & Johnson (2012)	
Emotion control	Self-efficacy (Bell & Kozlowksi, 2008)	Bell & Kozlowski (2008)	Keith & Frese (2005)

Table 3 – Summary of empirical evidence suggesting relationships of self-regulated learning constructs and with learning and transfer outcomes.

These conclusions encourage us to study the role of self-regulated learning in promoting effectiveness of training in organisations. Hypothesised relationships about the nature of the concrete interaction between self-regulated learning and training effectiveness are presented below.

1.3 Hypotheses and research model

Now that we have (a) defined the concept of self-regulated learning and (b) analysed the potential relationship with training outcomes, we are going to hypothesise the specific nature of that relationship.

Transfer motivation (or motivation to transfer, as a synonym) is a construct first introduced by Noe (1986), who defined it as learners' desire to apply on the job the knowledge and skills acquired in a training course. Since then, this construct has raised attention in research for its role in predicting transfer to the workplace (e.g. Egan, Yang & Bartlett, 2004; Seyler, Holton, Bates, Burnet & Carvalho, 1998; Holton *et al.*, 2000). For instance, Holton *et al.* (2000) position transfer motivation in the very centre of their learning transfer system as a predictor of transfer performance, along with environmental variables

At the same time, in the scheme of the transfer literature, work environment variables have received increased attention in the last two decades (Burke & Hutchins, 2007). Environmental factors, such as peer and supervisor support or opportunity to use, explain a large amount of variance in transfer motivation (Seyler *et al.*, 1998).

Training and transfer climate is a fundamental component of transfer models. For instance, Holton *et al.* (2000) LTSI measure has a transfer climate factor that assesses individual's perceptions and attitudes about how performance (i.e., effort–performance expectations, performance self-efficacy, openness to change, performance–outcome expectations), feedback (i.e., performance coaching), and support (peer and supervisor) impact transfer of learning. In contrast, Tracey, Tannenbaum & Kavanagh (1995) conceptualised a later validated (Tracey & Tews, 2005) three-factor model, referred to as the General Training Climate Scale (GTCS), that features set of work environment transfer support variables, aggregated in the dimensions of job support, manager support and organisational support.

The importance of both peer and supervisor support for training motivation is well established (Van der Klink, Gielen & Nauta, 2001; Grossman & Salas, 2011; Homklin *et al.*, 2014). Also, perceived openness of climate during training was shown to be positively associated with transfer motivation (Kastenmüller, Frey, Kerschreiter, Tattersall, Traut-Mattausch & Fischer, 2012). In sum, we expect to confirm that training climate positively influences transfer motivation.

Hypothesis 1: There is a positive association between training climate and transfer motivation.

At the same time, Holton *et al.* (2000) hypothesise performance self-efficacy and learner readiness as predictors of motivation to transfer and transfer effort. Similarly, Kozlowski *et al.* (2001) stressed the importance of self-regulation in active learning and pointed out the

need to include self-regulatory constructs, such as self-monitoring, self-evaluation and attributions, to better explain the process of knowledge acquisition.

In addition, Bell & Kozlowski (2008) demonstrated that self-evaluation activity not only influenced knowledge acquisition in training, but also adaptive transfer. Consistent with previous studies (Kozlowski & Bell, 2006), the authors found out that the quality of training participants' cognitive self-regulatory activities is particularly important to training effectiveness when training's goal is to develop more complex and adaptive skills.

Finally, Bell & Kozlowski (2008) identified that motivational processes, namely intrinsic motivation and self-efficacy resulted in increased effort and persistence during training and ultimately emerged as key predictors of knowledge acquisition and analogical transfer. Given these findings, we expect that self-regulated learning may act as mediator between training climate and transfer motivation.

Hypothesis 2: The relationship between training climate and transfer motivation is mediated by self-regulated learning.

Learning and transfer are critical outcomes at any training program. Individuals must acquire knowledge, skills and abilities, and then apply them to their work context. Training effectiveness can be ultimately measured by the means of training evaluation. Many models of training evaluation coexist. One of the most populars (Blau, Gibson, Bentley & Chapman, 2012) is the Kirkpatrick's four-level framework (Kirkpatrick, 1967), which measures learner's reactions, learning outcomes (e.g. knowledge acquisition), transfer (e.g. adoption of new behaviours) and organisational results (e.g. customer satisfaction or financial performance).

Positive workplace climate has been found as predictor of training transfer (Martin, 2010). Noe's (1986) model of transfer assumes a direct relationship between a favourable climate and training transfer as well as through linkages to motivation to learn. Additionally, Tracey *et al*. (1995) showed that organisational climate was directly related with the adoption of new behaviours after training. Given these findings, we hypothesise that training climate will be positively related with training evaluation.

Hypothesis 3: There is a positive association between training climate and training evaluation.

Pintrich (2004) postulates as assumption of the self-regulated learning perspective that self-regulatory activities mediate the relationship between contextual characteristics and actual perfomance.

Empirical evidence has been found to support this assumption. For instance, self-efficacy has been shown to strengthen the relationship between organisational factors (e.g. organisational culture) and training transfer (e.g. Simosi, 2012). Additionally, Keith & Frese (2005) found self-regulation (emotion control and metacognition) as mediators of performance effects. More recently, Grohmann *et al.* (2014) called future research to address mediating variables that further support training transfer, for example self-efficacy.

In sum, we expect that self-regulated learning mediates the relationship between training contextual factors, measured by training climate, and training outcomes, measured by training evaluation.

Hypothesis 4: The relationship between training climate and training evaluation is mediated by self-regulated learning.

There is abundant evidence that transfer motivation precedes transfer of training to the workplace (e.g. Gegenfurtner, Festner, Gallenberger, Lehtinen & Gruber, 2009; Grohmann *et al.*, 2014). Therefore, to complete our research model, we expect that transfer motivation will be directly and positively associated with training evaluation.

Hypothesis 5: There is a positive association between transfer motivation and training evaluation.

The hypotheses we have developed on the basis of existing literature are now synthesised our research model (Figure 4), which is going to be tested later, with the help of the structured equations model method.

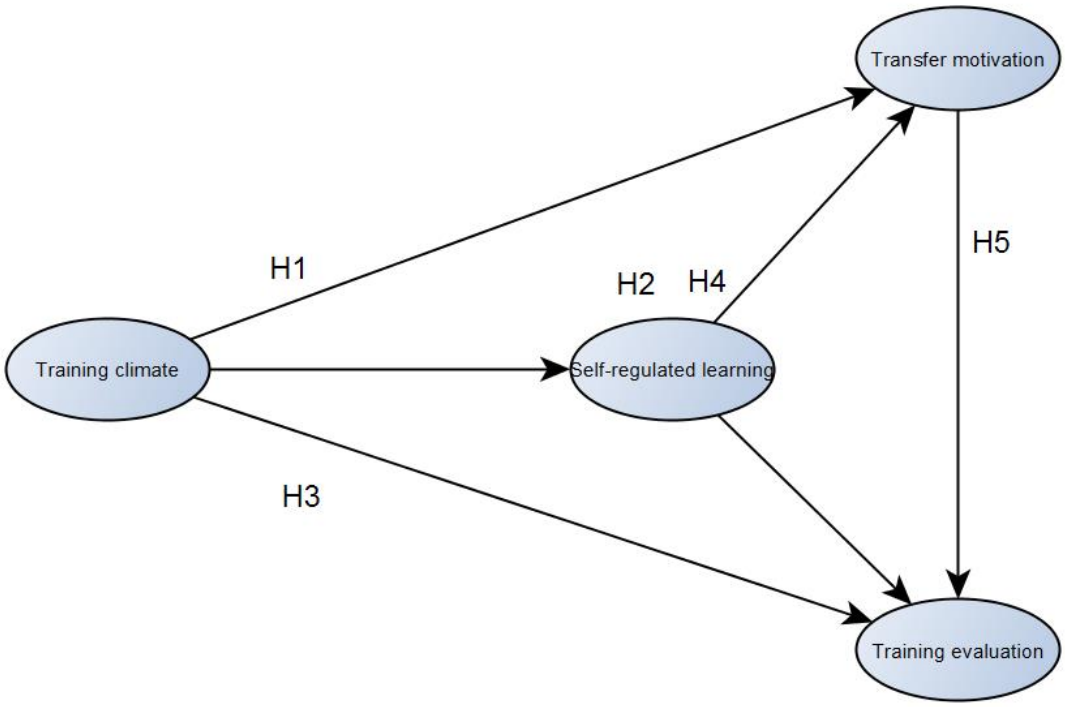

Figure 4 - Hypothesised model of interaction among Training Climate, Self-Regulated Learning, Transfer Motivation and Training Evaluation.

2. Method

2.1 Data collection and sample

2.1.1 Sample 1

Data was collected from two different sources:

a. A questionnaire was distributed among employees of a retail company on paper. The participants (n=104) were store managers, who voluntarily responded during a one-day classroom training course on the topic of process management, conducted between January and March 2016.
b. To ensure a larger sample, the same questionnaire was published online, using the SoSci Survey platform (https://www.soscisurvey.de/). The participants (n=126) were invited to respond using multiple social networks, such as Facebook, LinkedIn and Xing. The questionnaire was available between March and May 2016. The two conditions to participate in the study were (1) to be currently working for an organisation and (2) to have attended at least one training course in the last 12 months. A 6-year study on memory of daily events revealed that less than 1 percent of the events were forgotten during the first year, whereas after then this rate increased by around 5 percent to 6 percent annually (Linton, 1982). Taking this into account, considering trainings that date back at most 1 year seemed appropriate for our study.

In both situations, respondents were informed that the anonymity of the answers would be ensured during the whole process. After an introduction, in which the aim of the study was briefly presented and anonymity of the answers during the whole process was ensured, participants provided their demographic, position information and company information. Then, they were asked to complete the training climate scale. After that, they were invited to think on their strategies in the context of occupational training courses in general and to answer the self-regulated learning scale, rating their thoughts, emotions and behaviours regarding their learning processes in the context of occupational training. Finally, participants were asked to think about the last training course they had attended and completed the scales of transfer motivation and training evaluation.

A total of 230 valid respondents resulted of the described data collection process. It was obtained a good balance in the gender, with exactly 50% of respondents being male 50% being female. The age group with the biggest expression in the sample is the one between 30

and 39 years (60,4%), with an average age of 35,8 years (M = 35,8; SD = 6,3). Regarding educational level, the majority of respondents (53,0%) had some higher education degree.

Information on work-related characteristics was also collected. The substantial majority of the respondents (85,2%) worked for companies with 250 or more employees. Regarding company sector, the majority of the respondents (56,5%) worked in wholesale and retail trade.

2.1.2 Sample 2

Like for study 1, for study 2, data was collected with two different sources. The revised, shorter version of the questionnaires, based on the exploratory factor analysis conducted, was applied to both paper and online version:

a. The revised questionnaires were distributed on paper among employees of the same retail company as for study one. The participants (n=97) were once again store managers, who voluntarily responded during a one-day classroom training course on the topic of recruitment and selection, conducted between May and July 2016.
b. To ensure a larger sample, the same questionnaires were published online, using the SoSci Survey platform (https://www.soscisurvey.de/). The participants (n=116) were invited to respond using multiple social networks, such as Facebook, LinkedIn and Xing. The questionnaire was available in July 2016. The same conditions to participate in the survey were the same.

Respondents were informed again that the anonymity of the answers would be ensured during the whole process. The order of the scales (training climate, self-regulated learning, transfer motivation and training evaluation) was the same used in study 1.

A total of 213 valid respondents resulted of the described data collection process. It was obtained a good distribution in the gender, with 48,8% of respondents being male 52,2% being female. The age group with the biggest expression in the sample is the one between 30 and 39 years (47,4%), with an average age of 33,8 years (M = 33,8; SD = 7,6), two years less than in study 1. Regarding educational level, the majority of respondents (57,2%) had some higher education degree.

Information on work-related characteristics was also collected. The substantial majority of the respondents (77,9%) worked for companies with 250 or more employees. Regarding company sector, the majority of the respondents (63,8%) worked in wholesale and retail trade.

2.2 Study 1: Instrument development

In order to validate the hypothesised model, we developed and validated a scale to measure the central variable of our model, self-regulated learning, in work-related training courses. We also adapted and validated existing instruments to measure the three other variables, namely training climate, to gather information regarding organisational context, transfer motivation, to evaluate individual's motivation to transfer training contents, and training evaluation, to measure the perceived learning and transfer.

All these scales were validated using the following procedure. First, items were selected from pre-existing instruments. Some new items were created. Second, we ran a principal components analysis and some items were dropped out to ensure satisfactory level of internal consistency of the subscales measuring each factor. Third, using a different sample, we ran a confirmatory factor analysis to ensure maximal validity of the scales, which were further refined. In the next pages, we present the whole process in detail.

2.2.1 Measures construction

A total number of 4 scales was used to measure four different constructs: self-regulated learning (based on several existing instruments, e.g. Pintrich *et al.*, 1991), training climate (Tracey & Tews, 2005), transfer motivation (Gegenfurtner *et al.*, 2009) and training evaluation (Grohmann *et al.*, 2014; Velada *et al.*, 2007). While the scale to measure self-regulated learning was developed from scratch, based on several previously developed instruments, each of the other three scales were adapted from a pre-existing and validated instrument. The procedure used to develop each scale is presented below.

A 7-point Likert-type response scale was used, ranging from 1 = *totally disagree* to 7 = *totally agree* was used in all scales in order to measure the extent of the respondent's agreement with each item. Consequently, a higher score indicated stronger agreement. All questions were related to the latest fully completed training in which the respondent had participated. Furthermore, the entire survey is based on self-evaluations by the respondents; the limitations resulting from this will be presented in the discussion.

2.2.1.1 Training Climate

The company's training climate was initially assessed with 15 items from the General Training Climate Scale (GTCS; Tracey & Tews, 2005), an instrument used to measure perceived support from management, work, and the organization for formal and informal

training and development activities, rated on a 7-point Likert-type response scale ranging from 1 (strongly disagree) to 7 (strongly agree). The GTCS originally consists of three dimensions: managerial support (e.g." Supervisors give recognition and credit to those who apply new knowledge and skills to their work"), job support (e.g. "Gaining new information about ways to perform work more effectively is important in this organization") and organizational support (e.g. "Employees are provided with resources necessary to acquire and use new knowledge and skills"). The overall goal of this instrument is to measure employees' perceptions of from job, managers and organisation as a whole to both formal and informal training and development (Tracey & Tews, 2005). The scale has been developed on a sequence of previous studies based in the assumption that environmental factors, such as the continuous-learning culture (Tracey *et al.*, 1995) or work environment (Tracey, Hinkin, Tannenbaum & Mathieu, 2001), play a key role in a variety of training outcomes, including training transfer. Reliability analysis showed Cronbach's alpha values ranging between 0,85 and 0,87, which revealed good internal consistency of all three subscales. Additionally, all items loaded exclusively on the proposed factor, accounting altogether for 65,8% of total variance. Lastly, confirmatory factor analysis conducted by the authors confirmed model fit (NFI = 0,98; CFI = 0,97; RMSEA = 0,048).

All items were used in their original version, except for the item "There is a performance appraisal system that ties financial rewards to use of newly acquired knowledge and skills", which was reworded to "There is a performance and potential appraisal system that values the use of newly acquired knowledge and skills", to make the item more generic since many organisations do not have variable compensation at all.

2.2.1.2 Self-regulated learning

In order to assess employees' perceptions of their self-regulated learning in a pre-post analysis, we developed a questionnaire initially consisting of 48 items. The questionnaire was based on Zimmerman's model cyclical of self-regulated learning (2000a), containing the three phases: forethought, performance and self-reflection. Each phase contained several subscales to measure the processes.

Following the two-step approach of Fontana *et al.* (2015), we (1) started by identifying the sub-processes of self-regulation that would be relevant in job-related training and then (2) we took items from pre-existing instruments. We also developed some new items to measure the relevant processes when suitable items were not found in the literature. The availability of a

large number of pre-existing validated instruments to assess SRL, such as the MSLQ (Pintrich *et al.*, 1991), provided a solid starting point for the development of a new SRL instrument.

Phases	**Forethought**	**Performance**	**Self-reflection**
Sub-processes	**Task Analysis** Goal setting Strategic planning **Self-Motivation Beliefs** Self-efficacy Outcome expectations Task interest/value Goal orientation	**Self-control** Self-instruction Imagery Attention focusing Task strategies Environmental structuring Help seeking **Self-observation** Metacognitive monitoring Self-recording	**Self-Judgement** Self-evaluation Causal attribution **Self-Reaction** Self-satisfaction/affect Adaptive/defensive

Table 4 – SRL phases and sub-processes as outlined by Zimmerman (2003).

Not all of the sub-processes outlined by Zimmerman appeared to be relevant in formal workplace training course. The degree to which the individual *motivates* himself and *reflects* about his learning, since these activities hugely depend on *personal* attitudes and choices. But there are other activities, especially those that fall in the performance phase, that rely more on the *environmental* factors, such as time management. For example, usually an employee does not have to study to pass on an exam in a training course of negotiation techniques. The exception would be a training that would give access to a certain certification, with a strict evaluation process, for example an IT certification. But since these characteristics do not apply to a significant amount of training courses and our goal was to develop an instrument as flexible and comprehensive as possible, we have decided to drop out elements that would not suit most of job-related training situations. Following this line of thought, elements typically related with academic education, such as self-instruction or environmental structuring, were dropped out.

On the other hand, we included an additional sub-process, critical thinking, identified in the MSLQ (Pintrich *et al.*, 1991), because we considered it particularly relevant in job-related training. Critical thinking refers to the degree to which learners apply knowledge to concrete situations, in order to solve problems, make decisions or evaluate results. We therefore assume that, at least conceptually, this construct may be related with the learner's ability to transfer the acquired knowledge to real workplace situations.

We reviewed a number of previously validated instruments and selecting items so that each SRL or its sub-process would be covered by a range of items. Five instruments used as sources for items are as follows.

- *Self-Regulated Learning at Work Questionnaire (SRLWQ)* - This instrument developed by Fontana *et al.* (2015) provided some adequate items (e.g. "It is important for me to learn new things in this job"), since the questionnaire was developed specifically for work context, while other instruments mostly targeted formal educational contexts. However, as the authors admit and similarly to Schulz & Roßnagel (2010), this instrument is aims measuring informal workplace learning, whereas our goal is to measure self-regulated learning regarding formal job-related training. Therefore, the instrument as a whole would not fit this study's needs.
- *Motivated Strategies for Learning Questionnaire (MSLQ*) - The Motivated Strategies for Learning Questionnaire (MSLQ) an 81-item self-report instrument to measure student motivation and learning strategies with 15 subscales introduced by Pintrich *et al.* (1991) that has been widely used in the past two decades to predict academic performance (Rotgans & Schmidt, 2010; Credé & Philips, 2011). It has been proved to be a reliable and valid instrument (Pintrich et al., 1993; Rotgans & Schmidt, 2010; Credé & Philips, 2011). A total of 20 items (e.g. "I treat the course material as a starting point and try to develop my own ideas about it") were adapted and used in our scale.
- *Metacognitive Awareness Inventory (MAI)* - Schraw & Dennison (1994) developed a 52-item inventory to measure metacognitive awareness. It is based on a two-component view of metacognition, namely (a) knowledge of cognition and (b) regulation of cognition. This instrument provided us some items to measure metacognitive activity (e.g. "I periodically review to help me understand important relationships")
- *Error Orientation Questionnaire (EOQ)* - Rybowiak et al. (1999) we selected two items that measure learning from errors: "My mistakes help me to improve my work" and "Mistakes provide useful information for me to carry out my work". Learning from errors is defined by the authors as "the ability to prevent errors in the long term by learning from them, planning, and changing work processes". Given the experimental nature of everyday work (as opposed to the much more theoretical nature

of formal education), we believed these items would the scale's ability to measure the adaptive/defensive process in job-related training.

- *Learning Strategies Questionnaire (LSQ)* - Warr & Downing (2000) constructed a 45-items inventory of reported learning strategies. Since it measures a wide range of regulatory aspects, from mental strategies to emotions control, it the nature of this instrument can be described as versatile and comprehensive. Our specific goal however was to use this instrument as a source of items to measure the SRL-Performance phase, since it displays a significant amount of items measuring active use of learning strategies (e.g. "I tried to develop an overall idea of how different bits of the materials relate to each other").
- *Online Self-Regulated Learning Questionnaire (OSLQ)* – Barnard-Brak, Lan & Paton (2010) developed a 24-item scale with a 5-point Likert-type response format, that provided one item to measure peer learning ("I share my problems with my classmates online so we know what we are struggling with and how to solve our problems").

Based on the conceptualization of the SRL construct presented, 57 items were initially developed. Each one of them was submitted to a rigorous examination of the content appropriateness and clarity by one Professor and one HR Training & Development Practioneer. Based on these results, 9 items were deleted, forming a 48-item scale. The verb tense was standardised across all items, form past or future tense to present tense, so that the instrument could fulfil its purpose of measuring self-regulation of learning not at the course-specific level (i.e. an individual training course or programme) but at a general level (i.e. all courses taken together).

The three SRL scales were structured as follows. The scale measuring the forethought phase consisted of 17 items representing six sub-processes. The scale measuring the performance phase included 18 items representing another six sub-processes. Finally, the scale designed to measure self-reflection consisted of 13 items representing four sub-processes

Sub-processes represented in the test version of the questionnaire are presented in table 5.

Phases	Forethought	Performance	Self-reflection
Sub-processes	**Task Analysis** Goal setting Strategic planning **Self-Motivation Beliefs** Self-efficacy Outcome expectations Task interest/value Goal orientation	**Self-control** Attention focusing Task strategies Help seeking Peer learning **Self-observation** Metacognitive monitoring Critical thinking	**Self-Judgement** Self-evaluation Causal attribution **Self-Reaction** Self-satisfaction/affect Adaptive/defensive

Table 5 - Sub-processes of self-regulation included in the test version of the SRL questionnaire.

2.2.1.3 Transfer motivation

In order the measure motivation to transfer the training contents to the workplace, the scale developed by Gegenfurtner *et al.* (2009) was adopted. Four subscales were adapted and used for our study: attitudes towards training content (e.g. "I easily come up with at least five reasons for complying with safety and health regulations."), instructional satisfaction (e.g. "The examples used by the instructor were colourful."), controlled motivation to transfer (e.g. "Successful training application will probably be appreciated by my supervisor (e.g. through praise)") and autonomous motivation to transfer ("Successful application of the training content is an exciting challenge for me."). The subscale "relatedness" was excluded from our study, because the topic of learning support by others was already covered in the training climate scale. While the original questionnaire features 5-point response scale, we used a 7-point scale for our study, to ensure a higher level of sensitivity. In the end, the scale we used to measure transfer motivation encompassed 20-items. Reliability analysis made by the authors showed Cronbach's alpha values ranging between 0,75 and 0,84, which revealed acceptable internal consistency of all four subscales used.

2.2.1.4 Training evaluation

In the search for an appropriate self-report instrument to measure training outcomes, one may find that there are several theoretical models and frameworks for training evaluation (e.g. Aguinis & Kraiger, 2009; Salas & Cannon-Bowers, 2001), many of them drawn upon Kirkpatrick's four-level framework: reaction, learning, behaviour and organisational results (Kirkpatrick, 1967). One of them is the "Questionnaire for Training Evaluation" (Q4TE), a

12-item scale developed by Grohmann & Kauffeld (2013). This questionnaire encompasses previous contributions, like Wang & Wilcox (2006), by considering two temporal dimensions: short-term and long-term evaluation. As shown in figure 2, the Q4TE scales reaction (e.g. "I enjoyed the training very much."), learning/knowledge (e.g. "After the training, I know substantially more about the training contents than before."), application to practice ("I successfully manage to apply the training contents in my everyday work.") and organisational ("My job performance has improved through the application of the training contents. "). We used this questionnaire because of its time efficiency and easy application, as well as due to its psychometric qualities shown in the study. Reliability analysis showed Cronbach's alpha values ranging between 0,79 and 0,96, which revealed good internal consistency of subscales, which accounted altogether for 74,6% of variance. Additionally, confirmatory factor analysis conducted by the authors confirmed model fit (CFI=0,97; RMSEA=0,074).

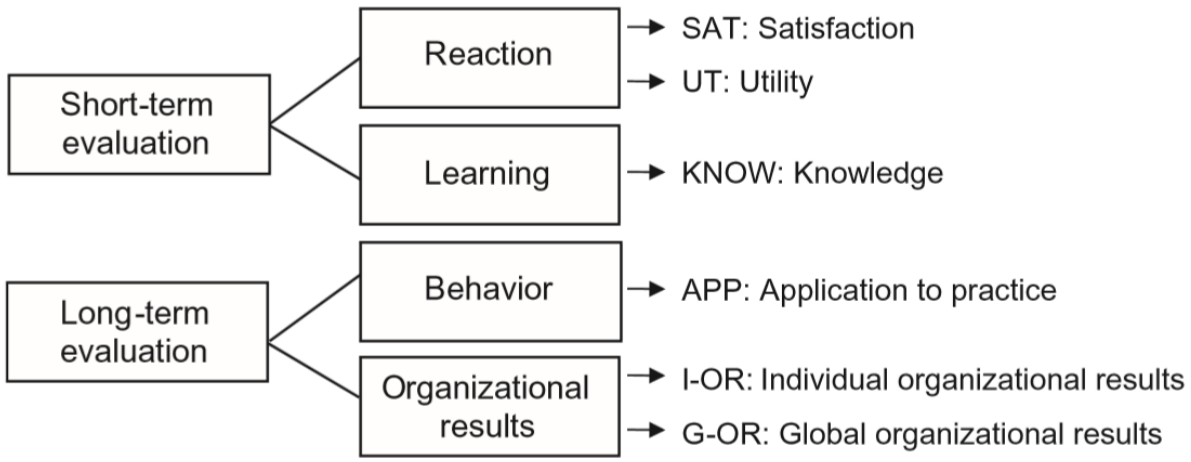

Figure 5 – Subscales of the Q4TE (Grohmann & Kauffeld, 2013)

We also added the scale of training retention developed by Velada *et al.* (2007), who created a small scale to measure training retention, because a measure of training retention could not be found in the literature. The three items (e.g. "I still remember the main topics that I have learned in the training course") showed acceptable internal consistency ($\alpha = 0,70$) Overall, the questionnaire we first used to measure training evaluation included 15 items.

2.2.2 Measures validity and reliability

We used a Principal Components Analysis with varimax rotation to prove construct validity and conducted a Cronbach's reliability test regarding all items of the various constructs measured. According to statistical best practices, factors loaded by only one or two items were deleted (Hakstian, Rogers, & Cattell, 1982). Furthermore, and in accordance with Ford, MacCallum, and Tait (1986), we deleted items with loadings greater than 0,40 on two or more factors. In the tables, we suppressed factor loadings with values below 0,32 and changed the original order of the survey for the sake of clarity. After selecting the items, all subscales showed acceptable internal consistency values ($0{,}73 \leq \alpha \leq 0{,}93$). According to Nunnally (1978), reliabilities of 0,70 (or greater) are sufficient. The results regarding each scale and the subsequent interpretation of loaded factors are presented below.

2.2.2.1 Self-regulated learning

Due to the modest sample size ($n = 230$) it was not possible to conduct a single factor analysis for the whole SRL-Questionnaire. We conducted therefore 3 separated factor analysis, for each 3 phases of self-regulated learning: forethought, performance and self-reflection.

SRL-Forethought

The factor analysis of the items measuring Forethought phase of SRL resulted in 3 components. The first component ($\alpha = 0{,}83$) integrates 7 items. It brings together self-efficacy and task interest and value. We interpreted this component as representing intrinsic motivation (IM).

The second component ($\alpha = 0{,}80$) represents orientation for extrinsic goals and outcome expectancies. We interpreted this component as representing extrinsic motivation (EM).

The third component ($\alpha = 0{,}74$) gathers strategic planning and goal setting, two intimately related constructs from a conceptual point of view. We interpreted this component as representing the SRL process of task analysis (TA) as represented in Zimmerman’s model.

Three other items selected to measure intrinsic goal orientation originally loaded in a separated factor. Initially composed by three items, one of them (SR14) had to be dropped because of its cross-loading in all factors and very low communality (0,370). With only two items remaining (SR12, SR13) and the intrinsic motivation already being measured through

the items SR08, SR10 and SR08 (part of task interest/value), we have decided to eliminate this dimension from our further analysis.

Items	Dimension		
	IM	EM	TA
SR06. I'm certain I can master the skills being taught in the training courses.	**0,767**		
SR07. When I'm confronted with a problem during a training, I can usually find several solutions.	**0,713**		0,344
SR05. I'm certain I can understand the most difficult and complex material presented in training courses.	**0,695**	0,368	
SR10. Understanding the subject matter of training courses is very important to me.	**0,665**		
SR09. I think I will be able to use what I learn in training courses in my work.	**0,643**		
SR11. I am very interested in the content area of the training courses.	**0,566**		
SR08. It is important for me to learn new things in my job.	**0,563**		
SR16. If I can, I want to get better results in the training courses than most of my colleagues.		**0,846**	
SR15. I am interested in the training courses because I want to get a promotion.		**0,820**	
SR17. I want to do well in the training courses because it is important to show my skills to my supervisor, colleagues and team.		**0,762**	
SR03. I seek information (in books, on the Internet, etc.) to get ready for a training.			**0,850**
SR04. Before a training course I set specific learning goals.			**0,842**
SR02. Before attending a training course, I ask myself questions about how it is going to be.			**0,672**
Eigenvalues	3,294	2,339	2,250
% of explained variance	19,376	13,759	13,325
Cronbach's alpha	0,833	0,797	0,741

Table 6 - SRL-Forethought questionnaire factorial structure - Rotated component matrix.

Self-Regulated Learning - Performance

Factor analysis of Performance SRL-phase resulted in 2 components. The first factor comprehends items representing activities initiated by the learner. Only 5 of the 6 items were kept in the dimension, since SR28 was a clear case of cross-loading that reduced the internal consistency. We interpreted this factor as representing SRL process of self-control (SC).

The second component compiles 2 elements of critical thinking (SR34 and SR35) and metacognitive monitoring (SR32). The other 2 elements associated to this component (SR30

and SR33) were deleted due to their low loading in this dimension. We interpreted this factor as representing SRL process of self-observation (SO).

Other two components measuring attention focusing and help seeking were suggested by the rotated component matrix. However, since each of these dimensions had only two solid items and had a low internal consistency (0,672 and 0,493), we have decided to drop them out.

Items	Dimension	
	SC	SO
SR26. I translate the concepts and definitions presented in the training into my own words.	**0,726**	
SR24. I try to develop an overall idea of how different bits of information relate to each other.	**0,706**	
SR27. I often try to explain what I learn in trainings to a classmate or a friend.	**0,683**	
SR25. I think of examples of situations of my work where training content can be applied.	**0,670**	
SR23. During training courses I make notes (including diagrams, etc.) to help organise my thoughts.	**0,572**	
SR34. I treat the course material as a starting point and try to develop my own ideas about it.		**0,795**
SR35. I try to play around with ideas of my own related to what I am learning in a training course.		**0,714**
SR32. After the training, I review my notes to understand important relationships between the concepts.		**0,640**
Eigenvalues	3,056	2,798
% of explained variance	16,978	15,543
Cronbach's Alpha	0,756	0,733

Table 7 - SRL-Performance questionnaire factorial structure - Rotated component matrix.

SRL-Self-reflection

Regarding the last SRL phase – self-reflection – the factor analysis (KMO=0,842) resulted in two components. The first one ($\alpha = 0,74$) encompasses four items that concern adaptation (or keeping) of learning strategies on the basis of previous experience. Therefore, we name it after Zimmerman's process of "self-reaction" (SR). The second factor brings together three items that measure if the individual thinks about and examines the success of his or her learning strategies in a reflective way. Thus we have decided to call it "self-judgement" (SJ), another process of self-regulated learning. A third factor was initially extracted, but excluded because it included only two items with significant loadings and showed insufficient internal consistency ($\alpha = 0,40$).

Items	Dimensions	
	SR	SJ
SR46. My mistakes help me to improve my work.	**0,757**	
SR48. After a training I think how I will be able to learn better in the next training.	**0,736**	
SR47. I change some learning strategies when I feel difficulties.	**0,723**	
SR44. I feel fulfilled when what I learn is useful for my work.	**0,602**	
SR38. I ask myself if I learned as much as I could have once I finish a training.		**0,813**
SR37. I ask myself how well I have accomplished my goals once I finish a training.		**0,807**
SR36. I ask myself if there were other ways to do things after I finish a training.		**0,761**
Eigenvalues	2,747	2,563
% of explained variance	21,129	19,713
Cronbach's Alpha	0,742	0,814

Table 8 - SRL-Self-reflection questionnaire factorial structure - Rotated component matrix

Summary

Sub-processes after exploratory factor analysis are represented in Table 9. As we can see, the results of exploratory factor analysis give support, not to all sub-processes individually treated, but to the second-level processes as depicted by Zimmerman (2003).

Phases	**Forethought**	**Performance**	**Self-reflection**
Processes Sub-processes	**Task Analysis** Goal setting and strategic planning	**Self-control** Task strategies	**Self-judgement** Self-evaluation
	Self-Motivation Beliefs Self-efficacy and task interest/value (*intrinsic motivation*)	**Self-observation** Metacognitive monitoring and critical thinking	**Self-reaction** Adaptive/defensive
	Outcome expectations (*extrinsic motivation*)		

Table 9 – Sub-processes of SRL extracted from exploratory factor analysis.

Across all phases a good balance is achieved with the factorial solution given by the exploratory factor analysis. In fact, in all three phases there is one factor that measures the *behavioural* aspect of SRL and one (or two as we will see in the case of forethought) aspect(s) that focus on the *cognitive/emotional* dimension of SRL.

Task analysis includes activities of goal setting and strategic planning, i.e. the activities a learner endeavours to get ready for a training. Task analysis, as defined by Zimmerman

(2013: 143), *"... refers to a learner's efforts to break a learning task into key components, such as math operations in a story problem."* For example, a participant on a training in Recruitment & Selection would decompose the training contents in separate and distinct elements, such as screening curricula, interviewing candidates or selecting the right person.

Regarding the process of self-motivation beliefs, the factor analyses divided it in two factorial dimensions: intrinsic motivation, which encompasses elements sub-processes self-efficacy and task interest/value; and extrinsic motivation, which corresponds to the sub-process of outcome expectations. From a conceptual standpoint, it is reasonable that this two types of motivation to learn remain separate, since the drivers of intrinsic motivation (e.g. "I want to learn because it makes be a better professional") are very different of the elements that trigger extrinsic motivation (e.g. "I want to learn, because I want to be recognised by my peers.").

Self-control focus on the behavioural aspect of SRL during the course of training, that is what the learner *does* during a training course, while self-observation is more focused on the cognitive aspects, i.e. how the learner *thinks* about what and how he is learning.

The distinction between self-judgement and self-reaction is pretty similar to the one between self-control and self-observation. While self-judgement regards the perceptions of learning success and emotional attributions after the training activity was performed, self-reaction measures the actions deliberately made by the learner to adapt or maintain his learning strategies for the next learning opportunity.

All in all, after applying the principal component analysis to the 48 items of the pilot version of SRL-questionnaire, we obtained a 28-item questionnaire with three subscales, which measured three phases of SRL. However, since our goals is to develop a new instrument, next we will test if the factorial structure obtained in the exploratory factorial analysis is confirmed with another sample, by the means of a confirmatory factor analysis.

2.2.2.2 Training climate

Kaiser-Meyer-Olkin measure of sampling adequacy was high (0,904). However, the factor analysis conducted did not corroborate the dimensions identified by Tracey & Tews (2005). Instead, only two factors emerged from the exploratory factor analysis (Table 10).

Items	Dimensions	
	LS	CE
TC14. There are rewards and incentives for acquiring and using new knowledge and skills in one's job.	**0,811**	
TC15. This organization rewards employees focusing newly acquired knowledge and skills on the job.	**0,802**	
TC07. Job assignments are designed to promote personal development.	**0,773**	
TC08. Learning new ways of performing work is valued in this organization.	**0,753**	0,342
TC12. This organization offers excellent training programs.	**0,745**	
TC02. Supervisors match associates' needs for personal and professional development with opportunities to attend training.	**0,740**	
TC13. Employees are provided with resources necessary to acquire and use new knowledge and skills.	**0,735**	
TC09. Work assignments include opportunities to learn new techniques and procedures for improving performance.	**0,724**	0,404
TC11. There is a strong belief that continuous learning is important to successful job performance.	**0,659**	0,412
TC04. Top management expects high levels of performance at all times.		**0,862**
TC05. Top management expects continuing technical excellence and competence.		**0,857**
TC06. Gaining new information about ways to perform work more effectively is important in this organization.	0,417	**0,645**
Eigenvalues	5,415	2,531
% of explained variance	45,125	21,092
Cronbach's alpha	0,926	0,765

Table 10 - Training climate questionnaire factorial structure - Rotated component matrix.

The first factor (α = 0,93) integrates 9 items and refers to the elements in the organisation that support learning. Therefore, we call it "learning support".

The second factor (α = 0,77) aggregates 3 items and incorporates the expectations towards the individual regarding individual's competence and performance. Therefore, we call it "competence expectations".

2.2.2.3 Transfer motivation

Multicollinearity of training motivation scale, measured by Kaiser-Meyer-Olkin measure was high (0,904), suggesting a good sampling adequacy. In general, the factorial structure obtained by Gegenfurtner *et al.* (2009) was corroborated (Table 11). Some items had even so to be excluded from the scale. TM02 was excluded because of its low communality value (0,472). TM09 and TM12 were excluded because they loaded on three different factors with

about the same weight. A forth factor, containing TM10 and TM11, was initially extracted, but since only 2 items loaded on it, and its content was not meaningful for the purpose we wanted to use this scale, we have decided to drop it. After performing this factor analysis, the total number of items was reduced to 15.

Items	Dimensions		
	AT	AM	CM
TM03. I would like to contribute in making my work area more similar to what I have learned in the training courses.	**0,769**		
TM04. I think it is important to apply the training contents.	**0,730**		0,330
TM06. I feel morally committed to apply the training contents.	**0,679**	0,329	
TM05. I feel responsible for implementing the training contents in my working area.	**0,667**	0,325	0,369
TM01. I easily come up with at least five reasons for putting the training contents into practice.	**0,640**		
TM07. I had sufficient possibilities to play a part in the training (e.g. through own examples).	**0,623**	0,388	
TM08. The examples used by the instructor were colourful.	**0,609**	0,430	
TM20. This challenge is important for me.		**0,794**	
TM18. This learning is important for me.		**0,776**	
TM19. Successful application of the training content is an exciting challenge for me.		**0,768**	
TM17. While applying training at work, I can learn a lot.	0,336	**0,635**	0,470
TM15. Successful application of the training content will probably result in career opportunities.			**0,737**
TM16. These opportunities are important for me.			**0,727**
TM14. This appreciation is important for me.			**0,721**
TM13. Successful training application will probably be appreciated by my supervisor (e.g. through praise).			**0,608**
Eigenvalues	4,600	3,601	2,947
% of explained variance	23,001	18,007	14,737
Cronbach's alpha	0,876	0,916	0,797

Table 11 – Transfer motivation questionnaire factorial structure - Rotated component matrix

The first factor (α = 0,88) integrates 7 items. According to the original study (Gegenfurtner *et al.* 2009), 5 of the items corresponding to the dimension "Attitudes towards training content" and two of them to the dimension of "Instructional satisfaction". Therefore, we have decided to call this factor "Attitudes towards training" (AT).

The second factor (α = 0,92) aggregates 4 items, which precisely correspond to the dimension of "autonomous motivation to transfer", according to the original study. This items clearly

measure intrinsic motivation to apply the training contents in the workplace. Therefore, we have decided to keep the name the original authors first gave (AM).

Similarly, the third factor (α = 0,80) also aggregates 4 items that correspond to the original dimension of "controlled motivation to transfer". These items measure extrinsic motivation to apply the training contents in the workplace. Thus, also here we kept the name the original authors first gave (CM).

2.2.2.4 Training evaluation

The scale used to measure training evaluation loaded on two factors (Table 12). A third factor, which encompassed items from the retention scale (TE08, TE09, TE11), was excluded, because when measuring its internal consistency, it showed a very low Cronbach's alpha (0,495). Three items (TE01, TE07 and TE10) were excluded because they loaded on three different factors. One item (TE12) was excluded to strengthen the internal consistency of the factor it had loaded on. As a result of this item selection, the scale was reduced to only 8 valid items.

Items	Dimensions	
	RL	CT
TE04. Participation in this kind of training is very useful for my job.	**,819**	
TE05. After the training, I know substantially more about the training contents than before.	**,767**	
TE03. The training is very beneficial to my work.	**,763**	
TE06. I learned a lot of new things in the training.	**,684**	,324
TE02. I enjoyed the training very much.	**,634**	
TE15. Overall, it seems to me that the organizational climate has improved due to the training.		**,874**
TE13. My job performance has improved through the application of the training contents.		**,867**
TE14. Overall, it seems to me that the application of the training contents has facilitated the work flow in my company.		**,865**
Eigenvalues	4,173	3,784
% of explained variance	27,821	25,227
Cronbach's alpha	0,835	0,731

Table 12 – Training evaluation questionnaire factorial structure - Rotated component matrix

Two different levels of training evaluation, reaction and learning, were found to collapse into a single factor (α = 0,835) identified as "reaction and learning" (RL). It encompasses items

measuring satisfaction with the training course (TE02), perception of utility of training (TE03, TE04) and perception of knowledge acquisition (TE05, TE06).

The second factor (α=0,731). "content transfer" (CT) is composed by three items (TE13-15) that measure the perceived impact of content transfer to the workplace in organisational results. Therefore, we called it "content transfer".

2.3 Study 2: Model validation

2.3.2 Confirmatory factor analysis

The factorial structure that resulted from the exploratory factor analysis, was tested by conducting a confirmatory factor analysis (CFA) using the AMOS 23 software with another sample. We used the procedure of Maximum Likelihood (ML) as an estimation method. According to Hoyle (1998), this procedure presents advantages in terms of the statistical processing of relatively small samples and consequently, the fitness index seems to work better with ML than with other statistical estimation procedures.

Our decisions regarding model fit of the scales was essentially based on 3 fit indices: CMIN/DF is the minimum discrepancy divided by its degrees of fit. Although according to Marsh & Hocevar (1985) ratios as low as 2 or as high as 5 indicate a reasonable fit, we followed the advice of Byrne (1989), who advocated that a ratio > 2,00 represents an inadequate fit, and we only accepted a model after its showed a CMIN/DF ration below 2,00. The second group of criteria was the normed fit index (NFI), comparative fit index (CFI), and incremental fit index (IFI). NFI, CFI and IFI values higher than 0,9 indicate a good statistical fit (Bentler, 1990). The third criterion was the root mean square error of approximation (RMSEA). Values of RMSEA equal or less than 0,08 indicate a good fit (Browne & Cudeck, 1993).

For ML estimation, a minimum ratio of at least five cases per free parameter estimated is recommended (Bentler & Chou, 1987). Therefore, and similarly to the exploratory factor analysis previously conducted, we tested each scale independently. However, after the CFA was conducted, we will be able test the fit of the hypothesised model using all scales and latent variables that emerged from CFA.

In the next pages, we explain the results obtained in the CFA in each scale. In the case of SRL-scales, since we the purpose is the development of a new instrument to assess SRL in work-related training courses, and, therefore, we want to get as much evidence as possible

that the questionnaire is valid, we compared the model fit of the hypothesised solution that derived from the exploratory factor analysis with alternative models with a reduced number of factors.

2.3.2.1 Self-regulated learning

In the case of the item of SRL-forethought, a three-factor structure emerged from exploratory factor analysis (EFA): task analysis, extrinsic motivation and intrinsic motivation. We tested it against an alternative model with only two factors (task analysis and general motivation) and with a single-factor model. Table 13 displays the results obtained. The single-factor solution revealed a very poor adjustment. Contrarily, as we can see, the difference in model fit between the three-factor and the two-factor solutions is relatively small. In fact, Zimmerman's SRL-model (2000a) depicts "self-motivation beliefs" as a single process, encompassing both self-efficacy and intrinsic motivation (or task interest) aspects, as well as extrinsic motivational factors (outcome expectations). Therefore, from a conceptual standpoint, both factorial solutions could be accepted and the model fit of two-factor model could also be accepted from a statistical perspective. However, we chose the solution that showed the best statistical fit and decided to keep the three dimensions for our further analysis. We also highlight the existing correlations between the three latent variables ($0{,}28 > r > 0{,}40$), which were significant at the $p < 0{,}05$ level, suggesting that there should be a second-level latent variable that encompasses the whole phase of Forethought.

Model	χ^2	df	CMIN/DF	NFI	IFI	CFI	RMSEA
Three-factor	120,766	62	1,948	0,854	0,923	0,922	0,071
Two-factor	125,019	60	2,084	0,849	0,915	0,913	0,076
One-factor	273,441	61	4,483	0,670	0,723	0,717	0,136

Table 13 - Fit indices among competing models of SRL-Forethought. Note: $N = 190$.

Regarding the second SRL subscale, design to measure the Performance phase, we have obtained slightly better results in terms of overall model fit, with smaller level of CMIN/DF, RMSEA and a CFI level closer to 1. However, we had to eliminate one item (SR27) to obtain an acceptable fit, reducing to four the number of items measuring self-control. This item was a reminiscent of the original "peer learning" dimension, that in the exploratory factor analysis was integrated in self-control. The factorial structure that derived from EFA, composed by two factors (self-control and self-observation) was clearly corroborated, while the alternative, one-factor model showed very poor values (Table 14). A strong correlation ($r = 0{,}50$; $p <$

0,001) was measured between the two latent variables of self-control and self-observation, which give support to the cohesion of the processes constituting the Performance phase.

Model	χ^2	df	CMIN/DF	NFI	IFI	CFI	RMSEA
Two-factor	25,148	13	1,934	0,936	0,968	0,947	0,070
One-factor	34,706	12	2,892	0,912	0,941	0,939	0,100

Table 14 - Fit indices among competing models of SRL-Performance. Note: $N = 190$.

Lastly, we were able to achieve the best fit values in SRL-Self-reflection subscale. The strongest correlation value between latent variables of SRL was the one between self-judgement and self-reaction ($r = 0,59$; $p < 0,001$). Additionally, some covariances had to be drawn between the errors of the items of both dimensions. These facts could suggest that a single-factor solution would best fit this model. However, the two-factor solution, composed by self-judgement and self-reaction proved to be clearly more valid than the single-factor solution proposed and competing model, whose results were not statistical acceptable (Table 15).

Model	χ^2	df	CMIN/DF	NFI	IFI	CFI	RMSEA
Two-factor	18,970	10	1,897	0,935	0,968	0,967	0,069
One-factor	32,407	10	3,241	0,888	0,920	0,917	0,109

Table 15 - Fit indices among competing models of SRL-Self-reflection. Note: $N = 190$.

Finally, we would like to highlight that all observed variables were significantly correlated with the respective latent variables. Overall, and after making slight changes in the models, all subscales of SRL presented an adequate level of structural adjustment, being able to be used in the further procedures.

Finally, to validate the fit of model that underlies the instrument as a whole, we have tested all SRL-dimensions in the same model, having obtained adequate levels of adjustment (CMIN/DF = 1,595; CFI = 0,901; RMSEA = 0,056).

2.3.2.2 Training climate, transfer motivation and training evaluation

In the remaining scales, all observed variables (with the exception of TE06) were significantly correlated with the respective latent variables. Training climate scale exhibited strong adjustment levels (CMIN/DF = 1,370; CFI = 0,973; RMSEA = 0,057). Transfer motivation scale also revealed an acceptable model adjustment (CMIN/DF = 1,985; CFI = 0,953; RMSEA = 0,073). Finally, the training evaluation scale showed the best fit of all scales used

(CMIN/DF = 1,263; CFI = 0,996; RMSEA = 0,038), although in order to fit to be reached, one item (TE06 = “I learned a lot of new things in the training”) was removed. After deleting this item, the subscale of learning and reaction still presents an acceptable number of four items.

3. Results

Structural equation modelling (SEM) was used in this study to test the hypothesised model (Figure 1). SEM supports explicit tests of both direct and indirect structural hypotheses as well as establishment of measurement error. Both exogenous constructs (that is, external predictors and variables) and endogenous constructs (underlying dependent variables) are examined using this approach. AMOS software used in this study examined the maximum likelihood method and produced outputs or indices that support determination of model fit. Results are judged against established fit standards to ascertain the strength of the findings in relation to the hypothesised model (Figure 1). A SEM model with indices found to be in the appropriate ranges offers explanation for the covariance structure observed. In order to conduct SEM analysis, cases with missing data were excluded from the analyses, resulting in 137 cases providing complete data.

3.1 Descriptive statistics and correlation of variables

In order to understand the existing relation between different constructs obtained validated with the CFA, we with the CFA, we start to present the correlations between them, as well as the mean and standard deviation standard deviation values (

Table 16). While the correlations obtained were statistically significant in most of the cases, some analyses can be made. For example, constructs that make part of both transfer motivation and training evaluation showed higher correlations ($0{,}50 > r > 0{,}70$), suggesting that the strongest relationship in the model will the one between transfer motivation and training evaluation ($r = 0{,}62$) A second area where higher correlations can be observed is between learning support and transfer motivation variables. Remaining significant correlation values are to find between items that share the same latent variable (e.g. self-control and self-motivation $r = 0{,}54$).

	Descriptive Statistics			Correlations											
	M	SD	N	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Learning support	4,93	1,11	137													
2. Competence expectations	6,01	0,92	137	,635**												
3. Task analysis	5,01	1,12	137	,030	-,109											
4. Intrinsic motivation	6,10	0,53	137	,407**	,345**	,211*										
5. Extrinsic motivation	4,78	1,31	137	,246**	,287**	,085	,236**									
6. Self-control	6,04	0,60	137	,184*	,226**	,246**	,470**	,201*								
7. Self-observation	5,63	0,81	137	,282**	,236**	,301**	,421**	,133	,540**							
8. Self-judgement	5,45	0,83	137	,193*	,148	,335**	,284**	,182*	,441**	,534**						
9. Self-reaction	5,99	0,70	137	,322**	,251**	,394**	,447**	,261**	,336**	,301**	,380**					
10. Attitutes towards training	5,95	0,89	137	,497**	,412**	,226**	,489**	,242**	,370**	,457**	,449**	,421**				
11. Controlled motivation to transfer	5,55	1,09	137	,622**	,498**	,108	,379**	,405**	,306**	,282**	,223**	,386**	,680**			
12. Autonomous motivation to transfer	6,10	0,97	137	,457**	,398**	,249**	,426**	,289**	,344**	,366**	,403**	,475**	,770**	,718**		
13. Reaction and learning	5,65	0,94	137	,358**	,304**	,195*	,470**	,214*	,286**	,322**	,292**	,304**	,671**	,486**	,643**	
14. Content transfer	4,86	1,23	137	,488**	,266**	,202*	,323**	,294**	,209*	,255**	,351**	,424**	,575**	,562**	,595**	,702**

Note: M = mean; SD = standard deviation

** $p < 0,01$

* $p < 0,05$

Table 16 – Descriptive statistics and correlations of main study variables.

3.2 Structure model

The model consisted of six first-level latent factors (training climate, SRL-Forethought, SRL-Performance, SRL-Self-reflection, transfer motivation and training evaluation), one second-level latent factor (Self-regulated learning, aggregating each SRL-phase) and 14 observed variables. An initial test to the model revealed a very satisfactory fit to the data (N = 137): p < 0,001; RMSEA = 0,068; and CFI = 0,966. All the factor loadings for the indicators on the latent variables were significant (p < 0,001), indicating that all the latent factors were well represented by their respective indicators. In addition, as shown in Figure 6, most latent factors from the model were significantly correlated (p < 0,05).

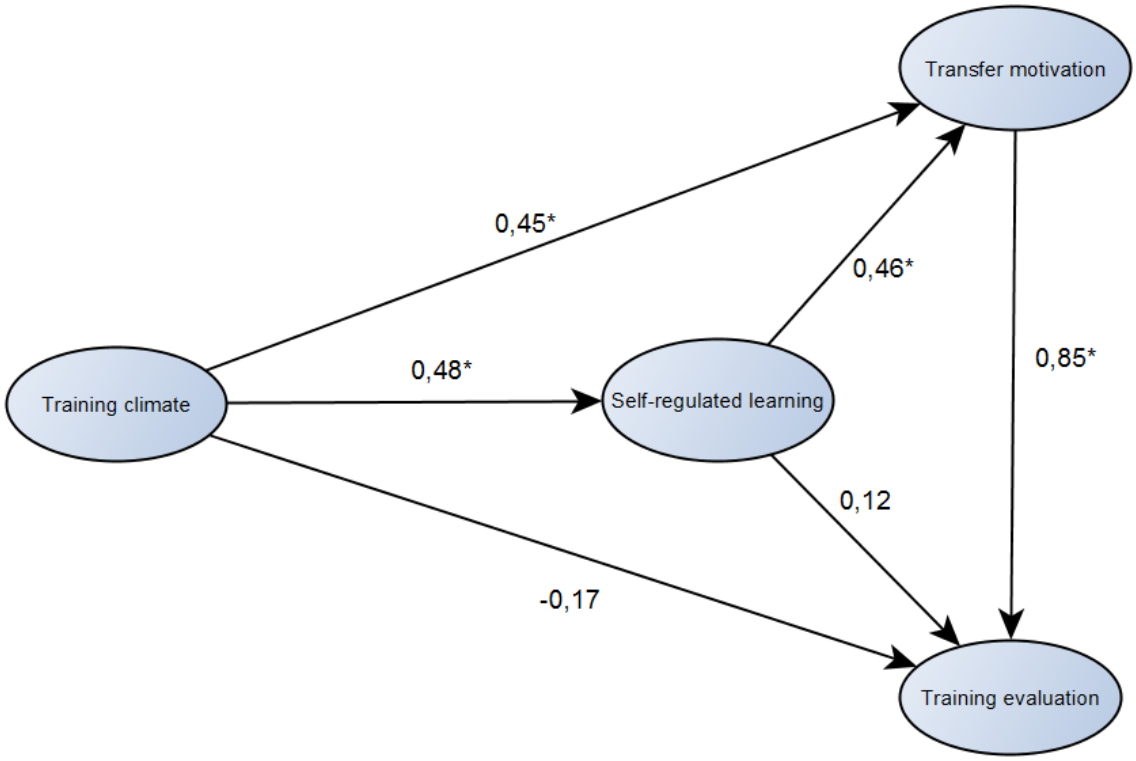

Figure 6 - Structural Equation Modelling Results for Interaction Among Training Climate, Self-regulated Learning, Transfer Motivation and Training Evaluation. Note: *p < 0,05; **p < 0,01.

To ensure the model in Figure 6 was the best one possible, we tested the hypothesised model (Model 1) in relation to alternatives. The first alternative (Model 2), was a model in which Self-Regulated Learning was removed. In the second competing model (Model 3), we removed the second-order latent variable of Self-Regulated Learning but kept the first-order latent variables of each SRL-phase and hypothesised relationships among them. The model with the best fit was obtained with Model 1, except for the NFI/IFI/CFI levels, which were

slightly better in the case of Model 2 (Table 17). These results give additional support to the hypothesised interaction depicted in Figure 6 by indicating that alternative models 2 and 3 were not able to show as much fit as the hypothesised model.

	χ^2	df	CMIN/DF	NFI	IFI	CFI	RMSEA
Model 1	100,939	62	1,628	0,897	0,957	0,956	0,068
Model 2	30,109	9	3,011	0,949	0,965	0,965	0,122
Model 3	111,882	64	1,748	0,885	0,947	0,946	0,074

Table 17 – Fit indices among competing models. Note: *N = 137*.

3.3 Hypotheses testing

After having validated the model, our next step was to test the hypothesised mediation effects (H2 and H4) and direct relations (H1, H3 and H5). To perform this test, different methods are available from the Baron & Kenny (1986) procedure, to Sobel's (1982) test and the Bootstrapping method, advocated, among other authors, by Preacher & Hayes (2004, 2008).

As stated by Preacher & Hayes (2008: 886) bootstrapping is "… *the most powerful and reasonable method of obtaining confidence limits for specific indirect effects under most conditions*" In fact, there is a growing consensus that the significance of indirect effects is best tested by bootstrap method (Cheung, 2007; MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2008; Shrout & Bolger, 2002). It basically consists in a resampling technique for estimating statistical parameters, such as standard errors and confidence intervals.

Given the literature advice, the significance of the mediating effect of self-regulated learning was tested using the Bootstrap estimation procedure in AMOS software. A bootstrap sample of 150 was specified, since a bigger sample could not be used with standardised estimates.

Table 18 displays both direct and indirect effects and their associated 95% confidence intervals, as well as the significance level of the relationships.

Model pathway	Point estimate	Standard error	95% confidence interval		*p*-Value
			Lower bound	Upper bound	
TC → TM	0,431	0,107	0,297	0,712	0,025
TC → SRL	0,494	0,109	0,205	0,683	0,011
SRL → TM	0,514	0,108	0,207	0,688	0,018
TC → SRL → TM	0,254	0,063	0,144	0,421	0,004
TC → TE	0,324	0,115	0,118	0,565	0,015
TC → SRL	0,454	0,120	0,205	0,683	0,013
SRL → TE	0,468	0,127	0,161	0,670	0,012
TC → SRL → TE	0,213	0,066	0,088	0,371	0,005
TM → TE	0,831	0,053	0,681	0,906	0,018

Table 18 - Standardised effects and 95% confidence intervals.

Three steps were made to find (a) if there was a direct relationship between the latent variables, (b) if this relationship was mediated by a third variable, and (c) what was the nature of the existing mediation (full or partial). The results regarding each hypothesis are presented with more detail below.

H1: There is a positive association between training climate and transfer motivation.

First, we tested there was a direct effect between training climate and transfer motivation, without the influence of any other variable. The results of bootstrapping show that the relationship (r = 0,70) is statistically relevant (p = 0,021 < 0,05). Therefore, Hypothesis 1 is accepted.

H2: The relationship between training climate and transfer motivation is mediated by self-regulated learning.

Now that the direct relationship between training climate and transfer motivation has been validated, the second step was to test the indirect effect through the self-regulated learning as mediating variable. With r = 0,254, the mediation showed significance (p = 0,004 < 0,05) Therefore, Hypothesis 2 is accepted. The third step regarding this mediation is to assess its nature, i.e. if it is a full or a partial mediation. Since the relationship between training climate and transfer motivation remains even after the mediating variable was added (r = 0,43; p = 0,025), we are in front of a partial mediation. In other words, results of bootstrapping suggest

that the relationship between training climate and transfer motivation is *partially* mediated by self-regulated learning.

H3: There is a positive association between training climate and training evaluation.

First, we tested there was a direct effect between training climate and training evaluation, without the influence of any other variable. The results of bootstrapping show that the relationship (r = 0,25) is statistically relevant (p = 0,035 < 0,05). Therefore, Hypothesis 3 is accepted.

H4: The relationship between training climate and training evaluation is mediated by self-regulated learning.

The next step is to test the indirect effect through the self-regulated learning as mediating variable between training climate and training evaluation. With r = 0,213, the mediation showed significance (p = 0,004 < 0,05) Therefore, Hypothesis 4 is accepted. The third step regarding this mediation is to assess its nature. Since the relationship between training climate and training evaluation remains even after the mediating variable was added (r = 0,32; p = 0,025), we are in front of a partial mediation. In other words, results of bootstrapping suggest that the relationship between training climate and training evaluation is *partially* mediated by self-regulated learning.

H5: There is a positive association between transfer motivation and training evaluation.

Finally, to complete the testing of the hypothesised mode, we tested there was a direct effect between transfer motivation and training evaluation. The results of bootstrapping show that the relationship (r = 0,831) is statistically relevant (p = 0,018 < 0,05). Therefore, Hypothesis 5 is accepted.

4. Discussion

4.1 Theoretical implications

One of the purposes of this study was to examine the role of self-regulated learning in the relationship between training context variables and organisational outcomes. Available literature has focused on contextual variables, such as workplace climate (e.g. Martin, 2010), social support (e.g. Homklin *et al*., 2014) and supervisor support (e.g. Van der Klink *et al*., 2001). Conversely, little was studied about the self-regulatory processes professionals engage in.

We sought to extend existing research developing a new measurement instrument of self-regulated learning for use in organisational context and testing a theoretical model. The three main implications for research of our study are (a) the introduction of a new concept in training literature, (b) the presentation of a validated instrument to assess self-regulated learning in training and (c) the validation of a theoretical model that sheds some light on the role of self-regulation in learning and transfer to the workplace.

First, this study supports the introduction of a new concept in management and training literature. Self-regulated learning is a concept developed and extensively studied in the field of educational psychology (Zimmerman, 1990; Boekerts, 2002; Pintrich, 2004; Zimmerman, 2013). In contrast, organisational psychology has shown some interest in the topic of self-regulation as a predictor of organisational outcomes (e.g. Yeow & Martin, 2013), but has not addressed the topic of self-regulated learning in training. By introducing this new concept, we allow a better understanding of intrapersonal processes in learning and transfer and we believe new avenues in management and training research are open.

Second, we have developed and successfully validated a new instrument to measure self-regulated leaning in training. All subscales of self-regulated learning measuring each process showed adequate internal consistency. As comparison, the Cronbach's alpha values obtained in our study are higher than the ones of the MSLQ (Pintrich *et al.*, 1993; Rotgans & Schmidt, 2010), one the most popular measurement instruments of self-regulated learning (Zimmerman, 2008). However, there is some room for improvement. For instance, other items could be added to measure processes, such as help-seeking, that may be relevant in organisational context.

As for the results of the confirmatory factor analysis, we were able to validate the three-factor structure of the self-regulated learning scale with another sample of participants. As other studies have assumed in the recent past (e.g. DiBenedetto & Zimmerman, 2013; Fontana *et al.*, 2015), our factor analysis gives empirical support to Zimmerman's (2000a) three-phase cyclical model of self-regulated learning. Overall, the final twenty six-items scale appears suitable for use in organisational context in terms of scale internal consistency reliability.

The third main contribution to research is the validation of a theoretical model that sheds some light on the role of self-regulation in learning and transfer to the workplace. The hypothesised model was supported by the structured equations model. Overall, the hypothesised role of self-regulated learning as mediator in the relationship between contextual variables (e.g. training climate) and organisational outcomes (e.g. training evaluation) is confirmed.

First of all, the model showed a better fit when all variables converged into a second order latent variable, what seems to confirm the existence single variable that encompasses a series of different self-regulatory processes. This finding is consistent with abundant evidence of interrelation between self-regulatory processes (e.g. Ford *et al.*, 1998; Kozlowksi *et al.*, 2001) and should encourage researchers to consider self-regulated learning as a single concept in their future studies, instead of studying isolate self-regulatory processes.

As expected, our first hypothesis was supported, confirming the importance of contextual variables to predict transfer motivation, as it has been consistently found in the literature (Egan, 2008; Van der Klink *et al*., 2001; Grossman & Salas, 2011; Homklin *et al.*, 2014; Kastenmüller *et al.*, 2012).

Our second hypothesis also found support in obtained results. Bootstrap analysis showed that self-regulated learning mediates the relationship between training climate and transfer motivation. This finding is in line with previous studies that identified that self-regulatory motivational processes, such as intrinsic motivation and self-efficacy, predicted learning and transfer (Bell & Kozlowksi, 2008).

The third hypothesis was confirmed, as it would be to expect, given previous evidence that context variables, such as organisational climate, predicted training transfer (e.g. Tracey *et al.*, 1995; Martin, 2010). Like the first hypothesis, it underlines the importance of research to

further understand how organisations may promote a climate that supports successful training transfer.

The forth hypothesis, which stated that self-regulated learning mediated the relationship between training climate and training evaluation, was accepted, as bootstrapping results showed that the mediation was statistically relevant. This gives support to social cognitive theory, according to which human functioning is a product of reciprocal interplay of intrapersonal, behavioural and environmental determinants (Bandura, 2001). As a matter of fact, intrapersonal determinants (self-regulated learning) was found to mediate the relationship between environmental determinants (training climate) and behavioural determinants (training evaluation, in particular content transfer). This finding also reinforces the agentic perspective of the human being (Bandura, 2006), with individual self-regulation to play a key role in the achievement developmental outcomes, such as knowledge acquisition and training transfer. The results also give empirical support to the theoretical assumption of Pintrich (2004), who hypothesised that self-regulatory activities would mediate the relationship between contextual characteristics and actual performance.

Finally, and not surprisingly, the fifth and last hypothesis was also accepted. Given the body of research showing that transfer motivation predicts training transfer (e.g. Grohmann *et al.*, 2009; Grohmann *et al.*, 2014). The validation of the final hypothesis is an important step to further establish the concept of self-regulated learning in a theoretical transfer system and validate the whole hypothesised model.

4.2 Practical implications

This study had the ambition to bring a concept originated and tested in the field of educational psychology to organisational research and, ultimately, provide fruitful conclusions for management practice.

As discussed before, the study's results suggest that self-regulated learning mediates the relationship between training climate and both transfer motivation and training evaluation. From a human resource management standpoint, this suggests that organisations can enhance trainings' effectiveness, and therefore organisational results, by actively prompting self-regulated learning amongst employees. This argument gains in pertinence taking into account the fact that professionals exhibit poor self-regulatory skills of their learning in the workplace (Margaryan *et al.*, 2013).

As Schunk & Zimmerman (2003) reflected, self-regulation neither develops itself automatically, nor is passively acquired from the environment, thus systematic interventions are needed to assist the development of self-regulatory skills. Fortunately, existing literature on self-regulated learning provides a broad range of effective measures to promote self-regulated learning in individuals. Effective interventions include classroom instruction on self-regulated learning (Kostons, Van Gog & Paas, 2012; Noordzij, Van Hooft, Van Mierlo, Van Dam & Bornet, 2013), the use of reminders (Sitzmann & Ely, 2010), the introduction of a learning diary or protocol (Bertholt *et al.*, 2007; Hübner *et al.*, 2010; Nückles *et al.*, 2009; Schwonke, Hauser, Nückles & Renkl, 2006;) and social support of self-regulated learning (Margaryan *et al.*, 2013).

One strategy human resource professionals could adopt would be to directly train employees in self-regulatory competencies. Studies have shown that training interventions (e.g. reflecting on positive experiences with the training program) can have an impact on participants' motivation to transfer (e.g. Kastenmüller *et al.*, 2012). In parallel, several studies in educational research have confirmed that self-regulated learning training programmes have been shown to positively impact learning (Cleary & Zimmerman, 2004; Dignath, Buettner & Langfeldt, 2008; Berthold *et al.*, 2007; Hübner, Nückles, & Renkl, 2006; Sitzmann, Bell, Kraiger & Kanar, 2009). Therefore, we would suggest practitioners to implement such programmes in their organisations with the aim of enhancing employee's self-regulation of learning.

Training contents of such intervention could include delivering practical tools to foster the self-regulated use of learning strategies. For instance, Mih & Mih (2011) propose conceptual maps as mediators of self-regulated learning intervention, having a positive effect on learning performance. Other techniques, such as illustrative diagrams (Bui & McDaniel, 2015) and or strategic note-taking (Boyle, 2011) or providing a list of strategies to assist learners (Garner, 1990), also proved to be effective. A self-regulated learning training could also address goal setting strategies, as it promotes self-regulation and learning outcomes (Noordzij *et al.*, 2013).

An also evidence-based and more parsimonious way to improve the levels of self-regulated learning among employees attending training would be to deliver a learning diary (e.g. Schmitz & Perels, 2011; Schmitz & Wiese, 2006), so that individuals could reflect upon their learning process, define learning and transfer goals, plan their learning task and monitor their

learning. Inviting learners to plan their learning has shown positive impact in learning (Sitzmann & Johnson, 2012).

Additionally, there is evidence that specific self-regulatory processes can be enhanced through training design, namely through embedding of instructional principals of self-regulation (Ley & Young, 2001). For instance, Kozlowski *et al.* (2001) recommend that trainers set easier goals early in training to allow learners early successes ("quick wins") to promote self-efficacy. These authors also proposed that trainees be taught that they have control over learning to facilitate positive beliefs about performance capability. Thus, messages sent by course titles, trainer introductions, and feedback on learning can be used to increase self-efficacy. Training should also embed evaluation moments, like for example individual assignments to foster self-evaluation (Ley & Young, 2001). Trainer can also promote reciprocal feedback and peer evaluations to encourage metacognitive processes (Osman & Hannafin, 1992).

4.3 Limitations and future research

Regarding generalisation of the findings, and as in any research, there are some limitations to the study reported herein. Three main limitations should be kept in mind.

The first limitation regards sample size and representativeness. Sample size can also be considered as a limitation, particularly since only 137 respondents were available for the structured equations model. Regarding diversity, though the sample includes professionals from many fields of work, it is too much based in one area of activity, namely retail. This implies socio-demographic and organisational specificities. Thus, results obtained in the present study may not be generalised to other organisational realities. We suggest future research to test the models in other contexts.

The second limitation is related with data collection method, namely the exclusive use of self-reported and the absence of a longitudinal approach. Since data comes from self-reported sources, some caution is required when analysing study's results, because there is the tendency of people to socially desired responses (Crowne and Marlowe, 1964). In fact, the values used to evaluate leaning and transfer are exclusively based on individuals' perceptions. Future research should therefore include additional data gathered among employees' peers and supervisors. In order to avoid common method bias (Podsakoff, MacKenzie, Lee & Podsakoff, 2003), this would be particularly useful with respect to effectiveness measures,

namely with training evaluation. This could be done with the help of knowledge tests, to assess learning, and supervisor questionnaires, to evaluate content transfer to the workplace, as well as by crossing with data from performance appraisal. More qualitative data should also be collected, for example, using learning diaries (Panadero, Klug & Järvelä, 2015).

In addition, data on self-regulated learning was studied only at one point in time, giving a static perspective on self-regulatory processes, and participants responded only in a retrospective way, i.e. there were asked to think about what they felt and thought in the past. Thus, the full potential of Zimmerman's (2000a) cyclical model was not fully exploited. Future research should, therefore, study the role of self-regulated learning in training through experimental studies, as it has been successfully made in the field of formal education (e.g. Cleary & Zimmerman, 2004; Perels *et al.*, 2005). Specifically, such longitudinal studies would allow researchers to empirically confirm the cyclical nature of self-regulated learning, namely through multiple interventions where the processes of each self-regulated learning phase would be trained with several performance measurements, across time (e.g. Kitsantas & Zimmerman, 2002).

The third and last main limitation regards the variables measured. We suggest future researchers to include more contextual variables when studying self-regulated learning in the workplace. For instance, training design has been contemplated in many learning transfer theories (Baldwin & Ford, 1988; Holton *et al.*, 2000) and has showed to play an important role in promoting transfer motivation (e.g. Velada *et al.*, 2007). As reflected before, training design may influence the level of self-regulated learning trainees engage in, thus the inclusion of this variable would have added further insights into the role of self-regulated learning. It would also enrich the study to know more about the nature of training participants answered about, if more learner-centred or more instructor-centred, since for instance simulation learning requires more self-regulation as more autonomy is given to participants (e.g. Gegenfurtner, Quesada-Pallarès & Knogle, 2014). Additionally, perceived knowledge acquisition and content transfer were analysed together in a single variable, namely training evaluation. To better understand the impact in learning and transfer, these variables should be analysed independently by future researchers.

In conclusion, to further exploration of the issue of self-regulated learning in training, researchers should strive for sound research design and participant sampling in future studies. As it has been shown, self-regulated learning has important implications regarding training

outcomes. Therefore, and although our study makes meaningful and relevant contributions, there is much more to know about self-regulated learning in the workplace.

5. Conclusion

With evolving realities both in learning (Kraiger, 2014) and in transfer requirements (Bell & Kozlowksi, 2008), individuals are required to self-regulate their learning efforts and their transfer behaviours in order to succeed professionally.

In this shifting context, and knowing the importance of training effectiveness to organisational results (De Grip & Sauermann, 2013; Saks & Burke-Smalley, 2014) organisations are called to activate all factors that promote knowledge acquisition and transfer to the workplace. As our study showed, this should also involve fostering self-regulated learning amongst employees visiting training.

The current study provides novel evidence regarding the importance of self-regulatory processes to enhance effective learning and transfer of training in organisations. Specifically, and despite the limitations, the present research presents evidence in support of the good psychometric properties of the new questionnaire for measuring self-regulated learning in occupational training courses. Additionally, through structured equations modelling, we were able to validate that self-regulated learning mediates the relationship between contextual variables and training outcomes.

We are hopeful that research on self-regulation in the workplace will continue to progress over the next years. We believe that this study's findings open a fruitful opportunity for researchers, who should adjust their focus to accommodate self-regulated learning as a variable, to better understand how learning occurs in work-related training, and develop tools that allow organisations to measure and promote self-regulation among employees.

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List of Appendices

1. Scale construction

1.1 Self-regulated learning scale

1.1.1 SRL-Forethought

Item name	Process	Subprocess	Adapted item (PT)	Adapted item (EN)	Original item	Original instrument	EFA	CFA
SR01	Task analysis	Strategic planning	Uso estratégias específicas para os diferentes tipos de coisas que tenho de aprender.	I use specific strategies for different types of things I need to learn.	I use specific strategies for different types of things I need to learn.	SRLWQ	(Excluded)	
SR02	Task analysis	Strategic planning	Antes de ir a uma formação, questiono-me sobre a forma como ela vai decorrer.	Before attending a training course, I ask myself questions about how it is going to be.	I ask myself questions about each learning task before I begin.	SRLWQ	TA	TA
SR03	Task analysis	Strategic planning	Procuro informação (em livros, na internet, etc.) para me preparar para a formação. (ED)	I seek information (in books, on the Internet, etc.) to get ready for a training.	N/A	Originally developed	TA	TA
SR04	Task analysis	Goal setting	Antes de começar uma formação, defino objetivos específicos sobre o que quero aprender	Before a training course I set specific learning goals.	I set specific goals before I begin a task.	MAI	TA	TA
SR05	Self-motivation beliefs / values	Self-efficacy	Estou certo de que consigo compreender os materiais mais difíceis e complexos apresentados nas formações em que irei participar.	I'm certain I can understand the most difficult and complex material presented in training courses	I'm certain I can understand the most difficult material presented in the readings for this course.	MSLQ	IM	IM
SR06	Self-motivation beliefs / values	Self-efficacy	Estou certo de que conseguirei dominar as competências treinadas nas formações.	I'm certain I can master the skills being taught in the training courses	I'm certain I can master the skills being taught in this class.	MSLQ	IM	IM
SR07	Self-motivation beliefs / values	Self-efficacy	Quando encontro uma dificuldade durante uma formação habitualmente encontro várias soluções.	When I'm confronted with a problem during a training, I can usually find several solutions.	When I'm confronted with a problem in my job, I can usually find several solutions.	SRLWQ	IM	IM
SR08	Self-motivation beliefs / values	Task-interest / value	Para mim é importante aprender coisas novas no meu trabalho.	It is important for me to learn new things in my job.	It is important for me to learn new things in this job.	SRLWQ	IM	IM
SR09	Self-motivation beliefs / values	Task-interest / value	Penso que serei capaz de utilizar o que aprendo nas formações no meu trabalho.	I think I will be able to use what I learn in training courses in my work.	I think I will be able to use what I learn in this job in the future / I think I will be able to use what I learn in this course in other courses.	SRLWQ	IM	IM
SR10	Self-motivation beliefs / values	Task-interest / value	Para mim é importante aprender os conteúdos das formações que frequento.	Understanding the subject matter of training courses is very important to me.	Understanding the subject matter of this course is very important to me.	MSLQ	IM	IM
SR11	Self-motivation beliefs / values	Task-interest / value	Estou muito interessado nos conteúdos das formações a que vou.	I am very interested in the content area of the training courses.	I am very interested in the content area of this course.	MSLQ	IM	IM
SR12	Self-motivation beliefs / values	Goal orientation (intrinsic)	Prefiro formações que me desafiem verdadeiramente para que possa aprender coisas novas.	I prefer training courses that really challenge me so I can learn new things.	1. In a class like this, I prefer course material that really challenges me so I can learn new things.	MSLQ	(Excluded)	

Note: TA = Task Analysis; IM = Intrinsic Motivation

Item name	Process	Subprocess	Adapted item (PT)	Adapted item (EN)	Original item	Original instrument	EFA	CFA
SR13	Self-motivation beliefs / values	Goal orientation (intrinsic)	Prefiro formações que despertem a minha curiosidade, mesmo que sejam difícil aprender.	I prefer training courses whose content arouses my curiosity, even if it is difficult to learn.	In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.	MSLQ	(Excluded)	
SR14	Self-motivation beliefs / values	Goal orientation (intrinsic)	O mais motivador para mim nas formações é tentar compreender o conteúdo tão detalhamente quanto possível.	The most motivating thing for me is trying to understand the course content as thoroughly as possible.	The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.	MSLQ	(Excluded)	
SR15	Self-motivation beliefs / values	Goal orientation (extrinsic) / Outcome expectancies	Vou-me interessar pela formação porque quero ser promovido.	I am interested in the training courses because I want to get a promotion.	N/A	Originally developed	EM	EM
SR16	Self-motivation beliefs / values	Goal orientation (extrinsic) / Outcome expectancies	Se eu puder, quero obter melhores resultados nas formações do que a maior parte dos meus colegas.	If I can, I want to get better results in the training courses than most of my colleagues.	If I can, I want to get better grades in this class than most of the other students.	MSLQ	EM	EM
SR17	Self-motivation beliefs / values	Goal orientation (extrinsic) / Outcome expectancies	Quero ser bom nas formações porque é importante para mim mostrar as minhas competências à minha chefia, aos meus colegas e à minha equipa.	I want to do well in the training courses because it is important to show my skills to my supervisor, colleagues and team.	I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.	MSLQ	EM	EM

Note: EM = Extrinsic Motivation

1.1.2 SRL-Performance

Item name	Process	Subprocess	Adapted item (PT)	Adapted item (EN)	Original item	Original instrument	EFA	CFA
SR18	Self-control	Help-seeking	Peço ao formador para clarificar conceitos que não percebo bem.	I ask the instructor to clarify concepts I don't understand well.	I ask the instructor to clarify concepts I don't understand well.	MSLQ	(Excluded)	
SR19	Self-control	Help-seeking	Partilho as minhas dúvidas e problemas com os meus colegas para que saibamos onde está a dificuldade e como podemos resolvê-la.	I share my questions and problems with my colleagues so we know what we are struggling with and how to solve our problems.	I sahre my problems with my classmates online so we know what we are struggling with and how to solve our problems.	OSLQ	(Excluded)	
SR20	Self-control	Help-seeking	Mesmo que esteja com dificuldades em aprender, tento fazer sozinho as tarefas, sem pedir ajuda a ninguém (reversed)	Even if I have trouble learning, I try to do the work in my own, without help from anyone.	Even if I have trouble learning the material in this class, I try to do the work in my own, without help from anyone.	MSLQ	(Excluded)	
SR21	Self-control	Attention focusing	Faço um esforço adicional para me concentrar quando não acho os conteúdos interessantes.	I increase my concentration effort when the training contents do not really interest me.	N/A	Originally developed	(Excluded)	
SR22	Self-control	Task activities	Pergunto a mim próprio em que medida o que estou a aprender numa formação está relacionado com o que já sei.	I ask myself how what I'm learning in a training course is related to what I already know.	I ask myself how what I'm learning is related to what I already know.	SRLWQ	(Excluded)	
SR23	Self-control	Task activities	Durante as formações tomo notas (como esquemas, etc.) para ajudar a organizar os meus pensamentos	During training courses I make notes (including diagrams, etc.) to help organise my thoughts.	When learning I make notes (including diagrams, etc.) to help organize my thoughts.	SRLWQ	SC	SC
SR24	Self-control	Task activities	Tento desenvolver uma ideia geral de como os diferentes aspetos se relacionam uns com os outros.	I try to develop an overall idea of how different bits of information relate to each other.	I tried to develop an overall idea of how different bits of the materials relate to each other.	LSQ	SC	SC
SR25	Self-control	Task activities	Penso em exemplos de situações do meu trabalho em que os conteúdos da formação podem ser aplicados	I think of examples of situations of my work where training content can be applied.	N/A	Originally developed	SC	SC
SR26	Self-control	Task activities	Traduzo os conceitos e as definições apresentadas na formação para as minhas próprias palavras.	I translate the concepts and definitions presented in the training into my own words.	When I study math, I translate the formulas or definitions in the textbook into my own words.	LSQ	SC	SC
SR27	Self-control	Peer learning	Frequentemente tento explicar o que aprendo nas formações a um colega ou a um amigo.	I often try to explain what I learn in trainings to a classmate or a friend.	When studying for this course, I often try to explain the material to a classmate or a friend.	MSLQ	SC	(Excluded)
SR28	Self-observation	Metacognitive monitoring	Coloco questões a mim próprio sobre os conteúdos da formação para testar a minha compreensão dos mesmos.	I ask myself questions about training content in order to test my understanding of it.	I asked myself questions about some material in order to test my understanding of it.	LSQ	(Excluded)	
SR29	Self-observation	Metacognitive monitoring	Durante as formações perco frequentemente pontos importantes porque estava a pensar noutras coisas. (reversed)	During training courses I often miss important points because I'm thinking of other things.	During class time I often miss important points because I'm thinking of other things (reversed).	MSLQ	(Excluded)	
SR30	Self-observation	Metacognitive monitoring	Pergunto-me periodicamente durante a formação se estou a atingir os meus objetivos de aprendizagem.	During training I ask myself periodically if I am meeting my learning goals.	I ask myself periodically if I am meeting my goals.	MAI	(Excluded)	

Note: SC = Self-Control

Item name	Process	Subprocess	Adapted item (PT)	Adapted item (EN)	Original item	Original instrument	EFA	CFA
SR31	Self-observation	Metacognitive monitoring	Quando é apresentado um tema, tento decidir o que é suposto aprender com ele, em vez de ficar apenas a ler a apresentação.	When a topic is presented, I try to decide what I am supposed to learn from it rather than just read the presentation.	I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying.	MSLQ	(Excluded)	
SR32	Self-observation	Metacognitive monitoring	Após a formação, revejo os apontamentos para perceber relações importantes entre os conceitos.	After the training, I review my notes to understand important relationships between the concepts	I periodically review to help me understand imporant relationships.	MAI	SO	SO
SR33	Self-observation	Critical thinking	Frequentemente questiono as coisas que são ditas na formação para decidir se as acho convincentes.	I often find myself questioning things I hear in this course to decide if I find them convincing.	I often find myself questioning things I hear or read in this course to decide if I find them convincing.	MSLQ	(Excluded)	
SR34	Self-observation	Critical thinking	Trato o material da formação como um ponto de partida e tendo desenvolver as minhas próprias ideias sobre ele.	I treat the course material as a starting point and try to develop my own ideas about it	I treat the course material as a starting point and try to develop my own ideas about it.	MSLQ	SO	SO
SR35	Self-observation	Critical thinking	Tento relacionar as minhas próprias ideias com o que é ensinado na formação.	I try to play around with ideas of my own related to what I am learning in a training course.	I try to play around with ideas of my own related to waht I am learning in this course.	MSLQ	SO	SO

Note: SO = Self-Observation

1.1.3 SRL_Self-reflection

Item name	Process	Subprocess	Adapted item (PT)	Adapted item (EN)	Original item	Original instrument	EFA	CFA
SR36	Self-judgement	Self-evaluation	Pergunto a mim próprio se havia outra forma de fazer as coisas depois de concluir a formação.	I ask myself if there were other ways to do things after I finish a training.	I ask myself if ther were other ways to do things after I finish a task.	SRLWQ	SJ	SJ
SR37	Self-judgement	Self-evaluation	Pergunto a mim próprio em que medida atingi os meus objetivos quando concluo uma formação.	I ask myself how well I have accomplished my goals once I finish a training.	I ask myself how well I accomplish my goals once I'm finished.	MAI	SJ	SJ
SR38	Self-judgement	Self-evaluation	Pergunto a mim próprio se aprendi tanto quanto podia ter aprendido quando termina uma formação.	I ask myself if I learned as much as I could have once I finish a training.	I ask myself if I learned as much as I could have once I finish a task.	MAI	SJ	SJ
SR39	Self-judgement	Causal attribution	Se utilizar as estratégias de aprendizagem adequadas sou capaz de aprender os conteúdos das formações	If I use the appropriate learning strategies, then I will be able to learn the training contents.	If I study in appropriate ways, then I will be able to learn the material in this course.	MSLQ	(Excluded)	
SR40	Self-judgement	Causal attribution	Se eu me esforçar sou capaz de entender os conteúdos das formações.	If I try hard enough, then I will understand the training contents.	If I try hard enough, then I will understand the course material.	MSLQ	(Excluded)	
SR41	Self-judgement	Causal attribution	É minha culpa se não aprender bem os conteúdos de uma formação.	It is my own fault if I don't learn the training contents.	It is my own fault if I don't learn the material in this course.	MSLQ	(Excluded)	
SR42	Self-reaction	Self-satisfaction/ affect	Tento compreender qual o impacto no meu trabalho daquilo que aprendi na formação.	I try to understand how what I've learned in a training impacts my work.	I try to understand how new information I've learned impacts my work.	SRLWQ	(Excluded)	
SR43	Self-reaction	Self-satisfaction/ affect	Penso sobre como o que aprendi encaixa na realidade da empresa.	think about how what I've learned fits in to the 'bigger picture' at my company	I think about how what I've learned fits in to the 'bigger picture' at my company.	SRLWQ	(Excluded)	
SR44	Self-reaction	Self-satisfaction/ affect	Sinto-me realizado porque o que aprendo é útil para o meu trabalho.	I feel fulfilled when what I learn is useful for my work.	N/A	Originally developed	SR	SR
SR45	Self-reaction	Self-satisfaction/ affect	Sinto-me realizado quando o formador elogia o meu contributo	I feel fulfilled when the trainer praises my contribution.	N/A	Originally developed	(Excluded)	
SR46	Self-reaction	Adaptive/ defensive	Os erros ajudam-me a melhorar o meu trabalho.	My mistakes help me to improve my work.	My mistakes help me to improve my work.	EOQ	SR	SR
SR47	Self-reaction	Adaptive/ defensive	Modifiquei algumas estratégias de aprendizagem quando senti dificuldades.	I change some learning strategies when I feel difficulties.	N/A	Originally developed	SR	SR
SR48	Self-reaction	Adaptive/ defensive	Depois de uma formação, penso como conseguirei aprender melhor na próxima formação.	After a training I think how I will be able to learn better in the next training.	N/A	Originally developed	SR	SR

Note: SJ = Self-Judgement; SR = Self-Reaction

1.2 Training climate scale

Item name	Dimension (original instrument)	Adapted item (PT)	Adapted item (EN)	Original item	Original instrument	EFA dimensions	CFA dimensions
TC01	Managerial Support	As chefias valorizam os colaboradores que aplicam novos conhecimentos e competências no seu trabalho.	Supervisors give recognition and credit to those who apply new knowledge and skills to their work.	Supervisors give recognition and credit to those who apply new knowledge and skills to their work.	GTCS (Tracey & Tews, 2005)	(Excluded)	
TC02	Managerial Support	As chefias proporcionam formações adequadas às necessidades de desenvolvimento de cada colaborador.	Supervisors match associates' needs for personal and professional development with opportunities to attend training.	Supervisors match associates' needs for personal and professional development with opportunities to attend training.	GTCS (Tracey & Tews, 2005)	LS	LS
TC03	Managerial Support	O pensamento independente e inovador é encorajado pelas chefias.	Independent and innovative thinking are encouraged by supervisors.	Independent and innovative thinking are encouraged by supervisors.	GTCS (Tracey & Tews, 2005)	(Excluded)	
TC04	Managerial Support	A gestão de topo espera sempre altos níveis de desempenho.	Top management expects high levels of performance at all times.	Top management expects high levels of performance at all times.	GTCS (Tracey & Tews, 2005)	CE	CE
TC05	Managerial Support	A gestão de topo espera excelência técnica e competência constantes.	Top management expects continuing technical excellence and competence.	Top management expects continuing technical excellence and competence.	GTCS (Tracey & Tews, 2005)	CE	CE
TC06	Job Support	Na minha organização é importante adquirir nova informação sobre como desempenhar o trabalho de forma mais eficaz.	Gaining new information about ways to perform work more effectively is important in my organisation.	Gaining newinformation about ways to perform workmore effectively isimportant in this organization.	GTCS (Tracey & Tews, 2005)	CE	CE
TC07	Job Support	As tarefas são desenhadas para promover o desenvolvimento pessoal.	Job assignments are designed to promote personal development.	Job assignments are designed to promote personal development.	GTCS (Tracey & Tews, 2005)	LS	LS
TC08	Job Support	Na minha organização valoriza-se a aprendizagem de novas formas de desempenhar o trabalho.	Learning new ways of performing work is valued in this organization.	Learning new ways of performing work is valued in this organization.	GTCS (Tracey & Tews, 2005)	LS	LS
TC09	Job Support	As tarefas incluem oportunidades de aprender novas técnicas e procedimentos para melhorar o desempenho.	Work assignments include opportunities to learn new techniques and procedures for improving performance.	Work assignments include opportunities to learn new techniques and procedures for improving performance.	GTCS (Tracey & Tews, 2005)	LS	LS
TC10	Job Support	Há uma forte crença de que a aprendizagem contínua é importante para o bom desempenho da função.	There is a strong belief that continuous learning is important to successful job performance.	There is a strong belief that continuous learning is important to successful job performance.	GTCS (Tracey & Tews, 2005)	(Excluded)	

Note: LS = Learning Support; CE = Competence Expectations

Item name	Dimension (original instrument)	Adapted item (PT)	Adapted item (EN)	Original item	Original instrument	EFA dimensions	CFA dimensions
TC11	Organizational Support	A avaliação de desempenho e de potencial valoriza a utilização de novos conhecimentos e competências.	There is a performance and potential appraisal system that values the use of newly acquired knowledge and skills.	There is a performance appraisal system that ties financial rewards to use of newly acquired knowledge and skills.	GTCS (Tracey & Tews, 2005)	LS	LS
TC12	Organizational Support	A minha organização oferece excelentes programas de formação.	My organisation offers excellent training programs.	This organization offers excellent training programs.	GTCS (Tracey & Tews, 2005)	LS	(Excluded)
TC13	Organizational Support	Os colaboradores recebem os recursos necessários para adquirir e utilizar novos conhecimentos e competências.	Employees are provided with resources necessary to acquire and use new knowledge and skills.	Employees are provided with resources necessary to acquire and use new knowledge and skills.	GTCS (Tracey & Tews, 2005)	LS	LS
TC14	Organizational Support	Há recompensas e incentivos para adquirir novos conhecimentos e competências no trabalho.	There are rewards and incentives for acquiring and using new knowledge and skills in one's job.	There are rewards and incentives for acquiring and using new knowledge and skills in one's job.	GTCS (Tracey & Tews, 2005)	LS	LS
TC15	Organizational Support	A minha organização recompensa os colaboradores que aplicam no seu trabalho os conhecimentos e as competências recentemente adquiridas.	My organisation rewards employees focusing newly acquired knowledge and skills on the job.	This organization rewards employees focusing newly acquired knowledge and skills on the job.	GTCS (Tracey & Tews, 2005)	LS	LS

Note: LS = Learning Support; CE = Competence Expectations

1.3 Transfer motivation scale

Item name	Dimension (original instrument)	Adapted item (PT)	Adapted item (EN)	Original item	Original instrument	EFA dimensions	CFA dimensions
TM01	Attitudes towards training content	Para mim é fácil identificar pelo menos cinco razões para pôr em prática os conteúdos desta formação.	I easily come up with at least five reasons for putting the training contents into practice.	I easily come up with at least five reasons for complying with safety and health regulations.	Gegenfurtner *et al.* (2009)	AT	AT
TM02	Attitudes towards training content	Para mim é importante aplicar no trabalho os conteúdos desta formação.	It is important for me to put the training contents into practice.	It is important for me to comply with the safety regulations at work.	Gegenfurtner *et al.* (2009)	(Excluded)	
TM03	Attitudes towards training content	Gostaria de dar o meu contributo para tornar a minha loja mais parecida com o que aprendemos nesta formação.	I would like to contribute in making my ork area more similar to what I have learned in the training courses.	I would like to contribute in making my work area safe and healthy.	Gegenfurtner *et al.* (2009)	AT	AT
TM04	Attitudes towards training content	Penso que é importante aplicar no trabalho os conteúdos da formação.	I think it is important to apply the training contents	I think it is important to apply the company's safety regulations to my workplace.	Gegenfurtner *et al.* (2009)	AT	AT
TM05	Attitudes towards training content	Sinto-me responsável por pôr em prática os conteúdos da formação na minha loja.	I feel responsible for implementing the training contents in my working area	I feel responsible for health and safety in my working area.	Gegenfurtner *et al.* (2009)	AT	AT
TM06	Attitudes towards training content	Sinto-me moralmente empenhado em aplicar os conteúdos da formação.	I feel morally committed to apply the training contents.	I feel morally committed to follow the safety regulations.	Gegenfurtner *et al.* (2009)	AT	AT
TM07	Instructional satisfaction	Tive oportunidades suficientes de participar na formação (por exemplo, dando exemplos próprios).	I had sufficient possibilities to play a part in the training (e.g. through own examples).	I had sufficient possibilities to play a part in the training (e.g. through own examples).	Gegenfurtner *et al.* (2009)	AT	AT
TM08	Instructional satisfaction	Os exemplos dados pelo formador foram ilustrativos.	The examples used by the instructor were colourful.	The examples used by the instructor were colourful.	Gegenfurtner *et al.* (2009)	AT	AT
TM09	Instructional satisfaction	Fui motivado a cooperar ativamente na formação.	I have been motivated for active cooperation.	I have been motivated for active cooperation.	Gegenfurtner *et al.* (2009)	(Excluded)	
TM10	Instructional satisfaction	Para mim, as demonstrações práticas foram pertinentes.	For me, the practical demonstrations were meaningful.	For me, the practical demonstrations were meaningful.	Gegenfurtner *et al.* (2009)	(Excluded)	
TM11	Instructional satisfaction	Para mim, os trabalhos em grupo foram uma atividade pertinente.	For me, doing group work was a meaningful activity.	For me, doing group work was a meaningful activity.	Gegenfurtner *et al.* (2009)	(Excluded)	
TM12	Instructional satisfaction	De um modo geral, fiquei satisfeito com o desempenho do formador.	Overall, I was satisfied with the training instructions.	Overall, I was satisfied with the training instructions.	Gegenfurtner *et al.* (2009)	(Excluded)	

Note: AT = Attitudes towards training.

Item name	Dimension (original instrument)	Adapted item (PT)	Adapted item (EN)	Original item	Original instrument	EFA	CFA
TM13	Controlled motivation to transfer	A aplicação bem-sucedida desta formação será provavelmente valorizada pela minha chefia (por exemplo através do elogio).	Successful training application will probably be appreciated by my supervisor (e.g. through praise).	Successful training application will probably be appreciated by my supervisor (e.g. through praise).	Gegenfurtner *et al.* (2009)	CM	CM
TM14	Controlled motivation to transfer	Esta valorização é importante para mim.	This appreciation is important for me.	This appreciation is important for me.	Gegenfurtner *et al.* (2009)	CM	CM
TM15	Controlled motivation to transfer	A aplicação bem-sucedida dos conteúdos desta formação resultará provavelmente em oportunidades de carreira.	Successful application of the training content will probably result in career opportunities.	Successful application of the training content will probably result in a material reward, such as a financial bonus.	Gegenfurtner *et al.* (2009)	CM	CM
TM16	Controlled motivation to transfer	Estas oportunidades são importantes para mim.	These opportunities are important for me.	This reward is important for me.	Gegenfurtner *et al.* (2009)	CM	CM
TM17	Autonomous motivation to transfer	Ao aplicar esta formação no local de trabalho conseguirei aprender muito.	While applying training at work, I can learn a lot.	While applying training at work, I can learn a lot.	Gegenfurtner *et al.* (2009)	AM	AM
TM18	Autonomous motivation to transfer	Esta aprendizagem é importante para mim.	This learning is important for me.	This learning is important for me.	Gegenfurtner *et al.* (2009)	AM	AM
TM19	Autonomous motivation to transfer	A aplicação bem-sucedida dos conteúdos desta formação será um desafio entusiasmante para mim.	Successful application of the training content is an exciting challenge for me.	Successful application of the training content is an exciting challenge for me.	Gegenfurtner *et al.* (2009)	AM	AM
TM20	Autonomous motivation to transfer	Este desafio é importante para mim.	This challenge is important for me.	This challenge is important for me.	Gegenfurtner *et al.* (2009)	AM	AM

Note: CM = Controlled motivation to transfer; AM = Autonomous motivation to transfer.

1.4 Training evaluation scale

Item name	Dimension (Original instrument)	Adapted item (PT)	Original item (EN) (= used item)	Original instrument	EFA dimensions	CFA dimensions
TE02	Reaction/Satisfaction	A formação deu-me muito gozo.	I enjoyed the training very much.	Q4TE (Grohmann *et al.*, 2014)	RL	RL
TE03	Reaction/Utility	A formação foi muito benéfica para o meu trabalho.	The training is very beneficial to my work.	Q4TE (Grohmann *et al.*, 2014)	RL	RL
TE04	Reaction/Utility	A participação neste tipo de formações é muito útil para o meu trabalho.	Participation in this kind of training is very useful for my job.	Q4TE (Grohmann *et al.*, 2014)	RL	RL
TE05	Learning/Knowledge	Depois da formação, fiquei a saber muito mais sobre os conteúdos da formação do que antes.	After the training, I know substantially more about the training contents than before.	Q4TE (Grohmann *et al.*, 2014)	RL	RL
TE06	Learning/Knowledge	Aprendi muitas coisas novas na formação.	I learned a lot of new things in the training.	Q4TE (Grohmann *et al.*, 2014)	RL	(Excluded)
TE13	Organizational results/Individual	Através da aplicação dos conteúdos da formação, o meu desempenho melhorou.	My job performance has improved through the application of the training contents.	Q4TE (Grohmann *et al.*, 2014)	CT	CT
TE14	Organizational results/Global	Através da aplicação dos conteúdos da formação os processos de trabalho na loja foram melhorados.	Overall, it seems to me that the application of the training contents has facilitated the work flow in my company.	Q4TE (Grohmann *et al.*, 2014)	CT	CT
TE15	Organizational results/Global	Através da formação o ambiente de trabalho na loja melhorou.	Overall, it seems to me that the organizational climate has improved due to the training.	Q4TE (Grohmann *et al.*, 2014)	CT	CT
TE01	Reaction/Satisfaction	Recordo a formação com satisfação.	I will keep the training in good memory.	Q4TE (Grohmann *et al.*, 2014)	(Excluded)	
TE07	Retention	Ainda me lembro dos principais tópicos que aprendi na formação.	I still remember the main topics that I have learned in the training course.	Velada *et al*. (2007)	(Excluded)	
TE08	Retention	Consigo referir facilmente algumas coisas que aprendi na formação.	I can easily say several things that I have learned in the training course.	Velada *et al*. (2007)	(Excluded)	
TE09	Retention	Nunca mais voltei a pensar no conteúdo da formação.	I had never thought again about the training content (reverse coded).	Velada *et al*. (2007)	(Excluded)	
TE10	Behaviour/Application in practice	Utilizo frequentemente no meu trabalho diário os conhecimentos que adquiri na formação.	In my everyday work, I often use the knowledge I gained in the training.	Q4TE (Grohmann *et al.*, 2014)	(Excluded)	
TE11	Behaviour/Application in practice	Consigo aplicar com sucesso os conteúdos da formação que aprendi no meu trabalho do dia-a-da.	I successfully manage to apply the training contents in my everyday work.	Q4TE (Grohmann *et al.*, 2014)	(Excluded)	
TE12	Organizational results/Individual	Desde a formação estou mais satisfeito com o meu trabalho.	Since the training, I have been more content with my work.	Q4TE (Grohmann *et al.*, 2014)	CT	CT

Note: RL = Reaction and Learning; CT = Content Transfer.

2. Data collection and sample

2.1 Study 1

2.1.1 Data collection source

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	online	**126**	**54,8**	**54,8**	**54,8**
	paper	**104**	**45,2**	**45,2**	**100,0**
	Total	**230**	**100,0**	**100,0**	

2.1.2 Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	**115**	**50,0**	**50,0**	**50,0**
	Female	**115**	**50,0**	**50,0**	**100,0**
	Total	**230**	**100,0**	**100,0**	

2.1.3 Descriptive statistics of age

Statistic	Value
Mean	**35,78**
Median	**35,00**
Mode	**35**
Std. Deviation	**6,243**
Minimum	**21**
Maximum	**59**

2.1.4 Age distribution

Age (years)	**Frequency**	**Percent**	**Cumulative Percent**
20-29	34	14,8	45,7
30-39	139	60,4	463,5
40-49	52	22,6	916,1
50-59	5	2,2	495,7
Total	**230**	**100,0**	

2.1.5 Educational level

	Frequency	Percent	Cumulative Percent
Primary school - Key stage 2 (6th grade)	2	,9	,9
Secondary school - Key Stage 3 (9th grade)	12	5,2	6,1
Secondary school - Key Stage 4 (12th grade)	60	26,1	32,3
University attainment (not completed)	34	14,8	47,2
Bachelor degree	80	34,7	81,7
Master degree or higher	42	18,3	100,0
Total	**230**	**100,0**	

2.1.6 Company size

Number of employees	Frequency	Percent	Cumulative Percent
1-9	**5**	**2,2**	**2,2**
10-49	**4**	**1,7**	**3,9**
50-249	**25**	**10,9**	**14,8**
250 or more	**196**	**85,2**	**100,0**
Total	**230**	**100,0**	

2.1.7 Company sector

Company sector	Frequency	Percent
Manufacturing	**2**	**,9**
Electricity, gas, steam and air conditioning supply	**3**	**1,3**
Construction	**3**	**1,3**
Wholesale and retail trade	**130**	**56,5**
Transportation and storage	**1**	**,4**
Information and communication	**27**	**11,7**
Financial and insurance activities	**8**	**3,5**
Real estate activities	**1**	**,4**
Professional, scientific and technical activities	**13**	**5,7**
Administrative and support service activities	**4**	**1,7**
Public administration and defence	**4**	**1,7**
Education	**5**	**2,2**
Human health and social work activities	**4**	**1,7**
Arts, entertainment and recreation	**1**	**,4**
Other service activities	**23**	**10,0**
Activities of extraterritorial organisations and bodies	**1**	**,4**
Total	**230**	**100,0**

2.2 Study 2

2.2.1 Data collection source

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	online	116	54,5	54,5	54,5
	paper	97	45,5	45,5	100,0
	Total	213	100,0	100,0	

2.2.2 Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	**104**	**48,8**	**48,8**	**48,8**
	Female	**109**	**51,2**	**51,2**	**100,0**
	Total	**213**	**100,0**	**100,0**	

2.2.3 Descriptive statistics of age

Statistic	Value
Mean	33,8
Median	34,0
Mode	32,0
Std. Deviation	7,6
Minimum	20
Maximum	62

2.2.4 Age distribution

Age (years)	**Frequency**	**Percent**	**Valid percent**
20-29	62	29,1	30,2
30-39	101	47,4	49,3
40-49	38	17,8	18,5
50-59	3	1,4	1,5
>60	1	0,5	0,5
Missing	8	3,8	
Total	**213**	**100,0**	**100,0**

2.2.5 Educational level

Educaction level	Frequency	Percent	Valid Percent	Cumulative Percent
Primary school - Key stage 2 (6th grade)	2	0,9	1,0	1,0
Secondary school - Key Stage 3 (9th grade)	8	3,8	4,0	5,0
Secondary school - Key Stage 4 (12th grade)	52	24,4	25,9	30,8
University attainment (not completed)	24	11,3	11,9	42,8
Bachelor degree	69	32,4	34,3	77,1
Master degree or higher	46	21,6	22,9	100,0
Total valid	201	94,4	100,0	
Missing	12	5,6		
Total	**213**	**100,0**		

2.2.6 Company size

Number of employees	Frequency	Percent	Cumulative Percent
1-9	12	5,6	5,6
10-49	15	7,0	12,7
50-249	20	9,4	22,1
250 or more	166	77,9	100,0
Total	**213**	**100,0**	

2.2.7 Company sector

Company sector	Frequency	Percent
Manufacturing	4	1,9
Electricity, gas, steam and air conditioning supply	2	,9
Water supply; sewerage, waste management and remediation activities	1	,5
Construction	2	,9
Wholesale and retail trade	136	63,8
Transportation and storage	3	1,4
Accommodation and food service activities	1	,5
Information and communication	9	4,2
Financial and insurance activities	8	3,8
Real estate activities	1	,5
Professional, scientific and technical activities	17	8,0
Administrative and support service activities	3	1,4
Public administration and defence	1	,5
Education	6	2,8
Human health and social work activities	4	1,9
Arts, entertainment and recreation	1	,5
Other service activities	14	6,6
Total	**213**	**100**

3. Confirmatory factor analysis

3.1 Descriptive statistics of study variables

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
LS	**137**	**1,88**	**6,88**	**4,9325**	**1,10512**	**-,531**	**,207**	**-,202**	**,411**
CE	**137**	**2,00**	**7,00**	**6,0097**	**,92084**	**-1,432**	**,207**	**2,999**	**,411**
TA	**137**	**1,33**	**7,00**	**5,0097**	**1,12091**	**-,813**	**,207**	**,512**	**,411**
IM	**137**	**4,57**	**7,00**	**6,1043**	**,53044**	**-,507**	**,207**	**-,047**	**,411**
EM	**137**	**1,00**	**7,00**	**4,7835**	**1,31208**	**-,551**	**,207**	**,151**	**,411**
SC	**137**	**4,00**	**7,00**	**6,0420**	**,59684**	**-,380**	**,207**	**,222**	**,411**
SO	**137**	**3,33**	**7,00**	**5,6302**	**,80914**	**-,431**	**,207**	**-,026**	**,411**
SJ	**137**	**2,67**	**7,00**	**5,4453**	**,82672**	**-,451**	**,207**	**,259**	**,411**
SR	**137**	**3,50**	**7,00**	**5,9872**	**,70210**	**-,727**	**,207**	**,578**	**,411**
AT	**137**	**1,00**	**7,00**	**5,9527**	**,88681**	**-1,722**	**,207**	**6,079**	**,411**
CM	**137**	**1,00**	**7,00**	**5,5547**	**1,09213**	**-,866**	**,207**	**1,175**	**,411**
AM	**137**	**1,00**	**7,00**	**6,1022**	**,97324**	**-2,291**	**,207**	**8,803**	**,411**
RS	**137**	**1,00**	**7,00**	**5,6540**	**,93793**	**-1,401**	**,207**	**3,980**	**,411**
CT	**137**	**1,00**	**7,00**	**4,8564**	**1,22661**	**-,731**	**,207**	**,833**	**,411**
Valid N (listwise)	**137**								

3.2 Correlations between study variables

Correlations

		LS	CE	TA	IM	EM	SC	SO	SJ	SR	AT	CM	AM	RS	CT
LS	Pearson Correlation	1	,635**	,030	,407**	,246**	,184*	,282**	,193*	,322**	,497**	,622**	,457**	,358**	,488**
	Sig. (2-tailed)		,000	,728	,000	,004	,031	,001	,024	,000	,000	,000	,000	,000	,000
	N	137	137	137	137	137	137	137	137	137	137	137	137	137	137
CE	Pearson Correlation	,635**	1	-,109	,345**	,287**	,226**	,236**	,148	,251**	,412**	,498**	,398**	,304**	,266**
	Sig. (2-tailed)	,000		,203	,000	,001	,008	,005	,085	,003	,000	,000	,000	,000	,002
	N	137	137	137	137	137	137	137	137	137	137	137	137	137	137
TA	Pearson Correlation	,030	-,109	1	,211*	,085	,246**	,301**	,335**	,394**	,226**	,108	,249**	,195*	,202*
	Sig. (2-tailed)	,728	,203		,013	,325	,004	,000	,000	,000	,008	,210	,003	,022	,018
	N	137	137	137	137	137	137	137	137	137	137	137	137	137	137
IM	Pearson Correlation	,407**	,345**	,211*	1	,236**	,470**	,421**	,284**	,447**	,489**	,379**	,426**	,470**	,323**
	Sig. (2-tailed)	,000	,000	,013		,005	,000	,000	,001	,000	,000	,000	,000	,000	,000
	N	137	137	137	137	137	137	137	137	137	137	137	137	137	137
EM	Pearson Correlation	,246**	,287**	,085	,236**	1	,201*	,133	,182*	,261**	,242**	,405**	,289**	,214*	,294**
	Sig. (2-tailed)	,004	,001	,325	,005		,018	,120	,033	,002	,004	,000	,001	,012	,000
	N	137	137	137	137	137	137	137	137	137	137	137	137	137	137
SC	Pearson Correlation	,184*	,226**	,246**	,470**	,201*	1	,540**	,441**	,336**	,370**	,306**	,344**	,286**	,209*
	Sig. (2-tailed)	,031	,008	,004	,000	,018		,000	,000	,000	,000	,000	,000	,001	,014
	N	137	137	137	137	137	137	137	137	137	137	137	137	137	137
SO	Pearson Correlation	,282**	,236**	,301**	,421**	,133	,540**	1	,534**	,301**	,457**	,282**	,366**	,322**	,255**
	Sig. (2-tailed)	,001	,005	,000	,000	,120	,000		,000	,000	,000	,001	,000	,000	,003
	N	137	137	137	137	137	137	137	137	137	137	137	137	137	137
SJ	Pearson Correlation	,193*	,148	,335**	,284**	,182*	,441**	,534**	1	,380**	,449**	,223**	,403**	,292**	,351**
	Sig. (2-tailed)	,024	,085	,000	,001	,033	,000	,000		,000	,000	,009	,000	,001	,000
	N	137	137	137	137	137	137	137	137	137	137	137	137	137	137
SR	Pearson Correlation	,322**	,251**	,394**	,447**	,261**	,336**	,301**	,380**	1	,421**	,386**	,475**	,304**	,424**
	Sig. (2-tailed)	,000	,003	,000	,000	,002	,000	,000	,000		,000	,000	,000	,000	,000
	N	137	137	137	137	137	137	137	137	137	137	137	137	137	137
AT	Pearson Correlation	,497**	,412**	,226**	,489**	,242**	,370**	,457**	,449**	,421**	1	,680**	,770**	,671**	,575**
	Sig. (2-tailed)	,000	,000	,008	,000	,004	,000	,000	,000	,000		,000	,000	,000	,000
	N	137	137	137	137	137	137	137	137	137	137	137	137	137	137
CM	Pearson Correlation	,622**	,498**	,108	,379**	,405**	,306**	,282**	,223**	,386**	,680**	1	,718**	,486**	,562**
	Sig. (2-tailed)	,000	,000	,210	,000	,000	,000	,001	,009	,000	,000		,000	,000	,000
	N	137	137	137	137	137	137	137	137	137	137	137	137	137	137
AM	Pearson Correlation	,457**	,398**	,249**	,426**	,289**	,344**	,366**	,403**	,475**	,770**	,718**	1	,643**	,595**
	Sig. (2-tailed)	,000	,000	,003	,000	,001	,000	,000	,000	,000	,000	,000		,000	,000
	N	137	137	137	137	137	137	137	137	137	137	137	137	137	137
RS	Pearson Correlation	,358**	,304**	,195*	,470**	,214*	,286**	,322**	,292**	,304**	,671**	,486**	,643**	1	,702**
	Sig. (2-tailed)	,000	,000	,022	,000	,012	,001	,000	,001	,000	,000	,000	,000		,000
	N	137	137	137	137	137	137	137	137	137	137	137	137	137	137
CT	Pearson Correlation	,488**	,266**	,202*	,323**	,294**	,209*	,255**	,351**	,424**	,575**	,562**	,595**	,702**	1
	Sig. (2-tailed)	,000	,002	,018	,000	,000	,014	,003	,000	,000	,000	,000	,000	,000	
	N	137	137	137	137	137	137	137	137	137	137	137	137	137	137

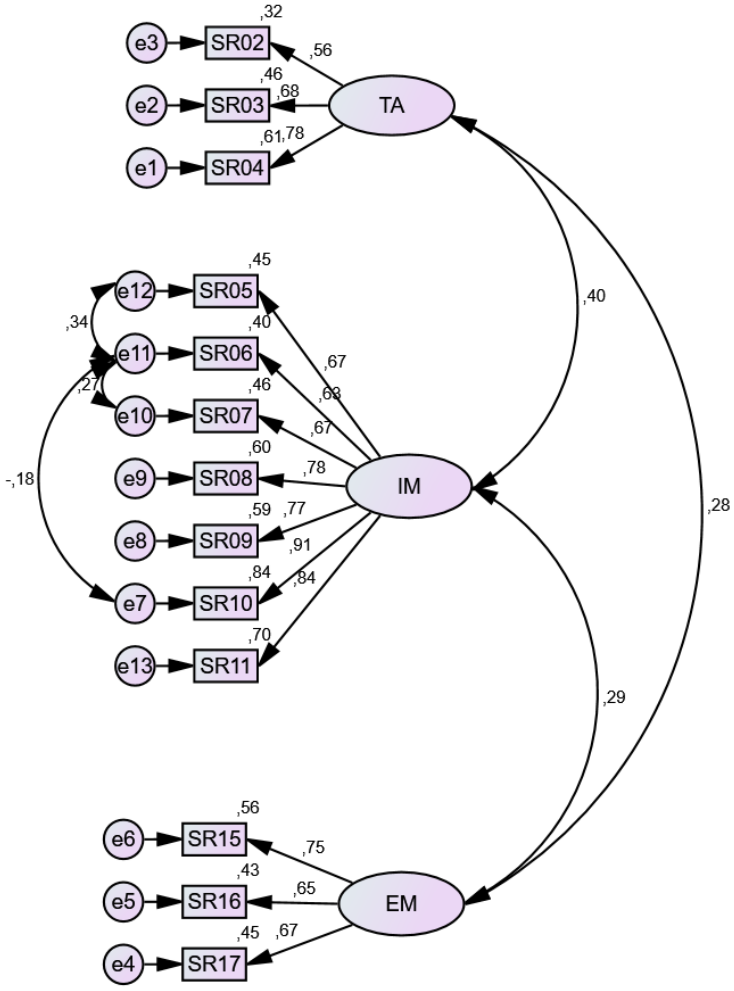
**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

3.3 Confirmatory factor analysis of self-regulated learning scale

3.3.1 SRL-Forethought

3.3.1.1 Three-factor model



CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	42	120,766	62	,000	1,948
Saturated model	104	,000	0		
Independence model	26	828,766	78	,000	10,625

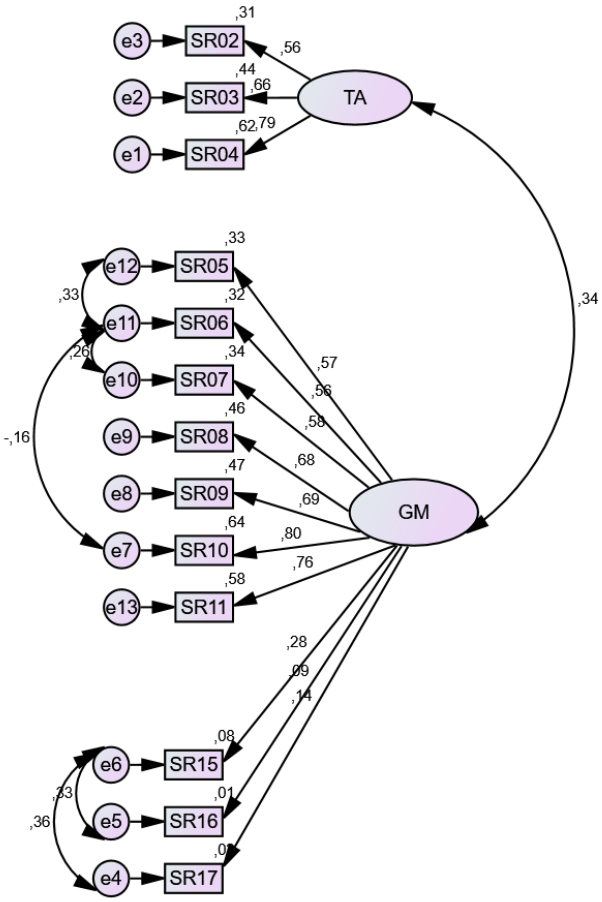
Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,854	,817	,923	,902	,922
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,071	,052	,090	,037

3.3.1.2 Two-factor model



CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	44	125,019	60	,000	2,084
Saturated model	104	,000	0		
Independence model	26	828,766	78	,000	10,625

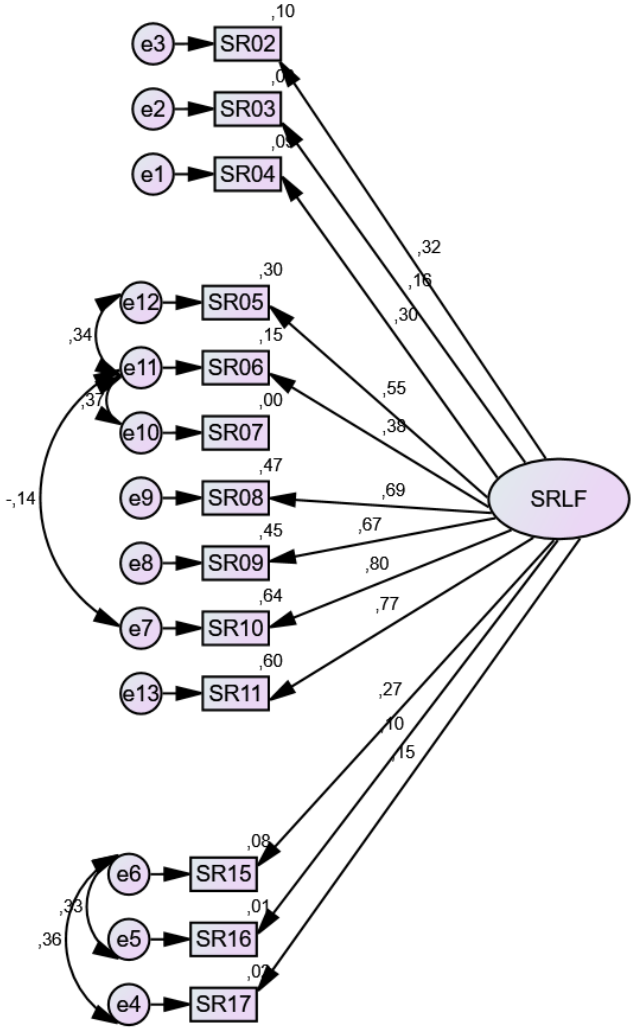
Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,849	,804	,915	,887	,913
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,076	,057	,094	,014
Independence model	,226	,212	,240	,000

3.3.1.3 One-factor model



CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	43	273,441	61	,000	4,483
Saturated model	104	,000	0		
Independence model	26	828,766	78	,000	10,625

Baseline Comparisons

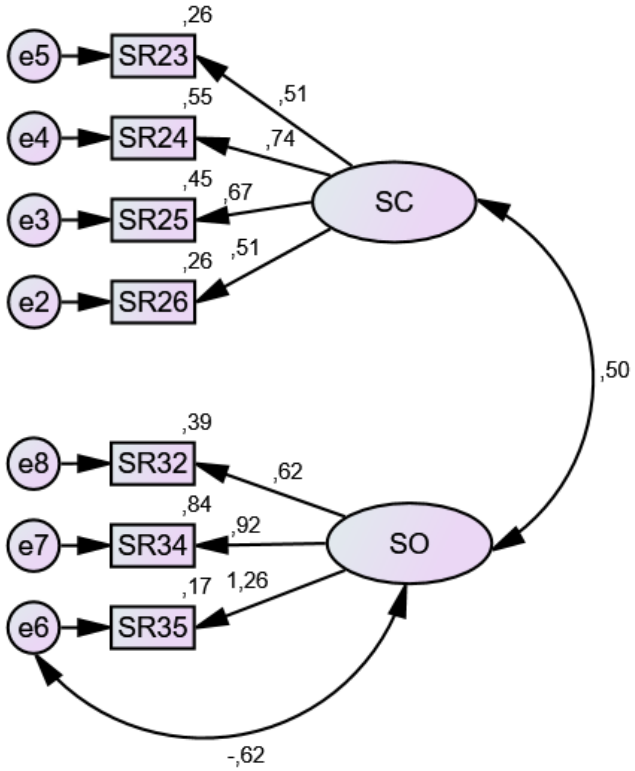
Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,670	,578	,723	,638	,717
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,136	,120	,152	,000
Independence model	,226	,212	,240	,000

3.3.2 SRL-Performance

3.3.2.1 Two-factor model



CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	22	25,148	13	,022	1,934
Saturated model	35	,000	0		
Independence model	14	394,092	21	,000	18,766

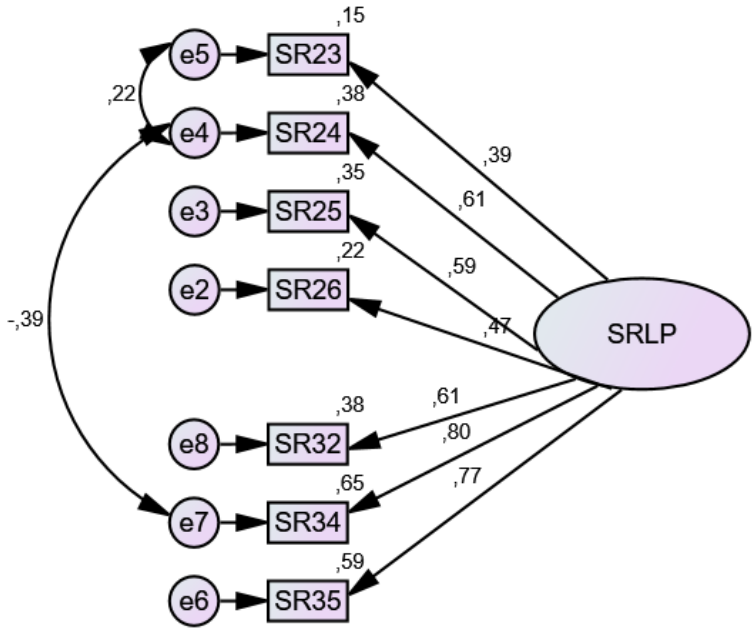
Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,936	,897	,968	,947	,967
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,070	,026	,111	,188
Independence model	,307	,281	,333	,000

3.3.2.2 One-factor model



CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	23	34,706	12	,001	2,892
Saturated model	35	,000	0		
Independence model	14	394,092	21	,000	18,766

Baseline Comparisons

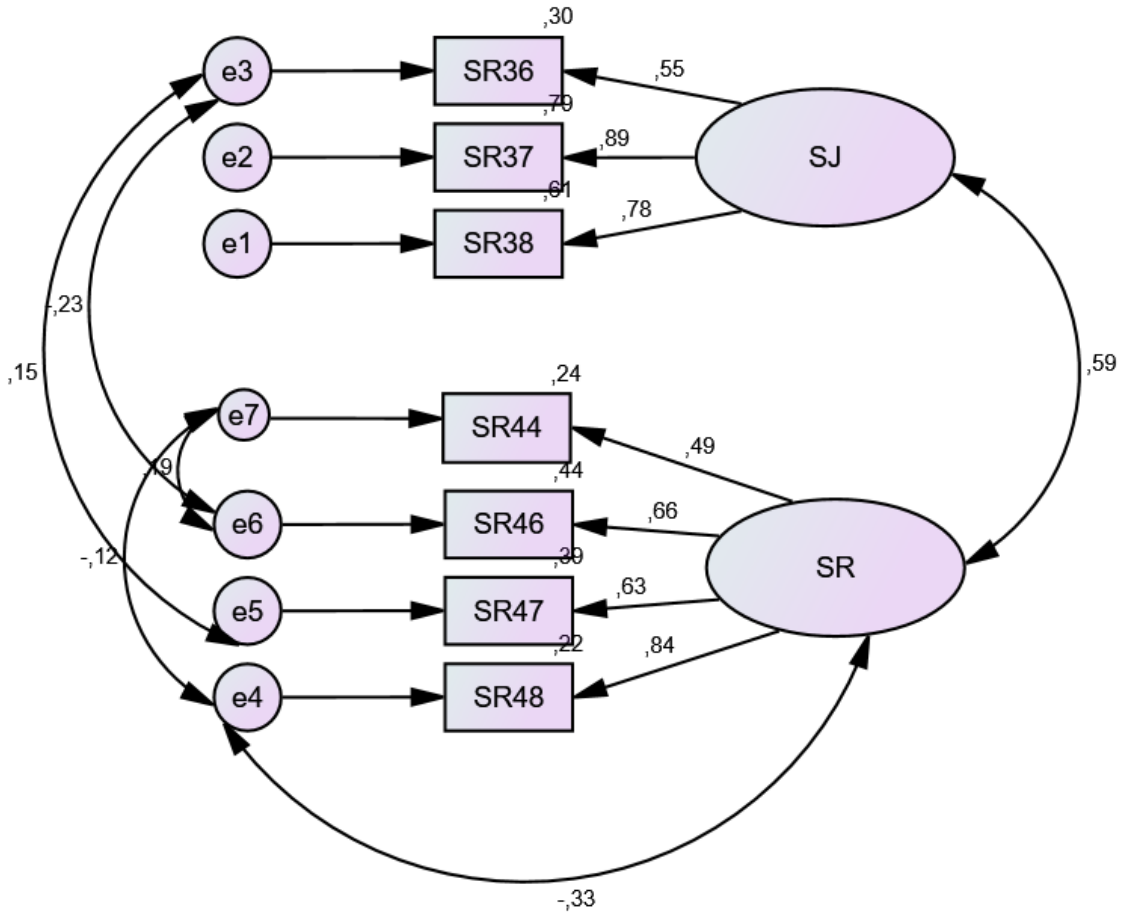
Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,912	,846	,941	,893	,939
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,100	,062	,140	,018
Independence model	,307	,281	,333	,000

3.3.3 SRL-Self-reflection

3.3.3.1 Two-factor model



CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	25	18,970	10	,041	1,897
Saturated model	35	,000	0		
Independence model	14	289,748	21	,000	13,798

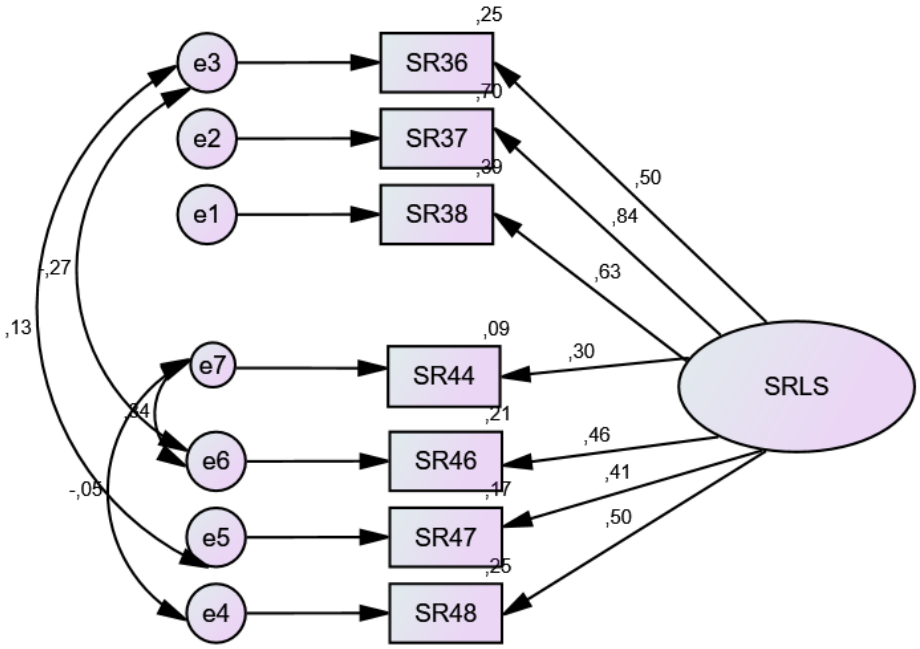
Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,935	,863	,968	,930	,967
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,069	,014	,116	,225
Independence model	,260	,234	,287	,000

3.3.3.2 One-factor model



CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	25	32,407	10	,000	3,241
Saturated model	35	,000	0		
Independence model	14	289,748	21	,000	13,798

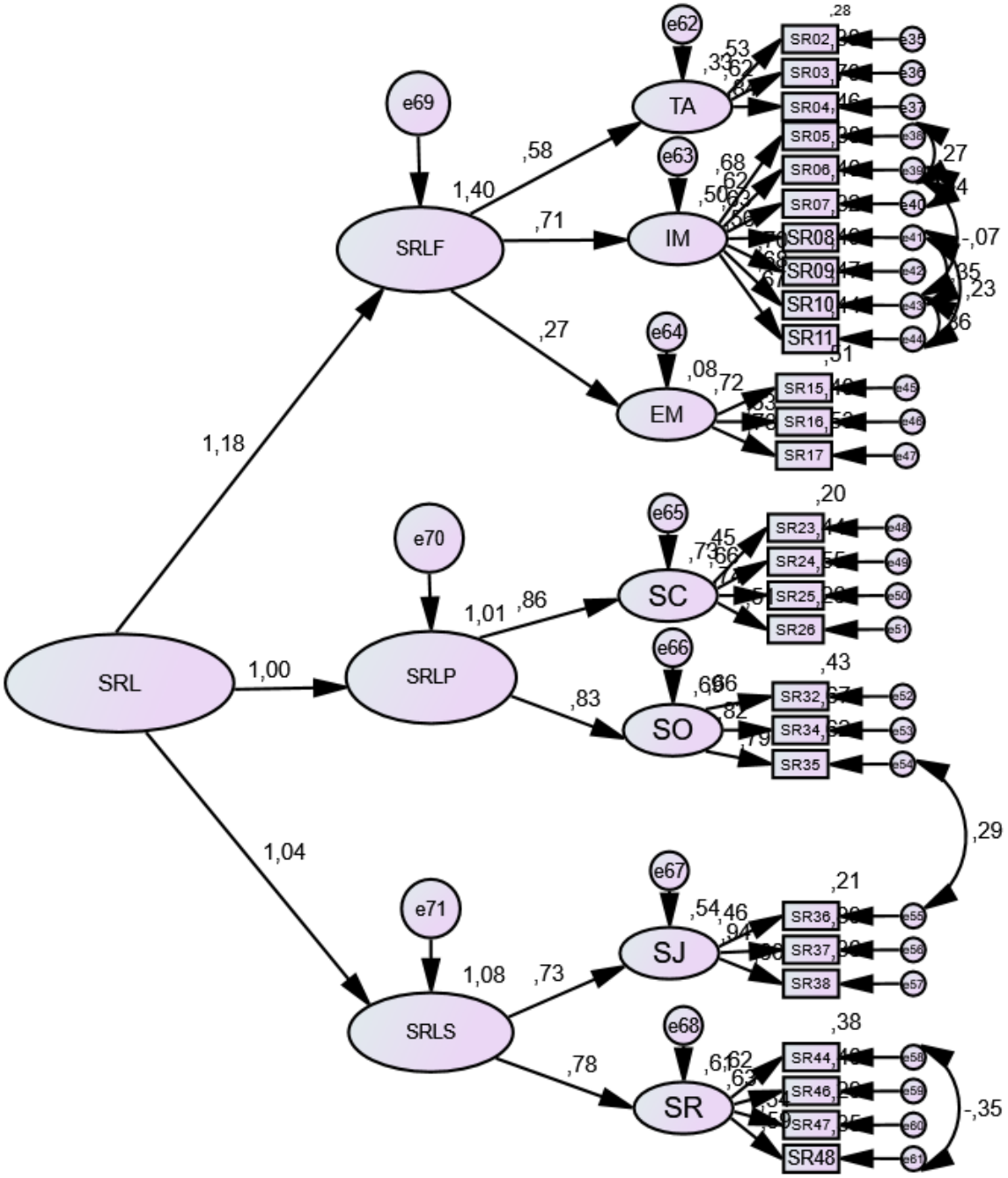
Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,888	,765	,920	,825	,917
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,109	,068	,152	,011
Independence model	,260	,234	,287	,000

3.3.4 Self-regulated learning – full model



CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	99	488,183	306	,000	1,595
Saturated model	405	,000	0		
Independence model	54	2186,946	351	,000	6,231

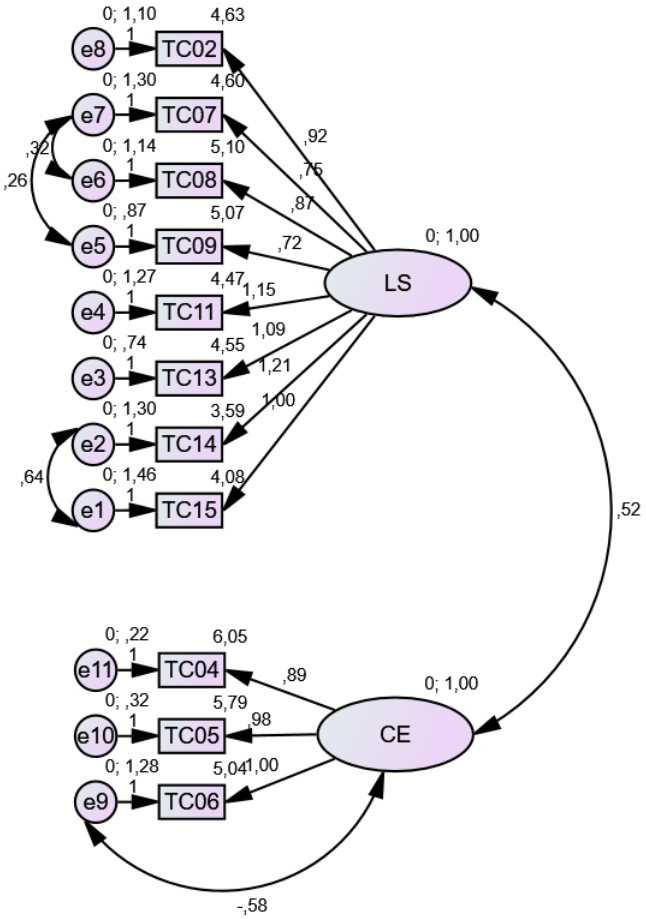
Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,777	,744	,903	,886	,901
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,056	,047	,065	,139
Independence model	,166	,160	,173	,000

3.4 Confirmatory factor analysis of training climate scale



CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	36	56,167	41	,058	1,370
Saturated model	77	,000	0		
Independence model	22	612,945	55	,000	11,144

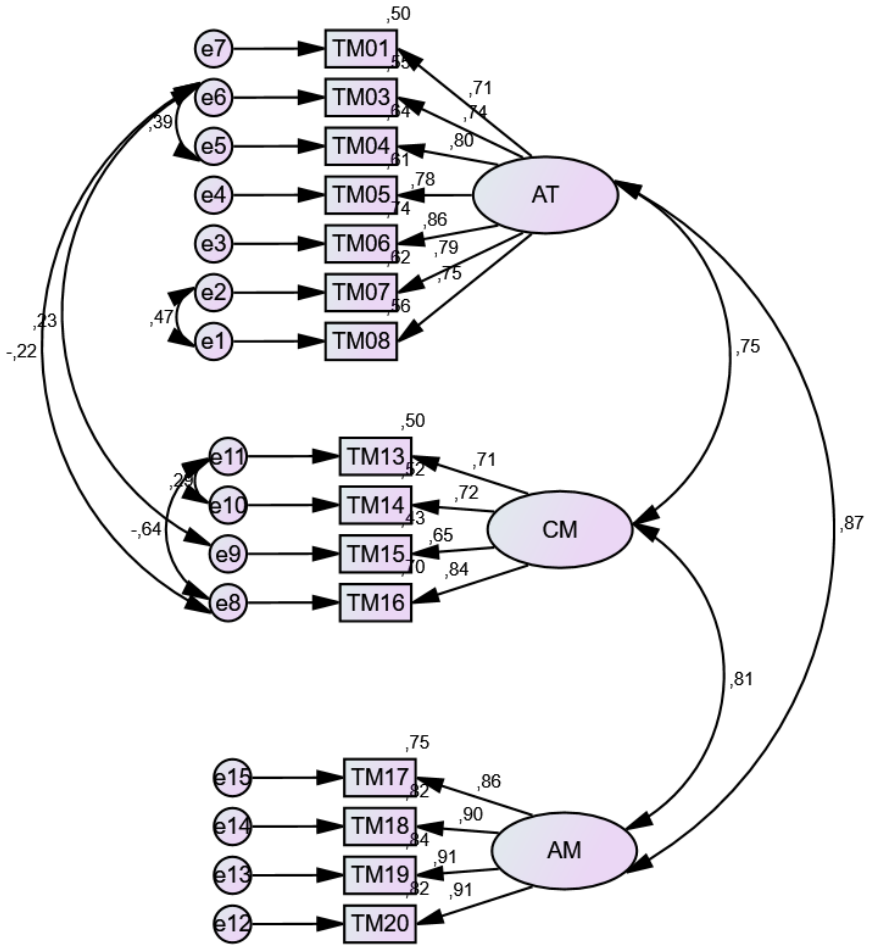
Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,908	,877	,973	,964	,973
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,057	,000	,092	,349
Independence model	,301	,280	,323	,000

3.5 Confirmatory factor analysis of transfer motivation scale



CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	51	166,707	84	,000	1,985
Saturated model	135	,000	0		
Independence model	30	1883,047	105	,000	17,934

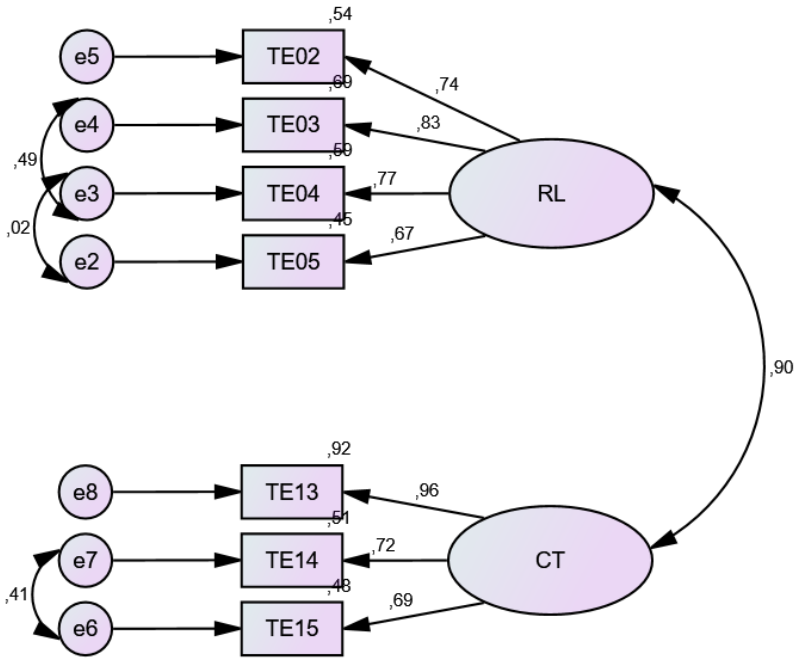
Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,911	,889	,954	,942	,953
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

PRMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,073	,056	,089	,012
Independence model	,302	,290	,314	,000

3.6 Confirmatory factor analysis of training evaluation scale



CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	24	13,893	11	,239	1,263
Saturated model	35	,000	0		
Independence model	14	832,827	21	,000	39,658

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,983	,968	,996	,993	,996
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

RMSEA

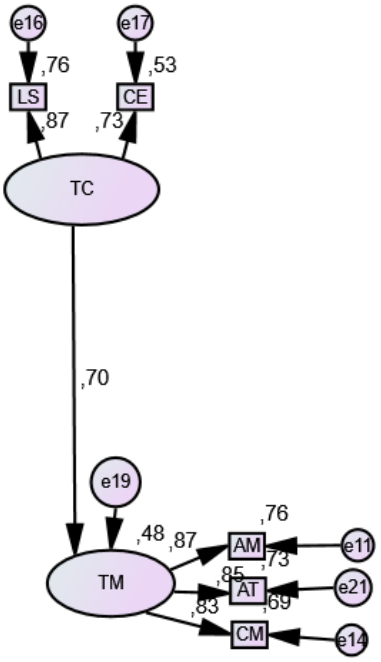
Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,038	,000	,090	,588
Independence model	,457	,431	,484	,000

4. Structured equations modelling

4.1.Bootstraping analysis: SRL as mediator between training climate and transfer motivation (H2)

4.1.1 Test if there is a direct effect between TC and TM without mediator (H1)

p=0,021<0,05 → there is a direct effect between TC and TM



Standardized Direct Effects (Group number 1 - Default model)

Standardized Direct Effects - Lower Bounds (BC) (Group number 1 - Default model)

	TC	TM
TM	,528	,000
AT	,000	,700
CE	,615	,000
LS	,767	,000
CM	,000	...
AM	,000	,755

Standardized Direct Effects - Upper Bounds (BC) (Group number 1 - Default model)

	TC	TM
TM	,861	,000
AT	,000	,939

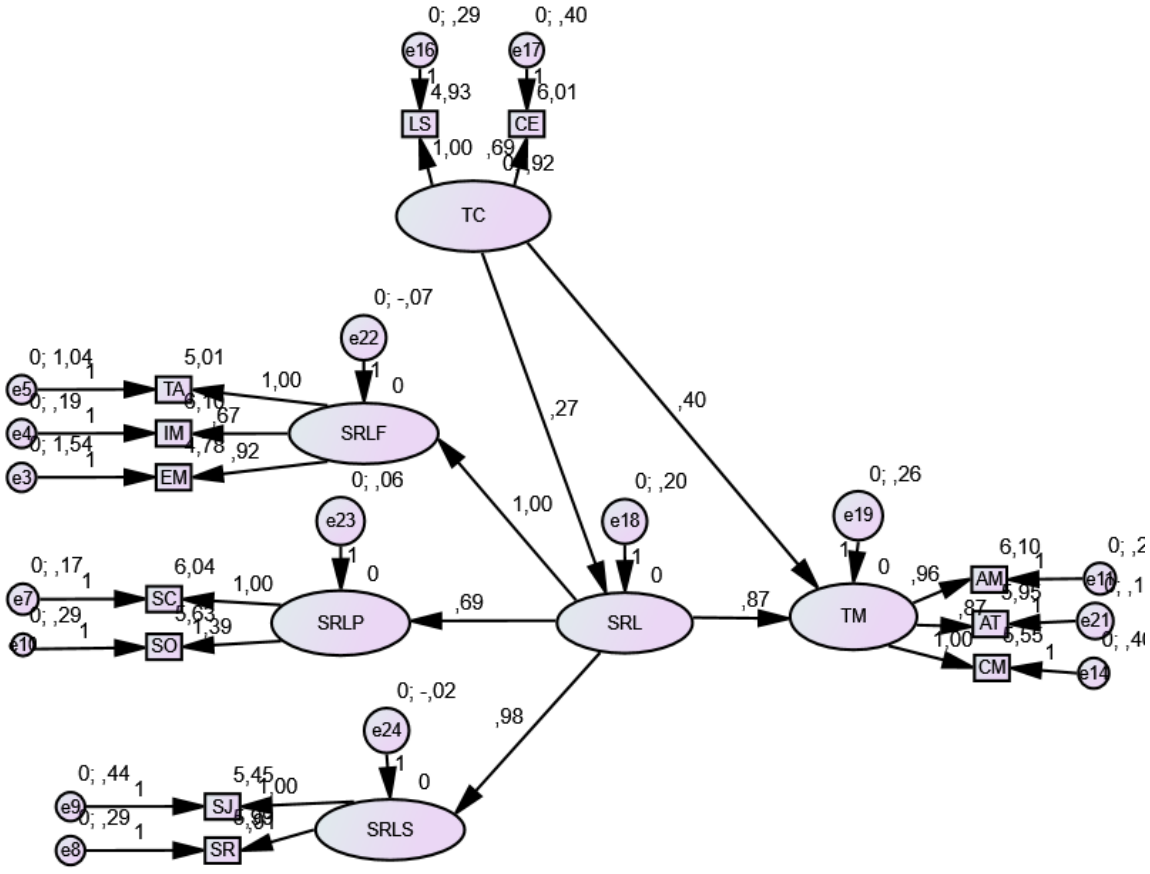
	TC	TM
CE	,842	,000
LS	1,060	,000
CM	,000	,895
AM	,000	,950

Standardized Direct Effects - Two Tailed Significance (BC) (Group number 1 - Default model)

	TC	TM
TM	**,021**	...
AT	...	,011
CE	,008	...
LS	,006	...
CM	...	,053
AM	...	,019

4.1.2 Test if there is an indirect effect with SRL as mediator

p=0,007<0,05 → there is an indirect effect between TC and TM through SRL, i.e. SRL acts as mediator.



Standardized Indirect Effects (Group number 1 - Default model)

Standardized Indirect Effects - Lower Bounds (BC) (Group number 1 - Default model)

	TC	SRL	TM	TE	SRLS	SRLP	SRLF
SRL	,000	,000	,000	,000	,000	,000	,000
TM	,137	,000	,000	,000	,000	,000	,000
TE	,388	,168	,000	,000	,000	,000	,000
SRLS	,294	,000	,000	,000	,000	,000	,000
SRLP	,215	,000	,000	,000	,000	,000	,000
SRLF	,312	,000	,000	,000	,000	,000	,000
AT	,405	,142	,000	,000	,000	,000	,000
CT	,312	,203	,394	,000	,000	,000	,000
RS	,304	,218	,412	,000	,000	,000	,000
CE	,000	,000	,000	,000	,000	,000	,000
LS	,000	,000	,000	,000	,000	,000	,000
CM	,348	,160	,000	,000	,000	,000	,000
AM	,404	,220	,000	,000	,000	,000	,000
SJ	,162	,324	,000	,000	,000	,000	,000
SR	,193	,470	,000	,000	,000	,000	,000
SC	,147	,362	,000	,000	,000	,000	,000
SO	,155	,385	,000	,000	,000	,000	,000
TA	,122	,246	,000	,000	,000	,000	,000
IM	,155	,515	,000	,000	,000	,000	,000
EM	,085	,218	,000	,000	,000	,000	,000

Standardized Indirect Effects - Upper Bounds (BC) (Group number 1 - Default model)

	TC	SRL	TM	TE	SRLS	SRLP	SRLF
SRL	,000	,000	,000	,000	,000	,000	,000
TM	,386	,000	,000	,000	,000	,000	,000
TE	,684	,597	,000	,000	,000	,000	,000
SRLS	,714	,000	,000	,000	,000	,000	,000
SRLP	,617	,000	,000	,000	,000	,000	,000
SRLF	,841	,000	,000	,000	,000	,000	,000
AT	,721	,585	,000	,000	,000	,000	,000
CT	,603	,557	,864	,000	,000	,000	,000
RS	,617	,600	,881	,000	,000	,000	,000
CE	,000	,000	,000	,000	,000	,000	,000
LS	,000	,000	,000	,000	,000	,000	,000
CM	,681	,542	,000	,000	,000	,000	,000
AM	,728	,619	,000	,000	,000	,000	,000
SJ	,503	,776	,000	,000	,000	,000	,000
SR	,489	,798	,000	,000	,000	,000	,000
SC	,431	,726	,000	,000	,000	,000	,000
SO	,487	,781	,000	,000	,000	,000	,000

	TC	SRL	TM	TE	SRLS	SRLP	SRLF
TA	,353	,637	,000	,000	,000	,000	,000
IM	,470	,817	,000	,000	,000	,000	,000
EM	,361	,588	,000	,000	,000	,000	,000

Standardized Indirect Effects - Two Tailed Significance (BC) (Group number 1 - Default model)

	TC	SRL	TM	TE	SRLS	SRLP	SRLF
SRL	...	...	...	...	...	...	...
TM	,007	...	...	...	...	...	...
TE	,019	,021	...	...	...	...	...
SRLS	,012	...	...	...	...	...	...
SRLP	,016	...	...	...	...	...	...
SRLF	,009	...	...	...	...	...	...
AT	,019	,027	...	...	...	...	...
CT	,015	,006	,016	...	...	...	...
RS	,018	,008	,021	...	...	...	...
CE	...	...	...	...	...	...	...
LS	...	...	...	...	...	...	...
CM	,023	,021	...	...	...	...	...
AM	,027	,015	...	...	...	...	...
SJ	,007	,042	...	...	...	...	...
SR	,007	,021	...	...	...	...	...
SC	,019	,038	...	...	...	...	...
SO	,011	,035	...	...	...	...	...
TA	,007	,013	...	...	...	...	...
IM	,015	,007	...	...	...	...	...
EM	,007	,006	...	...	...	...	...

4.1.3 Test if there is a direct effect between TC and TM with SRL as mediator

Since the path between TC and TM remains significant (p=0,025<0,05), it is a partial mediation.

Standardized Direct Effects (Group number 1 - Default model)

Standardized Direct Effects - Lower Bounds (BC) (Group number 1 - Default model)

	TC	SRL	TM	SRLS	SRLP	SRLF
SRL	,297	,000	,000	,000	,000	,000
TM	,224	,207	,000	,000	,000	,000
SRLS	,000	,867	,000	,000	,000	,000
SRLP	,000	...	,000	,000	,000	,000
SRLF	,000	,910	,000	,000	,000	,000
AT	,000	,000	,734	,000	,000	,000

	TC	SRL	TM	SRLS	SRLP	SRLF
CE	,613	,000	,000	,000	,000	,000
LS	,761	,000	,000	,000	,000	,000
CM	,000	,000	,696	,000	,000	,000
AM	,000	,000	,778	,000	,000	,000
SJ	,000	,000	,000	,354	,000	,000
SR	,000	,000	,000	,479	,000	,000
SC	,000	,000	,000	,000	,578	,000
SO	,000	,000	,000	,000	,548	,000
TA	,000	,000	,000	,000	,000	,199
IM	,000	,000	,000	,000	,000	,377
EM	,000	,000	,000	,000	,000	,154

Standardized Direct Effects - Upper Bounds (BC) (Group number 1 - Default model)

	TC	SRL	TM	SRLS	SRLP	SRLF
SRL	,712	,000	,000	,000	,000	,000
TM	,676	,688	,000	,000	,000	,000
SRLS	,000	1,280	,000	,000	,000	,000
SRLP	,000	,959	,000	,000	,000	,000
SRLF	,000	1,607	,000	,000	,000	,000
AT	,000	,000	,943	,000	,000	,000
CE	,839	,000	,000	,000	,000	,000
LS	1,057	,000	,000	,000	,000	,000
CM	,000	,000	,879	,000	,000	,000
AM	,000	,000	,950	,000	,000	,000
SJ	,000	,000	,000	,788	,000	,000
SR	,000	,000	,000	,800	,000	,000
SC	,000	,000	,000	,000	,861	,000
SO	,000	,000	,000	,000	,876	,000
TA	,000	,000	,000	,000	,000	,580
IM	,000	,000	,000	,000	,000	,759
EM	,000	,000	,000	,000	,000	,552

Standardized Direct Effects - Two Tailed Significance (BC) (Group number 1 - Default model)

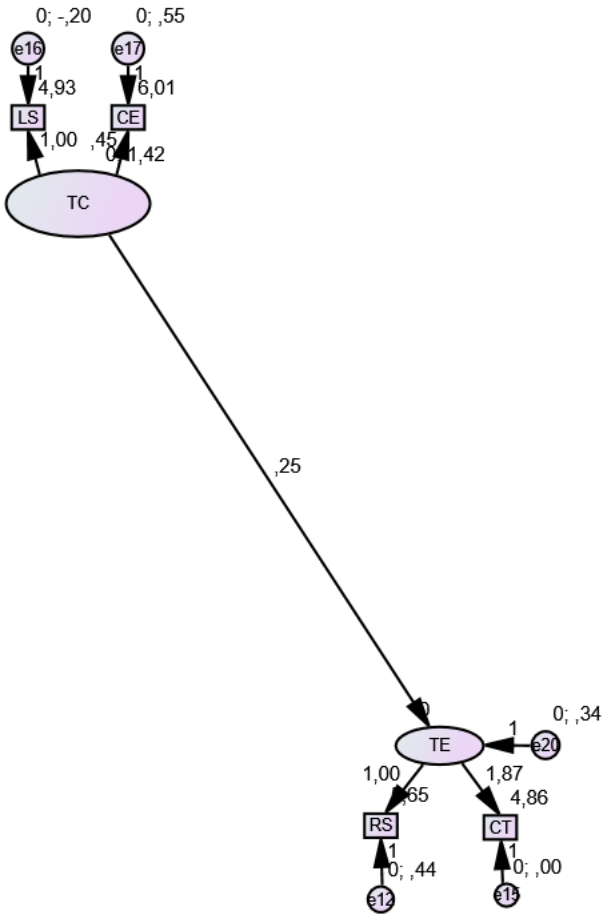
	TC	SRL	TM	SRLS	SRLP	SRLF
SRL	,011	...	...	...	...	...
TM	,025	,018	...	...	...	...
SRLS	...	,010	...	...	...	...
SRLP	...	,058	...	...	...	...
SRLF	...	,009	...	...	...	...
AT	...	...	,013	...	...	...
CE	,011	...	...	...	...	...
LS	,007	...	...	...	...	...
CM	...	...	,038	...	...	...

	TC	SRL	TM	SRLS	SRLP	SRLF
AM	...	...	,021	...	...	...
SJ	...	...	...	,032	...	...
SR	...	...	...	,012	...	...
SC	...	...	...	...	,018	...
SO	...	...	...	...	,023	...
TA	...	...	...	...	...	,021
IM	...	...	...	...	...	,018
EM	...	...	...	...	...	,007

4.2 Bootstraping analysis: SRL as mediator between training climate and training evaluation (H4)

4.2.1 Test if there is a direct effect between TC and TE without mediator

p=0,025<0,05 → there is a direct effect between TC and TE



Standardized Direct Effects (Group number 1 - Default model)

Standardized Direct Effects - Lower Bounds (BC) (Group number 1 - Default model)

	TC	TE
TE	,139	,000
CT	,000	,824
RS	,000	,488
CE	,353	,000
LS	,857	,000

Standardized Direct Effects - Upper Bounds (BC) (Group number 1 - Default model)

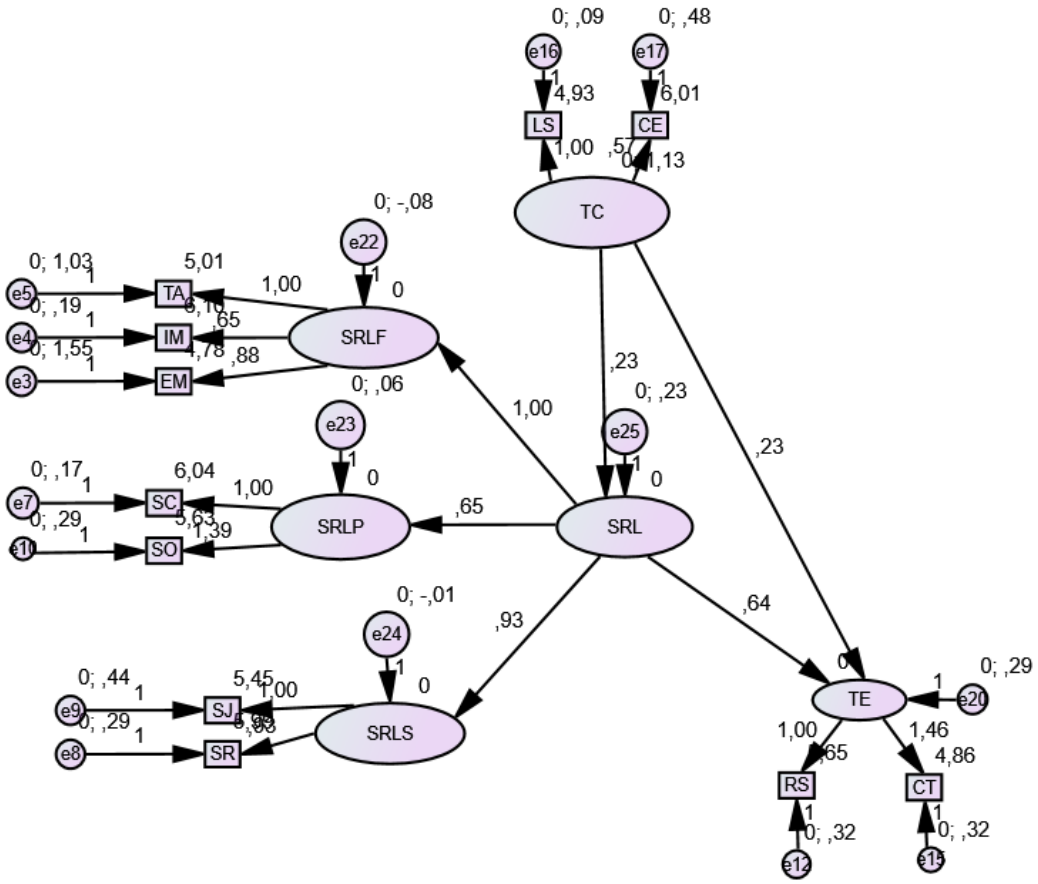
	TC	TE
TE	,674	,000
CT	,000	1,331
RS	,000	,833
CE	,726	,000
LS	2,110	,000

Standardized Direct Effects - Two Tailed Significance (BC) (Group number 1 - Default model)

	TC	TE
TE	,025	...
CT	...	,012
RS	...	,032
CE	,010	...
LS	,012	...

4.2.2 Test if there is an indirect effect with SRL as mediator

p=0,005<0,05 → there is an indirect effect between TC and TE through SRL, i.e. SRL acts as mediator.



Standardized Indirect Effects (Group number 1 - Default model)

Standardized Indirect Effects - Lower Bounds (BC) (Group number 1 - Default model)

	TC	SRL	TE	SRLS	SRLP	SRLF
SRL	,000	,000	,000	,000	,000	,000
TE	,088	,000	,000	,000	,000	,000
SRLS	,244	,000	,000	,000	,000	,000
SRLP	,162	,000	,000	,000	,000	,000
SRLF	,247	,000	,000	,000	,000	,000
CT	,251	,154	,000	,000	,000	,000
RS	,188	,135	,000	,000	,000	,000
CE	,000	,000	,000	,000	,000	,000
LS	,000	,000	,000	,000	,000	,000
SJ	,135	...	,000	,000	,000	,000
SR	,154	,484	,000	,000	,000	,000

	TC	SRL	TE	SRLS	SRLP	SRLF
SC	,124	,351	,000	,000	,000	,000
SO	,130	,367	,000	,000	,000	,000
TA	,097	,219	,000	,000	,000	,000
IM	,105	,507	,000	,000	,000	,000
EM	,054	,193	,000	,000	,000	,000

Standardized Indirect Effects - Upper Bounds (BC) (Group number 1 - Default model)

	TC	SRL	TE	SRLS	SRLP	SRLF
SRL	,000	,000	,000	,000	,000	,000
TE	,371	,000	,000	,000	,000	,000
SRLS	,714	,000	,000	,000	,000	,000
SRLP	,579	,000	,000	,000	,000	,000
SRLF	,899	,000	,000	,000	,000	,000
CT	,642	,586	,000	,000	,000	,000
RS	,592	,581	,000	,000	,000	,000
CE	,000	,000	,000	,000	,000	,000
LS	,000	,000	,000	,000	,000	,000
SJ	,474	,746	,000	,000	,000	,000
SR	,494	,818	,000	,000	,000	,000
SC	,426	,735	,000	,000	,000	,000
SO	,462	,767	,000	,000	,000	,000
TA	,363	,642	,000	,000	,000	,000
IM	,492	,839	,000	,000	,000	,000
EM	,332	,597	,000	,000	,000	,000

Standardized Indirect Effects - Two Tailed Significance (BC) (Group number 1 - Default model)

	TC	SRL	TE	SRLS	SRLP	SRLF
SRL	...	...	...	...	...	...
TE	,005	...	...	...	...	...
SRLS	,008	...	...	...	...	...
SRLP	,015	...	...	...	...	...
SRLF	,007	...	...	...	...	...
CT	,015	,011	...	...	...	...
RS	,025	,011	...	...	...	...
CE	...	...	...	...	...	...
LS	...	...	...	...	...	...
SJ	,006	,067	...	...	...	...
SR	,007	,018	...	...	...	...
SC	,010	,023	...	...	...	...
SO	,009	,045	...	...	...	...
TA	,007	,025	...	...	...	...
IM	,015	,007	...	...	...	...
EM	,011	,008	...	...	...	...

4.2.3 Test if there is a direct effect between TC and TE with SRL as mediator

Since the path between TC and TE remains significant (p=0,015<0,05), it is a partial mediation.

Standardized Direct Effects (Group number 1 - Default model)

Standardized Direct Effects - Lower Bounds (BC) (Group number 1 - Default model)

	TC	SRL	TE	SRLS	SRLP	SRLF
SRL	,205	,000	,000	,000	,000	,000
TE	,118	,161	,000	,000	,000	,000
SRLS	,000	,816	,000	,000	,000	,000
SRLP	,000	,562	,000	,000	,000	,000
SRLF	,000	,935	,000	,000	,000	,000
CT	,000	,000	,736	,000	,000	,000
RS	,000	,000	,620	,000	,000	,000
CE	,472	,000	,000	,000	,000	,000
LS	,754	,000	,000	,000	,000	,000
SJ	,000	,000	,000	,336	,000	,000
SR	,000	,000	,000	,481	,000	,000
SC	,000	,000	,000	,000	,605	,000
SO	,000	,000	,000	,000	,531	,000
TA	,000	,000	,000	,000	,000	,214
IM	,000	,000	,000	,000	,000	,380
EM	,000	,000	,000	,000	,000	,155

Standardized Direct Effects - Upper Bounds (BC) (Group number 1 - Default model)

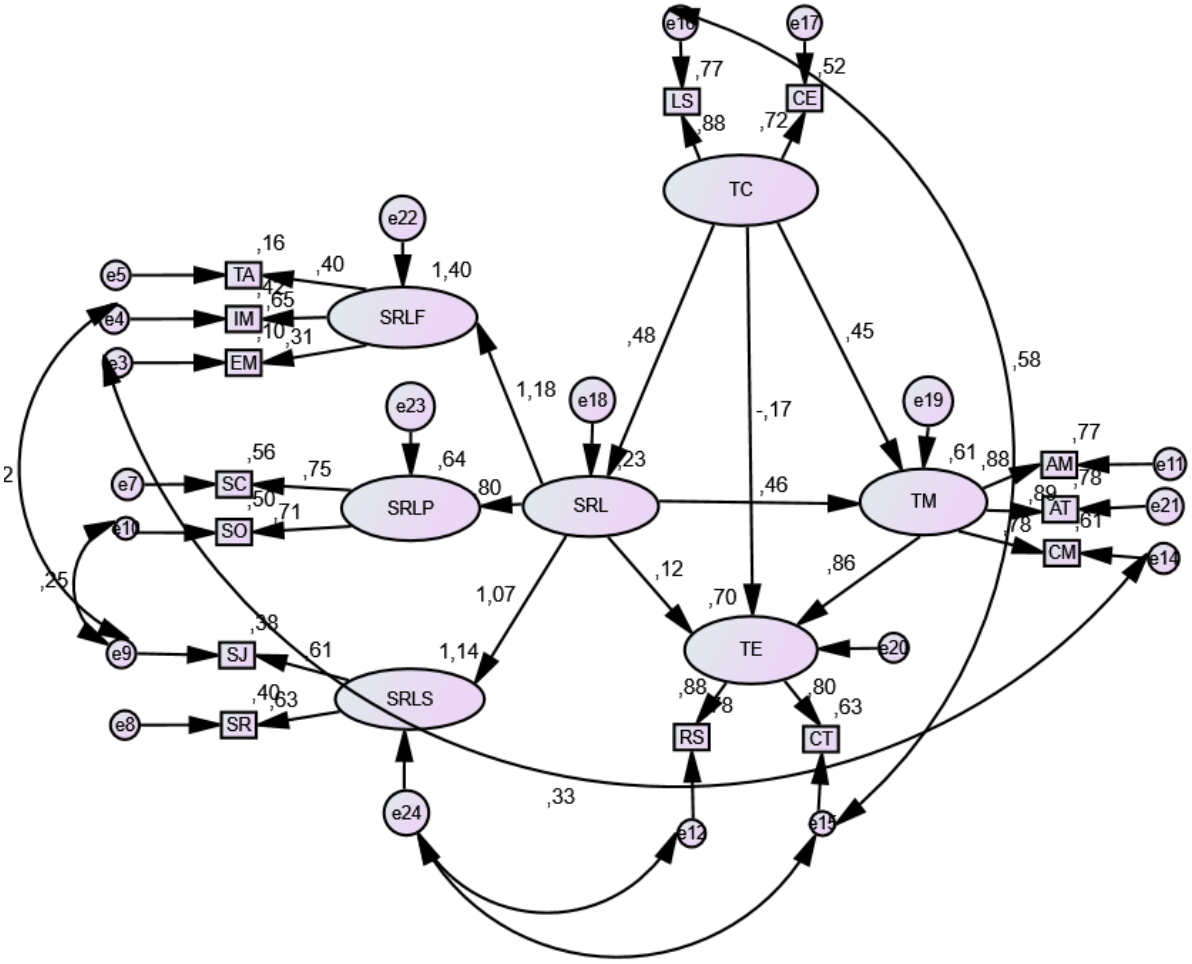
	TC	SRL	TE	SRLS	SRLP	SRLF
SRL	,683	,000	,000	,000	,000	,000
TE	,565	,670	,000	,000	,000	,000
SRLS	,000	1,253	,000	,000	,000	,000
SRLP	,000	,961	,000	,000	,000	,000
SRLF	,000	1,715	,000	,000	,000	,000
CT	,000	,000	1,001	,000	,000	,000
RS	,000	,000	,900	,000	,000	,000
CE	,794	,000	,000	,000	,000	,000
LS	1,425	,000	,000	,000	,000	,000
SJ	,000	,000	,000	,766	,000	,000
SR	,000	,000	,000	,813	,000	,000
SC	,000	,000	,000	,000	,922	,000
SO	,000	,000	,000	,000	,883	,000
TA	,000	,000	,000	,000	,000	,578
IM	,000	,000	,000	,000	,000	,777
EM	,000	,000	,000	,000	,000	,551

Standardized Direct Effects - Two Tailed Significance (BC) (Group number 1 - Default model)

	TC	SRL	TE	SRLS	SRLP	SRLF
SRL	,013	...	...	...	...	...
TE	,015	,012	...	...	...	...
SRLS	...	,013	...	...	...	...
SRLP	...	,035	...	...	...	...
SRLF	...	,007	...	...	...	...
CT	...	...	,018	...	...	...
RS	...	...	,030	...	...	...
CE	,009	...	...	...	...	...
LS	,015	...	...	...	...	...
SJ	...	...	...	,035	...	...
SR	...	...	...	,012	...	...
SC	...	...	...	...	,008	...
SO	...	...	...	...	,021	...
TA	...	...	...	...	...	,021
IM	...	...	...	...	...	,013
EM	...	...	...	...	...	,007

4.3 Model final validation

4.3.1 Model 1 (hypothesised model)



CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	57	100,939	62	,001	1,628
Saturated model	119	,000	0		
Independence model	28	975,459	91	,000	10,719

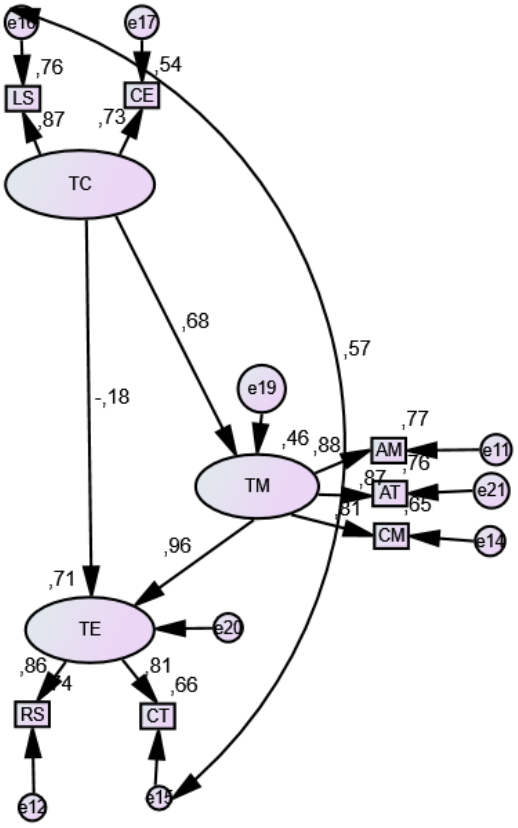
Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,897	,848	,957	,935	,956
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,068	,043	,091	,112
Independence model	,267	,252	,283	,000

4.3.2 Model 2 (competing model)



CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	25	30,109	10	,001	3,011
Saturated model	35	,000	0		
Independence model	14	592,619	21	,000	28,220

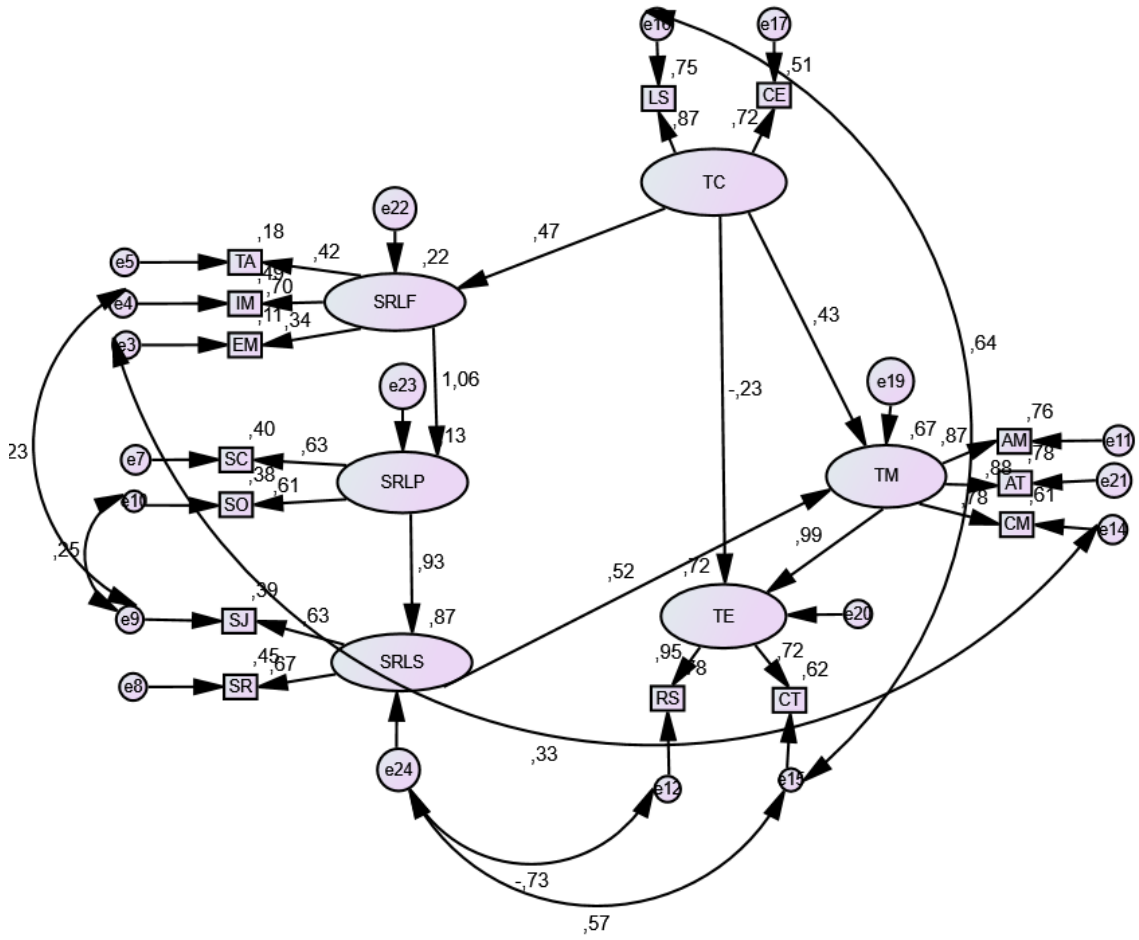
Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,949	,893	,965	,926	,965
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,122	,073	,173	,010
Independence model	,447	,417	,479	,000

4.3.3 Model 3 (competing model)



CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	55	111,882	64	,000	1,748
Saturated model	119	,000	0		
Independence model	28	975,459	91	,000	10,719

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,885	,837	,947	,923	,946
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,074	,051	,097	,046
Independence model	,267	,252	,283	,000