



ISCTE Business School

The transfer of safety training:
Unveiling the role of OHS trainers

Ana Cristina Cabrita Freitas

A thesis presented in partial fulfillment of the requirements for the degree of
Doctor in Management / Human Resources and Organizational Behavior

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June, 2018

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Abstract

The main goal of this thesis is to provide a contribution to the knowledge of the role played by OHS professionals in the transfer of the safety training they prepare and deliver in organizations as in-house trainers, in the context of their overall activity. The influences of other environmental and individual factors unexplored in the study of the transfer process are also examined. The present thesis is divided in five chapters that comprehend a review of literature about professional training and safety training, mainly focusing on the transfer problematic and the factors that affect it (Chapters 1 and 2), and three empirical studies that analyze different angles of the same phenomenon (Chapters 3, 4 and 5). The importance of the safety training transfer problematic is enhanced as well as the factors that may determine the success of interventions. From a theoretical point of view, the present work provides several major contributions, in particular: it unveils how OHS professionals, through their safety-related interactions with employees' in the work environment, can influence the transfer of safety training and how they perceive their role in the process; it reveals the effect of felt-responsibility in the transfer process, as a psychological mechanism that affect both the trainers' support toward transfer and the trainees' effort to apply the safety training in-the-job. Regarding the practical contributions, this thesis suggests important strategies to the training design and management in organizations that can improve the safety training success.

Keywords: transfer of training; safety training; OHS professionals; trainers

JEL Classification System: Organizational Behavior, Human Resources, Human Development

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Resumo

A presente tese tem como principal finalidade contribuir para o conhecimento sobre o papel desempenhado pelos profissionais de SST na transferência da formação que preparam e ministram aos trabalhadores, no âmbito do seu trabalho nas organizações. São ainda analisadas influências de fatores ambientais e individuais no processo de transferência ainda inexploradas pela investigação. Para o efeito estruturámos a tese em cinco capítulos que incluem: uma revisão da literatura sobre a formação profissional, em geral e no domínio específico da saúde e segurança no trabalho, com particular enfoque na problemática da transferência da formação e dos fatores que a afetam (capítulos 1 e 2); três estudos empíricos que analisam diferentes dimensões do mesmo fenómeno (capítulos 3, 4 e 5). A importância do tópico da transferência da formação em saúde e segurança no trabalho é realçada tal como a dos fatores que determinam o sucesso das intervenções. De um ponto de vista teórico, a tese proporciona como principais contributos: um conhecimento sobre como os profissionais de SST podem influenciar, através das interações que estabelecem com os trabalhadores, no âmbito do sistema de gestão da SST das organizações, a utilização das aprendizagens realizadas na formação; revela o efeito do sentido de responsabilidade no processo de transferência, enquanto mecanismo psicológico que afeta tanto o apoio prestado pelo profissional de SST à transferência como o esforço dos formandos em aplicar no trabalho os adquiridos na formação. No que respeita aos contributos práticos, a tese sugere importantes estratégias para o desenho e gestão das intervenções formativas em saúde e segurança no trabalho nas organizações.

Palavras-chave: transferência da formação, formação em saúde e segurança no trabalho, técnicos de saúde e segurança no trabalho, formadores

Sistema de Classificação do *Journal of Economic Literature*: Comportamento Organizacional, Recursos Humanos, Desenvolvimento Humano

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Introduction

There is a widespread recognition about the importance of training as an instrument to fulfill strategic objectives that rely on workers' knowledge, skills and attitudes. It is argued that training can positively influence, both directly and indirectly, the performance of individuals, teams, organizations, and the human capital of countries, facilitating economic prosperity (Aguinis & Kraiger, 2009).

The consensus on the positive societal effects of training is reflected in broad programs at a national and European¹ levels that contemplate training as a relevant tool: to develop human capital as a vehicle for structural changes in economies; to provide the right and equity in the access of workers to learning and development opportunities; to protect workers from (potential) risks that may compromise their health and safety in the workplace. The evaluation of the EU Strategy on Health and Safety at Work 2007-2012² highlighted the frequent use of training by Member States in national measures aimed at encouraging changes in behavior, to promote a preventive culture and to increase awareness. In 2014, the Portuguese government invested approximately 31,000,000 Euros (an increase of 96%, compared to 2011) in providing training to 42% (N = 246,543) of the civil servants³. The thematic area of occupational health and safety (OHS) absorbed most of the training hours (36% of the total number of hours), similar to what happened in the private sector where 20% of the total hours of training were dedicated to OHS topics⁴.

Underlying the training investments, there is the conviction that learning will be incorporated into individual and collective performances which will be translated into desirable organizational results as, for example, gains in safety. However, the transference process of learning from training to jobs is complex and involves a network of variables, which articulation

¹ European Commission / EACEA / Eurydice (2013). *Education and training in Europe 2020: Responses from the EU member states. Eurydice report*. Brussels: Eurydice.

² European Commission / DGESAI (2013). *Evaluation of the European Strategy on Safety and Health at Work 2007-2012. Final Report*. Kongens Lyngby, Denmark: Directorate-General of Employment, Social Affairs and Inclusion / EC.

³ INA - Direção Geral da Qualificação dos Trabalhadores em Funções Públicas (2015). *Relatório de Atividades de Formação da Administração Pública 2014*. Lisboa: INA-DGQTFP.

⁴ Ministério do Trabalho, Solidariedade e Segurança e Social / GEP (2015). *Segurança e Saúde no Trabalho 2014*. Lisboa: Gabinete de Estudos e Planeamento / MTSSS.

and accommodation in the Human Resource management systems constitutes a challenge for organizations (Baldwin, Ford, & Blume, 2017). In the last three decades, research has produced a rich body of knowledge about the general factors that can influence and/or predict the application and maintenance in the jobs of the knowledge, skills and attitudes acquired in training or, in other words, the transfer of training (TT) (Baldwin & Ford, 1988; Baldwin, Ford, & Blume, 2009). Despite the available knowledge on TT, organizations still struggle to assure that training efforts are translated in improved performances leading to the conviction, for one hand, that practitioners do not use as expected the existent transfer-related knowledge and, for another hand, that research must look and explore new aspects of the "transfer problem" (e.g. Blume, Ford, Baldwin, & Huang, 2010).

The role played by the trainer in the transfer process, especially outside the training design and delivery, is one of its' most unexplored dimensions (Hutchins, 2009). Previous research was mainly centered in the trainers' traits or attributes and their relationship with the trainees' satisfaction and learning outcomes as indicators of training effectiveness (e.g. Towler, 2009; Ghosh, Satyawadi, Joshi, Ranjan, & Singh, 2012). Such approaches neglect the active part trainers may play in the transfer process through their choices and decisions to help workers applying in the job the knowledge and skills learned in training (Baldwin, Ford, & Blume, 2017). When it comes to in-house trainers, such lack of knowledge is surprising since their link and familiarity with the organization puts them in a privileged position to foster TT (Martin & Hrivnak, 2009). From an economic point of view, in-house trainers, along with on-the-job training and training inside the company, are positively related to training effectiveness and profitability (Aragón et al., 2003; Saks & Burke-Smalley, 2014; Grip & Sauermann, 2013).

A specific type of in-house trainers is studied in this thesis: Occupational Health and Safety (OHS) professionals who develop safety training activities in organizations as part of their job and to fulfill organizational safety goals. OHS professionals are essential players in any organizational safety system, with a formal mandate to promote a safe working environment. Although, the choices and decisions they make to accomplish their mission, including how they use safety training and foster its effectiveness, are very much unexplored by research (Olsen, 2012; Daudigeos, 2013; Provan & Rae, 2016).

Along with trainees (and supervisors), trainers are key transfer stakeholders, potentially accountable for training success (Burke & Saks, 2009). However, it is still uncommon to find companies with a training accountability system and practices of training management that analyze the level of TT (Saks & Burke, 2012). In consequence, trainees and trainers (and supervisors) are rarely held accountable or responsible for training success. But the fact that trainers and trainees do not take responsibility for transfer does not mean that they shouldn't (Kopp, 2006) or even that they do not actually feel personal responsible for it. If trainers have a clear sense of duty for training results and trainees a clear sense of obligation to apply what they learn on the job, it would be expectable that both develop greater efforts toward TT (Burke & Saks, 2009), even in the absence of an external accountability system. Until the present, no study explored the influence of felt-responsibility in the transfer process, by associating this critical psychological state (e.g. Hackman & Oldham, 1975, 1976; Oldham & Hackman, 2010) to trainers' actions or even to trainees' efforts to apply the training in the job. The understanding of how felt-responsibility interferes in the TT and reacts to different work-related variables, will help organizations in finding alternative solutions to foster training effectiveness.

The two first chapters of the thesis are dedicated to the literature review. Chapter 1 presents general aspects of training, its benefits to the performance of individuals, teams, organizations and to society in general, and is particularly focused on the problematic of the TT. Several trends or landmarks that determined the evolution of this area of research are described, exposing the multidimensionality of the construct 'transfer of training' as well as the vast network of factors that influence it. Chapter 2 analyses safety training as type of on-job training, and a frequent element of safety management systems, hazard control and preventive programs. This chapter describes the different types, goals and designs that safety training can assume, to promote the workers' knowledge, behaviors and attitudes safety-related and health. The role of the safety trainer in the transfer process is also analyzed.

We conclude the literature review by presenting the research questions that guided the three empirical studies that were performed. The first empirical study (Chapter 3) intends to capture trainers' perspectives on best practices for enhancing ST success; to identify unexplored transfer factors based on best practices and the trainers' sense of self-efficacy and personal responsibility regarding ST results. Twenty semi-structured interviews were conducted with experienced and first-line safety trainers, all OHS professionals. This study was published in

an international scientific journal⁵. The second study (Chapter 4) aimed at identifying individual and contextual influences on trainers' role orientation toward the TT. We tested a model where felt-responsibility for TT mediates the influence of job resources (i.e. autonomy, access to resources, access to information, and organizational support) on trainers' definition of their role and where training safety climate exerts a moderator effect. Data was collected from 201 OHS professionals, all in-house safety trainers, of large public and private companies. This second study was published in an international⁶ journal. The third study (Chapter 5) intended to empirically analyze how safety professionals' reactions to employees' safety-related attitudes and behaviors affects the transfer process, by influencing their sense of responsibility to apply in the job what was learned in training. The effects of other variables related to social dimensions of the work environment were examined, namely the predictor role of coworkers and supervisors' safety responses and the moderator role of the supervisors on the transfer process. This is a longitudinal study, with data collected in two different times in a sample of 203 low-qualified blue-collar employees. It was submitted to publication⁷ in an international journal and is under review.

⁵ Freitas, A.C., & Silva, S.A. (2017). Exploring OHS trainers' role in the transfer of training. *Safety Science*, 91, 310–319. <http://doi.org/10.1016/j.ssci.2016.08.007>

⁶ Freitas, A.C., Silva, S.A. & Santos, C.M. (2017). Predictors of safety training transfer support as in-role behaviors of Occupational Health and Safety professionals. *European Journal of Training and Development*, 41(9), 776-799. <https://doi.org/10.1108/EJTD-03-2017-0024>.

⁷ Freitas, A.C., Silva, S.A. & Santos, C.M. (2017). Safety training transfer: the roles of coworkers, supervisors, safety professionals and felt-responsibility [under review in an international journal]

Chapter 1. Training and its transfer in organizations

Training plays an important role in helping workers to be ready to perform today's job and to be able to learn and adjust. The nature of work is rapidly changing, requiring workers to develop a wide, mutable set of skills, essential to the success of their organizations (Aguinis & Krieger, 2009). In this context, there is a widespread recognition of the ability of training activities to allow organizations, teams and individuals “to adapt, compete, excel, innovate, produce, be safe, improve service, and reach goals” (Salas et al, 2012, p.74).

Given the importance of training, decisions on what and how to train, and how to implement and evaluate training are required to be evidenced-based. The advancements made by research in the last decades reflect the influence of an evolving body of knowledge from a variety of disciplines (e.g. organizational psychology, cognitive psychology) which has allowed a deeper understanding of the processes of training design and delivery in organizations (Bell, Tannenbaum, Ford, Noe, & Kraiger, 2017). A recognized example of the theoretical advancement in the area of training concerns the transfer of training (TT), currently understood as a complex and dynamic process (e.g. Baldwin et al., 2017; Blume et al, 2010).

1.1. Multilevel benefits of training

The positive effects of training act at different levels. Aguinis and Kraiger (2009) reviewed the training literature produced since 2000 and gathered evidences on the benefits of training for society, organizations and teams and individuals. The recognition of the societal benefits of training activities has led countries all over the world to implement national policies that encourage the design and delivery of training programs at the national level to improve the nations' human capital economic and foster prosperity.

There is a positive relationship between training and organizations' performance (e.g. Saks & Burke-Smalley, 2014). Training helps organizations in building and maintaining an effective workforce, which in turn drives into corporate well-being and provides a competitive advantage (e.g. Tharenou et al., 2007). A poorly trained workforce can lead to errors and injuries, among other problems that can be extremely costly, both to workers and organizations (Grossman & Salas, 2011). The benefits of training to organizations can be measured in terms of performance as, for example, productivity, profitability and effectiveness (Grip &

Sauermann, 2013), and in terms of other outcomes related, directly (e.g. reduced costs) or indirectly, to performance (e.g. social capital) (Aragón-Sánchez et al., 2003).

Empirical research already provided enough evidence about the benefits of training to the performance of teams and individuals, through both direct and indirect effects (e.g. Salas & Cannon-Bowers, 2001; Salas & Stagl, 2009; Bell et al., 2017). Diverse types of skills are improved by training: technical skills, by increasing both declarative and procedural knowledge (i.e. facts/meanings and knowing how to perform skilled behavior); strategic skills (i.e. knowing when to apply a specific knowledge or skill); and tacit skills, implicit or hidden dimensions of knowledge and skill that function as key elements of ‘mastery’ (Evans & Kersh, 2015). Besides the direct effects, training can also impact in performance indirectly by promoting positive changes that serve as antecedents of job performance (e.g. self-efficacy, well-being, task coordination, empowerment, leadership) (e.g. Ford, Kraiger, & Merritt, 2010).

An important message from recent training research reviews is that ‘training works’ and that we understand now many of the reasons why.

1.2. Evidence-based activities for training effectiveness

A variety of scientific disciplines (e.g. education, organizational psychology, engineering) have contributed to a larger understanding of what makes training successful. An area of training effectiveness research where the advancements in knowledge have been notable, is the TT (section 1.3). The development of training effectiveness models has progressively highlighted the large number of factors that influence the process. For example, earlier models of training effectiveness as the Goldstein’s (1980) model described and linked the processes involved in identifying training needs, designing and delivering training. More recent models (e.g. Holton et al, 2000; Alvarez, Sala, & Garofano, 2004) and theories of training as, for example, training motivation (Colquitt et al., 2000) and goal-setting (Locke & Latham, 2002, 2006) revealed the diversity of factors that influence effectiveness. The discovery that conditions before and after training have a tremendous impact on both learning and performance, is perhaps the highest advancement in the field and undermined the traditional conviction that it is only on the 'during' that training exert its effects (Kraiger, 2014).

A number of authors attempted to summarize what we know about training and its effectiveness, after more than 30 years of intense research (e.g. Bell et al., 2017; Salas, Tannenbaum, Kraiger, and Smith-Jentsch, 2012; Grossman & Salas, 2011; Blume et al, 2010; Aguinis & Kraiger, 2009). There is a shared conviction that training works and it functions as a system, an interactive process involving elements or activities before, during and after training that can influence effectiveness. Salas et al. (2012) summarized the results of 8 meta-analyses on training effectiveness, to identify the critical elements of any training system and to provide a set of evidenced-based recommendations for implementing a training program (Figure 1).

Before training	During training	After training
<i>Training need analysis</i> (at an organizational, task and person levels)	<i>Trainees favorable mindset</i> (fostering self-efficacy, learning orientation, and motivation to learn)	<i>Ensuring transfer of training</i> (obstacle, tools/advice for supervisors, debriefs and/or others reinforcement)
<i>Learning climate</i> (schedule, notifications, policy of attendance, leaders and supervisors' involvement)	<i>Appropriate instructional principles</i> (valid training design and strategy, opportunities to practice, self-regulation, error training)	<i>Evaluate training</i> (purpose clarity, link to training needs and multilevel evaluation)

Figure 1. Evidenced-based activities to maximize training effectiveness – adapted from Salas, Tannenbaum, and Smith-Jenrsch (2012)

A pretraining element believed to maximize the training benefits is the *training needs analysis* (TNA). Needs analysis or needs assessment, is the process of determining the answer to the question of whether the organization's needs, objectives, and problems can be met or addressed by training (Ferreira, Abbad & Mourão, 2015; Arthur Jr. et al., 2003). It localizes the cause of a performance situation to ensure an appropriate intervention is employed or if training transfer is even relevant, allows detecting if trainees are ready and motivated for training and the existence of obstacles to positive transfer (Burke & Hutchins, 2007). The success of the TNA depends largely on a collaborative partnership between key stakeholders aimed at clarifying the purposes of training, to illuminate the organizational context, to define effective performance and its drivers, and to begin cultivate a climate of learning (Salas & Stagl, 2009).

To accomplish its purposes, the TNA can include an organizational, task and person levels of analysis (e.g. Dachner, Saxton, Noe & Keeton, 2013; Chen & Klimosky, 2007). In a TNA,

an organization analysis helps identify the expected level of financial and expert resources available for the developing and supporting of training. It examines the alignment between training and business key objectives, challenges, and strategies, and allows to identify and to remove from the work environment the existent/potential obstacles to training effectiveness (e.g. to what extent the organization's climate emphasizes learning, the supervisors' willingness to allow trainees to attend training and provide them with opportunities to transfer). The job-task analysis provides information about the frequency, importance, and difficulty of different (individual and/or team) tasks performed, the knowledge, skills, abilities, and other characteristics (e.g., job conditions) required for task performance; and under what conditions training should be delivered (e.g. equipment, tools). The person level of TNA intends to determine who will be most likely benefit from training and if training content or methods should and adapted for particular learners.

Training effectiveness can be influenced by pretraining motivation, an important element of the learning climate. The trainees' attitudes, expectations and beliefs determine their willingness to go to training and to learn (Aguinis & Kraiger, 2009). Training motivation is a well-known strong source of influences over training effectiveness that is both predicted by contextual (e.g. the organizational climate) and individual characteristics (e.g. anxiety, expectations) (Colquitt et al, 2000). Fostering realistic expectations about training contents, its utility to performance, can help maintaining a proper motivational level in trainees (Sitzmann & Weinhardt, 2015). The authors explain that framing training as an opportunity to acquire advanced skills increases the employees' perceptions that training will be exciting and a challenging opportunity for skill enhancement. In the opposite, if training is framed as remedial, it will be perceived as punitive, lowering trainees' motivation to learn.

The way attendance requirements are framed also matters (e.g. Curado, Henriques & Ribeiro, 2015): if mandatory (e.g. safety emergency procedures), signals the importance of training but may also create less positive attitudes than the optional attendance.

The importance of the supervisors' behaviors prior to course in training effectiveness was emphasized by the qualitative study of Lancaster, Milia, and Cameron (2013) who interviewed 24 employees to obtain a description of the supervisor behaviors considered helpful and unhelpful in facilitating training transfer. Discussing training contents, demonstrating interest

and setting expectations are examples of supervisors' supportive behaviors that can facilitate training effectiveness (Grossman & Salas, 2011). Although some mixed research results (Blume et al, 2010), the supervisor support is a major factor in transfer of training models (sections 1.3.3 and 5.5). In sum, supervisors (and team leaders) should send the right signal about training to enhance employees' motivation to learn before and during training.

During training, effectiveness can be fostered by enhancing trainees' motivational level and stimulating their perseverance when on the job. The motivation to learn is a recognized key determinant of training effectiveness (e.g. Bell et al, 2017; Blume et al, 2010) and it can be defined as the direction, intensity, and persistence of learning-directed behavior in training contexts (Colquitt, et al, 2000). Trainees with a high learning motivation are focused in developing competence through training, and are more likely to take on challenging tasks that will further support learning acquisition (e.g. Loch, Dam, & Chiaburu, 2013). It is a predictor of training performance and is influenced by individual (e.g. cognitive ability, age, perceived contents' utility), instructional (e.g. training design, trainer style), and work environment-related variables (e.g. social support) (Bell et al, 2017). As put it by Salas et al (2012, p. 85), "motivation to learn matters, before, during and after training and it should be promoted throughout the learning process", for example, by enhancing the link between training contents and work context and by providing both organizational and supervisory support.

A stronger desire to learn increases the trainees' commitment to learning goals, their persistence, attention, efforts, learning strategies, all components of self-regulation, a factor that contributes to maximize training effectiveness (Sitzmann & Ely, 2010; Sitzmann & Weinhardt, 2015). Sitzmann and Weinhardt (2015) describe the self-regulated learning as a cyclical process by which trainees establish goals, receive (internally or externally generated) feedback, and subsequently modify (or abandon) their regulatory strategies and training goals. In a longitudinal study, Sitzmann and Ely (2010) showed that prompting trainees' learning self-regulation by asking them reflective questions increased learning, an effect mediated by time on task. By answering such questions, trainees become more aware of their gaps in their understanding of the training contents and may engage in self-regulation to reduce goal-performance orientation. Therefore, the trainer should stimulate the trainees into self-regulatory processes by posing questions such as, for example, "are you learning what you need to learn?", or "which points haven't you understood yet?".

Directly related to the trainees' self-regulation strategies is their *goal orientation*. The goal orientation refers to one's dispositional or situational goal preferences in achievement situations (Payne, Youngcourt & Beaubien, 2007) like training. It provides a mental framework that individuals use to interpret and to guide their learning behavior (e.g. Guarino, Whitaker, & Jundt, 2017). The individuals' goal orientation can adopt two general types: a performance goal orientation (PGO, i.e. focused on the judgments or evaluation of others and in the avoidance of situations where failure can happen), and a learning or mastery orientation (MGO, i.e. focused on seeking more knowledge, comprehension, and personal development). Those with a MGO are mainly centered in developing their skills and engaging in complex tasks which is why they tend to learn more than the individual with the PGO. The literature review of Payne, Youngcourt and Beaubien (2007) found evidences of MGOs' proximal and distal consequences such as learning, academic performance, task and job performance. Although originally conceptualized as a stable individual (trait) difference, goal orientation can be a state induced by situational influences, which is why some authors suggest that organizations/trainers should shape instructions and overviews within training to create a climate for optimal training performance, for example, through a balanced positive feedback (Rogers & Spitzmueller, 2005) or by including opportunities for trainees to take responsibilities for their own learning (Salas et al., 2012).

The construct of self-efficacy is also associated with the MGO. Huang (2016) reviewed 125 studies to examine the relation between academic achievement goals and self-efficacy and found that correlations with MGO were generally moderate to strong while those between PGO and self-efficacy were low. Self-efficacy corresponds to the belief in ones' ability to successfully accomplish something (Bandura, 1977, 2001), for example, a learning experience. Literature reviews on TT present self-efficacy as a key factor (e.g. Grossman & Salas, 2011; Blume et al, 2010). The higher the trainees' self-efficacy, the more confidence they have in their ability to learn (and to apply in the job) and the more likely to persist when performing difficult tasks. Therefore, if self-efficacy leads to a better learning, training should be designed to promote it and to reinforced it afterward, for example, by reminding trainees of past successes, on the training or on the job, and by ensuring early successful experiences during training (Salas et al., 2012).

The use of appropriate training delivery methods and instructional principles is commonly pointed as a predictor of the training transfer and success (section 1.3.3), including in the field of safety training (section 2.3.1). Both the meta-analysis of Arthur et al (2003) and the recent literature review of Bell et al (2017) found that the effectiveness of training delivery methods varies accordingly to the task being trained (e.g. interpersonal skills, cognitive skills) and the training outcome (e.g. learning, behavior). However, there are some theory-based principles to enhance effectiveness, including: to stimulate the trainees' active role in the learning processes, for example, through exploratory training in which trainees explore and experiment with the training tasks (Keith & Wolff, 2015). An example of an active training intervention that uses exploration, is error management training, an approach focused on the informative aspects of errors and on its use by trainees' as a basis to think ahead and to try out something new (Keith & Frese, 2008). The meta-analysis of Keith and Frese (2008) found that deliberately incorporating errors into training can be an effective mean to promote learning and transfer, in contrast to many traditional training approaches focused exclusively on correct behaviors and denying any positive functions of errors during training.

After training, two main activities should be performed to maximize effectiveness: to evaluate training (section 1.3.4) and to ensure the transfer of the training (section 1.3). The two activities are strongly related (training evaluation is needed to determine if training has been transferred, although have been approached by research separately, with few exceptions (e.g. Saks & Burke, 2012). Training evaluation detects and analyzes the results obtained from a specific perspective: the extent to which training has responded to the needs of the individuals and the organization and its translated in terms of performance (Pineda, 2010).

To be effective, training evaluation must be integrated into the planning process and oriented by previously and clearly defined purposes. For Meignant (1997), the evaluation of training is one more phase in the overall planning process and, as such, it influences and it is influenced by other elements that constitute planning (e.g. budget). According to Kraiger (2003), training evaluation is generally done to decide about the training (e.g., whether a new safety training online program should be kept or eliminated) and/or to provide feedback to trainees and trainers, and/or to market training outcomes either to future organizations (or units within organizations) or to future trainees. Defining a clear purpose to the evaluation and

deciding on evaluation measures consistent with the purpose, it increases the likelihood that data are well received, it eliminates time spent measuring outcomes that do not support the evaluation purpose, and also increases the likelihood that training matters in the organization.

For training activities to provide its potential benefits a primary condition must be satisfied: the TT must happen. In other words, trainees must apply what they have learned in training on their jobs (Blume et al., 2010).

1.3. Transfer of training

The TT represents the goal of training since it regards the extent to which knowledge, skills, and attitudes acquired during training are applied and generalized in the job and maintained over a period of time (Baldwin & Ford, 1988). The concerns that the learned in training is not used in job, at least in the equivalent proportion of the training efforts, are not recent: Georgensen (1982) raised the issue that became known as the “transfer problem” (Baldwin & Ford, 1988, p.75) by formulating the rhetorical question “...I would estimate that only 10% of content which is presented in the classroom is reflected in behavioral change on the job?”. Although not based in empirical evidences, Georgenson (1982) doubts highlighted the glaring gap between training efforts and organizational outcomes (Grossman & Salas, 2011) and helped in launching the advances in TT knowledge (Farrington, 2011). Meta-analyses of training effectiveness literature revealed a persistent disconnection between learning and behavior (Arthur, Bennett, Edens, & Bell, 2003; Saks & Belcourt, 2006; van Wijk, Jansen, & Lyles, 2008). Despite the tremendous progress in TT, research is still trying to understand the process through which knowledge, skills and attitudes can be fully and properly transferred to job-related activities.

1.3.1. Landmarks in the transfer of training research

The issue ‘transfer’ (of learning) was first placed in the educational universe, an expectable ‘habitat’ since the existence of formal education is based on the presumption that it helps to apprehend general skills that, once transferred beyond the world of academia, will help students solving problems they confront and becoming productive members of society (Adams, 1987; Barnett & Ceci, 2002). In the beginning of the 20th century, studies on learning had mainly

a focus on efficiency and were largely influenced by the work of Thorndike, as the ‘law of effect’, who initiated what would become a specific and prolific area of research (Bell et al, 2017). During the 1940s and the 1950s an interest in the factors that predict training success started growing, especially in military settings but it was only in the late 1960s’ early 1970s that researchers started to adapt the study of transfer to improve the application of workplace learning (Blume, et al, 2010).

The literature review of Campbell (1971) is pointed out as a landmark in the history of training research (e.g. Salas et al., 2001; Bell et al., 2017). The author emphasized the lack of quality of the studies by stating that they were voluminous, non-empirical, non-theoretical, poorly written, and dull, focusing mainly on the testing interventions, new methods, but with no link to the existing learning theories. Basically, training literature and knowledge seemed to be of little value to trainers and researchers concerned with the transfer and effectiveness of training.

Maybe due to Campbell's (1971) diagnostic of training research, more theory-driven training research and systems thinking began to appear, particularly in the 1980s. During this period, studies start exhibiting a more learner-centered orientation, an interest in how trainees approach and respond to learning during training (Bell et al, 2017). Additionally, emerged an increased concern in organizations that the investment made in training should be justified in terms of improved organizational performance (Salas & Cannon-Bowers, 2001). The context was then favorable to the growth and expansion of transfer research for which the contribution of Baldwin and Ford (1988) was decisive. These authors reviewed the major empirical studies of training transfer, summarized key findings related to the linkage of training input factors and transfer, and proposed a framework that depicted the interactions among training trainee characteristics (e.g. cognitive ability, self-efficacy), design characteristics (e.g. training methods), and the work environment (e.g. constraints/opportunities to perform) in explaining learning and transfer (Section 1.2.3, Figure 1, page 13).

Thirty years after Campbell (1971) and mainly after Baldwin and Ford (1988) review, there was an effusion of both conceptual and empirical research aimed at bridging the gap between training and workplace performance (Saks, Salas, & Lewis, 2014). In 2001, Salas and Cannon-Bowers reviewed the training literature between the early and late 1990s and concluded

that training theory and research had made great advancements suggesting a number of important propositions and conclusions, including the following: TT should be conceptualized as a multidimensional construct; the “context matters”, since it sets motivations, expectations, perceptions, and attitudes for transfer.

The advances made in training knowledge can be attributed, at least in part, to the need for evidenced-based prescriptions for the design and delivery of training (Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2012). But as important as is effective training design/delivery, perhaps the most important advance on the field was the recognition that conditions before and after training have a tremendous impact both in learning and in the resulting performance change (Kraiger, 2014; Bell et al., 2017). Rouiller and Goldstein (1993) introduced the concept of “organizational transfer climate” to describe the extent to which trainees’ perceptions of the posttraining environment can be supportive of the application of training in job situations. The authors found that the supervisor and peer perceived support were much stronger predictors of transfer than what trainees have learned. Further studies (e.g. Tracey, Tannenbaum, &Kavanagh, 1995; Martin, 2010) gathered evidences that a supportive posttraining environment affects employees’ mindset, which in turn will determine the TT.

From 2000 onwards, the intense production of knowledge about TT continued. In Cheng and Hampson (2008, p.333) opinion “other than repetitive examinations of previous variables and models (...), there was little new research which discovered new variables in this period”. The acumulated knowledge since then has been synthesized in various reviews and meta-analytical articles (e.g. Grossman & Salas, 2011; Blume et al. 2010; Baldwin et al., 2009; Cheng & Hampson, 2008; Burke & Hutchins, 2007). These works testify a growing understanding that employees’ perception of the work environment, as the transfer climate and the social support, are powerful transfer predictors (e.g. Tracey, Tannenbaum, & Kavanagh, 1995; Chiaburu, 2010; Homklin, Takahashi, & Techakanont, 2014). Although, some factors also related to work context have received little attention or even been relatively neglected from research such as the level of autonomy and other situational constraints (Blume et al., 2010). In their recent proposal for a new research agenda for transfer, Baldwin et al. (2017) calls for a change in the research paradigm, in order to understand the enviromental influences on transfer but by adopting a different focus, more person-centric, able to capture the personnal experiences (i.e.

what feelings, attention, search for meaning and changes over time) of key stakeholders, as trainers.

The evolution of the evidence-based knowledge on the transfer of training highlighted the multidimensional nature of the construct posing new challenges to its study and measurement.

1.3.2. Multidimensionality of the concept

Since the beginning of the research on transfer, scholars have advocated clearer concepts and better operational definitions to measure it (Blume et al, 2010). The concept was originally defined as the extent in which the learning of a response in one situation influences the response in another, a sense inspired in Thorndike's 'identical elements theory of transfer', the notion that transfer is not based on general faculties (attention, reasoning, and memory) but is rather particular and limited, determined by identity of stimuli and/or responses made to them in the two situations. In sum, the generalization process would depend of the similarity in the stimuli and responses in the learning and the transfer environments (Bell et al, 2017).

In the 1960s, Gage defended that the study of transfer should consider the level of similarity between what was learned and the applying situation and proposed two types of generalization processes: the *lateral* (or *horizontal*, as defined by Barnett and Ceci, 2002) and *vertical transfer*. The first occurs when applying trained rules and procedures to situations similar to the trained; the second, when an acquired skill affects the acquisition of a more complex or super ordinate skill (Blume et al, 2010).

Other authors added to the transfer concept some requisites as, for example, the extent to which it enhances job-related performance (Wexley & Baldwin, 1986) and the effectiveness and continuity of the use of the knowledge/skills learned in the classroom (Georgensen, 1982). These last two dimensions were considered by Baldwin and Ford (1988, 2009, 2010) as essential to conclude on the occurrence of transference, namely: the *generalization* of the material learned in training to the job context, and *maintenance* – or the persistence over time of the changes that result from a learning experience. Another transfer dimension relates to its effects in the context of the application of the learned knowledge/skills and it can be described as *positive* or *negative transfer*: whenever the previous learned in training enhances a related performance in another context or undermine it (Perkins & Salomon, 1992). In organizational

contexts, positive transfer of training is generally regarded as the paramount concern of training efforts (Baldwin & Ford, 2009).

Despite the new facets of transfer suggested by previous research (i.e. applied to the job context, in new contexts or for new purposes, applied in an effective and continuous manner, generalized to the job, and maintained), Laker (1990) argued that the studies failed in the attempt to define the construct multidimensionality and proposed a discussion and assessment of transfer according to two dimensions: *time* and *generalizability* (distance). The temporal dimension includes *transfer initiation*, the degree to which the trainee initiates or attempts to apply the training on the job, and *transfer maintenance* or the degree to which the trainee persists in applying on the job the training he/she received. The dimension of generalizability includes *near* and *far transfer*, respectively, the extent to which what was acquired in training is applied to situations that mirror the trained ones and the extent to which the trainee applies the training to situations that are different from the previous or even new.

Along with capturing and understanding the multiple dimensions of the concept, researchers have worked to overcome the criterion problem, meaning the predominant use of self-reports of behavioral change as the major measure of transfer. In the 1998 review, Baldwin and Ford recommended both broadening of the outcomes measurement and the collection of multiple measurements of TT over time. Later, Baldwin et al. (2009) reviewed the transfer studies from 1988-2008 and emphasized the fact that researchers were given more attention to effectively measuring training transfer (e.g. several measures over time and after training) rather than simply relying on trainees' perceptions of their transfer, but there was still a need to expand the criterion space of transfer research. Nevertheless, knowledge on TT has traditionally been based on self-reported data mainly because of practical reasons since, as Hutchins, Nimon, Bates, and Holton (2013) have pointed, gathering self-reported data is easier and ensures a higher rate of response, than collecting data at post-training intervals. As an alternative or proxy transfer measure, several authors have proposed the use of 'intent to transfer' (e.g. Cheng, Sanders, & Hampson, 2015; Hutchins et al, 2013; Yamkovenko & Holton, 2010), a factor related to motivation to transfer although conceptually different.

Scholars have continued to refine the concept of transfer by proposing taxonomies and frameworks to clarify the nature, contexts and prevalence of transfer as well as to support its

measure. For example, Barnett and Ceci (2002) developed a taxonomy to categorize transfer studies according to nine dimensions: Content-related (what was transferred) – regards the type of the learned skill, memory demand and performance change; and context-related (when and where transferred from and to) – knowledge domain, physical context, temporal context, functional context, social context, and modality. Centering their attention in the intensity of transfer, Huang, Blume, Ford and Baldwin (2015) distinguished between *maximum* and *typical transfer*, a continuum drawn from job research performance, where one end reflects how much trainees can potentially transfer (maximum) and the other end captures how much trainees will transfer (typical).

In response to growing perspectives of the trainee as an active player in the transfer process (Bell & Kozlowski, 2008; Bell et al., 2017), scholars have called for an update and expansion of the traditional definition of training transfer as the use of the trained skills or the effectiveness in applying the training (Baldwin & Ford, 1988; Blume et al, 2010). Alternatively, has grown the view of TT as the series of choices that trainees and other stakeholders, as the trainers, make to discard, maintain, apply, modify and support trained knowledge and skills in their work context. Therefore, researchers should get closer to subjects and contexts to capture what happens in the transfer (Baldwin, Ford and Blume, 2009, 2017; Yelon and colleagues, 2014, 2013, 2004).

1.3.3. Main predictors of training transfer

The theoretical framework proposed by Baldwin and Ford (1988) to investigate TT is probably the most used by researchers (Figure 2). The authors organized the review of 63 transfer studies, from 1907 to 1987, around a model of training inputs (includes trainee characteristics, training design, and work environment), training outputs (knowledge and skills acquired during training), and conditions to transfer concerning (generalization and maintenance of the newly knowledge/skills in the job):

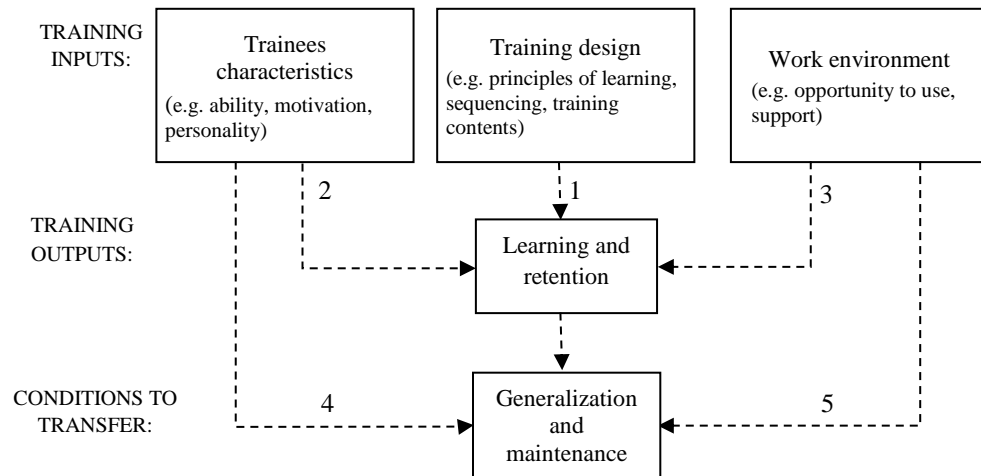


Figure 2. Baldwin and Ford's model of the transfer process (adapted from Baldwin & Ford, 1988)

A wide variety of transfer-related studies produced, since Baldwin and Ford's (1988) review, very rich and vast information on TT predictors and moderators but also inconsistent and mixed findings (Blume et al, 2010). Additionally, not all factors associated with TT appear to be equivalent in their relevance. For example, Burke and Hutchins (2007) assessed in a review the strength of the relationships between 31 factors and transfer and found that only 17 showed had a strong or moderate association. Overall, these particularities in the research results can make it difficult for organizations and practitioners to translate to training activities the evidence-based existent knowledge (Grossman et al, 2011). Scholars have attempted, through qualitative and quantitative literature reviews, to signal the strongest and consistent TT predictors and moderators (e.g. Burke & Hutchins, 2007; Cheng & Hampson, 2008; Grossman & Salas, 2010), related to trainee characteristics, training design and delivery and work environment, as foreseen in Baldwin and Ford (1982) framework.

Trainee's individual characteristics

Individual traits play an important role in facilitating TT. It includes motivation to learn and transfer, self-efficacy, the perceived contents instrumentality, and especially the cognitive ability (e.g. Colquitt, LePine, & Noe, 2000; Blume et al., 2010; Burke & Hutchins, 2008).

Both motivation to learn and to transfer has been recognized as critical factors for training effectiveness (e.g. Kontoghiorghes, 2002; Colquitt et al., 2000). The second can be

defined as the trainees' desire to apply on the job the learned training program (Noe, 1986) and plays a key role as an important predictor conceptual models of training transfer (e.g. Baldwin & Ford, 1988; Cheng & Hampson, 2008). Two important cognitive factors directly related to training motivation and transfer are the trainees' training self-efficacy and instrumentality (Chiaburu & Lindsay, 2008). The first regards the individual's belief that he/she can successfully perform a task (Bandura, 1977, 2009) and the second represents an individual's belief that performing a specific behavior will lead to a desired outcome (Chiaburu & Lindsay, 2008). Cognitive ability is recognized as a robust predictor of traditional training outcomes, such as declarative knowledge or skill acquisition (Blume et al, 2010), and as being indirectly related to self-efficacy in learning.

Training design and delivery

Of the three training inputs identified by Baldwin and Ford (1988), training design is the one that received the most attention from research (Blume et al., 2010). Any training program involves choosing the appropriate methods and techniques, identifying and sequencing instructional objectives, and determining the instructional tools and strategies necessary to support learning and transfer (Bell et al., 2017). Literature reviews and research meta-analysis have identified some common characteristics of the effective training interventions.

The role performed by *training need analysis* in training design was enhanced by Goldstein's (1986, 1991) instructional systems design (ISD) model, probably one of the most influential model in the training and development literature (Kraiger, 2014). The ISD adopts a rational perspective of training design and posits that needs assessment (i.e. assessment of organizational, task and competencies, and individual needs and requirements) informs training design, which dictates training delivery, which is followed by training evaluation to inform future training delivery (Goldstein, 1980). The Goldstein's ISD model has been very criticized, accused of being very time and money consuming (Gordon & Zemke, 2000). Additionally, the lack of research-based set of guidelines for selecting the most appropriate needs-assessment methods may also help explaining why is so rarely developed by organizations (Kraiger, 2003). In fact, training needs analysis has received little research attention (Bell et al., 2017), despite some evidences identified by several literature reviews on its' linkages with learning and training effectiveness (e.g. Salas & Cannon-Bowers, 2001; Arthur, Bennett, Edens, and Bell,

2003; Kraiger, 2003). In a recent review, Bell et al (2017) stated that future research in training needs analysis should take in consideration that organizations seek to become more agile and no longer have the luxury of taking months to conduct a detailed needs assessment. Therefore, research should try to understand if training needs can be identified more rapidly without sacrificing the quality of the information that is gathered.

Another element of design generally associated with transfer of training is *goal-setting* (e.g. Baldwin & Ford, 1988; Baldwin et al., 2009; Burke & Hutchins, 2007). Locke and Latham (2002, 2006) are the founders of the goal setting theory which states that goals signal what is important, provide a sense of direction, and enable feedback on task performance. To produce the desirable effects, the goals should be: specific, very focused, clear, and achieved within a certain time frame; challenging, stimulating the individual motivation; and difficult, although realistic so the individuals can have an enthusiasm to reach the goals (Latham, 2004).

Despite the apparent consensus on the motivational properties of goal setting and on its' contribute to training effectiveness, some research presents contradictory results. The review of Blume et al. (2010, p. 1092) found a relatively small effect of goal setting on transfer, with very wide confidence and credibility intervals: "Put simply, the evidence in support of transfer interventions was not as compelling as either our intuition or prior transfer commentaries would suggest". Additionally, the benefits of goal setting appear to be not without limitations. Ordóñez et al. (2009) stated that positive effects of goal setting have been overstated and that systematic harm caused by goal setting has been largely ignored, for example: to narrow one's focus, shift risk attitudes and precipitate the psychological costs associated with goal failure. Therefore, the authors suggest that managers and scholars need to conceptualize goal setting as a prescription-strength medication: careful dosing, consideration of harmful side effects, and close supervision. Also, identical goals may not be beneficial to different people, as individuals differ in their abilities and the degrees to which they identify with certain goals (Grossman & Salas, 2011).

Perceived content validity or the degree to which trainees believe that the training contents reflect their jobs requirements accurately, can predict positive training transfer to the workplace due to an increase of the motivational levels to improve work effectiveness (e.g. Bates et al, 2000; Holton et al., 2000). In their initial review, Baldwin and Ford (1988) underscored the

importance of the principle of identical elements according to which a high similarity between training characteristics and practice improves transfer. Further studies have gathered evidence that perceived content validity is central to the transfer process because it enhances a positive attitude toward training (Liberman & Hoffman, 2008) and the trainees' motivation to apply training (e.g. Bhatti & Kaur, 2010; Lochter et al., 2013). The theoretical framework of the concept goes back to Thorndike and Woodworth's identical elements theory which implies that training transfer depends on the degree to which the stimuli and responses in the training are identical to those in the transfer situation (Lochter et al., 2013). From this point of view, it will be easier for trainees to apply in the job what has been learned in the training when the stimuli and responses in the two settings matches well, so training should resemble the conditions which the participants face at work. However, the principle seems only suitable in situations where trainees do not have to use new skills or techniques on the job according to the circumstances (Bhatti, Ali, Faizal, Isa, & Battour, 2014).

The intrinsic nature of the training content has also consequences in the degree of transfer. The application to the work environment of *open or soft-skills*, such as interpersonal skills or supervisory competencies, are less straightforward and more sensitive to work context variables than *closed or hard-skills* (technical and operational) (e.g. Yelon & Kevin Ford, 1999; Lakker & Powell, 2009; Blume et al, 2010).

Design and delivery methods are a major factor in transfer models (e.g. Baldwin & Ford, 1988; Burke & Hutchins, 2007). Some training methods theory-driven have shown a strong relationship with TT (Chapter 2, section 2.3.1) in particular, 'behavioral modeling' - includes explanations of behaviors to be learned, models displaying the effective use of the expected behaviors, opportunities for trainees to practice learned skills followed by feedback and social reinforcement following practice (e.g. Taylor, Russ-Eft & Chan, 2005); 'error management' - training incorporates information regarding potential errors and how they should be dealt with, exemplifying negative outcomes that can occur without the acquisition of trained skills (Keith & Frese, 2008); 'realistic training environment' - training mirrors the particularities of the work context where knowledge/skills will be transferred (Lochter, 2013) - allow trainees to gain

experience with multiple conditions that can occur on the job, helps to maintain trainees' attention and contribute to transfer (Grossman & Salas, 2011).

Work environment

Training transfer happens in a certain work context and when trainees return to the job they must confront it. Scholars seem to agree on the important role played by the perceived post training environment in determining the degree to which the KSA acquired in training are transferred to the workplace. Transfer environment has been shown to influence training outcomes both directly and indirectly, as a moderator between individual factors and transfer (e.g. Clarke, 2002; Cromwell & Kolb, 2004; Pham, Segers, & Gijsselaers, 2013). The following categories of environment factors gather some consensus in literature:

Opportunity to use the learned skills on the job, the degree to which trainees in the workplace are provided with the resources and tasks necessary for the use of training, for example, time and equipment (e.g. Russ-Eft, 2002; Holton, Bates, & Ruona, 2000);

Transfer climate, includes the workplace situations and consequences that inhibit or facilitate and support the use of training in the job, such as the *social support*, i.e. the peers and supervisors influence and attitudes toward training (Martin, 2010; Govaerts & Dochy, 2014), and the extent to which organizational policies and practices support and reinforce the training efforts (e.g. Chiaburu & Marinova, 2005). Research results about the impact of the coworkers support (e.g. through feedback and encouragement) on TT appears to be more consistent (Van den Bossche, Segers, & Jansen, 2010) than the findings focusing on the role of the supervisor support, since some studies did not find any relationship between the variables (Velada, Caetano, Michel, Lyons, & Kavanagh, 2007; Chiaburu, Dam, & Hutchins, 2010). Several explanations are presented in literature. A first one regards the apparent multidimensionality of the construct of supervisor support. Govaerts and Duchy (2014) analyzed the existing items aimed at measuring the role of the supervisor in TT and found 24 categories of specific behaviors and attitudes that can facilitate the TT to the workplace.

General work environmental factors, for example, the available resources (e.g. budget, technical assistance) can influence the opportunities for trainees to apply what they have learned, directly or indirectly, by affecting their motivation to do it and/or their self-efficacy

(e.g. Homklin et al., 2014). Work characteristics (e.g. the level of job autonomy) can function as moderator variables that account for differences in the studies, explaining unexpected disparities in results (Pidd, 2004). This is also consistent to Chen and Hampson (2008, p.335) alert that there are still ‘some essential but hidden variables we need to spot’ in the social support for transfer. Additionally, Burke and Hutchins (2008) enhanced the need for a larger understanding of the interaction between environmental factors that are closer and more immediate to the trainee, like peer and supervisor support, with factors that are more distant and removed, like organizational (safety) climate. The link between the work context and newly knowledge/skills is enhanced by training activities such as on-the-job training and training inside the companies (provided by in-house trainers) which were found to be positively related to transfer and organization performance (Saks & Burke-Smalley, 2014; Aguinis & Kraiger, 2009).

1.3.4. *Accountability in the transfer of training*

Accountability is presented by some authors as an organizational predictor of TT (e.g. Baldwin & Magjuka, 1991; Burke & Hutchins, 2007) but the studies that test its relationship with TT are few, probably because accountability in training is still infrequent in companies.

The accountability hypothesis

Perceptions of accountability or felt-accountability, also commonly referred to as simply accountability, can be defined as the perceived expectation that one’s decisions or actions will be evaluated by an audience and that rewards or sanctions will be contingent on this expected evaluation (Hall, Frink, & Buckley, 2017). In the context of TT, the concept refers the degree to which the organization expects trainees to use trained knowledge and skills on the job and holds them responsible for doing so (e.g. Burke & Saks, 2009). Two main mechanisms can be used to account for training success: tracking training outcomes and, most especially, training evaluation because it can identify weaknesses that lead to improvements in training programs creating greater accountability among stakeholders for training outcomes (e.g. Saks & Burke, 2012; Saks, 2013). Longenecker (2004) as well as Burke and Hutchins (2007) explain the effect of accountability over transfer as a simple case of ‘what gets measured gets done’. The mere act of measurement signals to employees what is important in the organization, and so more

attention is paid to behaviors that are under measurement. If trainees are aware that they will face a post-training evaluation of their learning or be held responsible for the application of knowledge/skills, they will feel more motivated to transfer.

Along with trainees, supervisors and trainers are also transfer stakeholders because they are associated with the use of trained knowledge/skills on the job, therefore they should be involved in any accountability system for TT (Burke & Saks, 2009). In what concerns to trainers, Kopp (2006) pointed that behaviors called by their job are not only to train but also to ensure that transfer occurs as expeditiously as possible, so they should be held accountable for it.

Literature presents some arguments in favor of an existent relationship between accountability and TT. For example, the 193 trainees of Baldwin and Magjuka (1991) transfer study reported greater intentions to TT on the job when they recognized that they would have some accountability for learning with their supervisor, as a follow-up activity or assessment; the studies of Saks and Belcourt (2006), Burke and Hutchins (2008), and Hutchins (2009) found that accountability-related activities (e.g. submitting a report after training, considering in the performance appraisal system the use of the newly knowledge/skills) and post-training measurement were positively related to TT and reported by training professionals as a best practice for supporting transfer; more recently, Saks and Burke (2012) tested and confirmed, in a sample of 150 trainers, the accountability assumption that training evaluation efforts are related to TT.

Despite the research results suggesting the predictive power of accountability and associate post-training measures on the TT, the concept has received a scarce attention from research, especial when compared with social support mechanisms of the work environment as the supervisors and the coworkers' support for transfer. Major transfer models seem to ignore accountability as a transfer factor. For example, the Baldwin and Ford (1988) model of transfer process, which is probably the most used theoretical framework in the study of TT, identified the work environment as a transfer predictor (along with trainee characteristics and instruction design and delivery), grouping variables such as the supervisory and coworkers' support and opportunities to transfers but not accountability. The Learning Transfer System Inventory (LTSI), developed by Holton, Bates and colleagues (1997, 2000, 2012), assess a total of 16

factors related to individual, training and organizational features that can influence TT, although LTSI does not include any item related to accountability.

Training evaluation

Training evaluation is frequently considered the single most important strategy to ensure accountability and improve training transfer (Saks & Belcourt, 2006; Burke & Saks, 2009). The term training effectiveness is sometimes used interchangeably with training evaluation but the two are separate constructs: the former concerns the study of individual, training, and organizational features that influence the training process before, during, and after training; the latter refers to the measurement of the success or failure of a training program, regarding its contents, design, change in learners, and organizational payoffs (Alvarez, Salas & Garofano, 2004). The confusion between the two expressions is likely due the fact that frequently training effectiveness variables are studied through the targets of evaluation. For example, when we assess the relationship between the support from the supervisors and the changes in workers' compliance with safety rules and work-related injuries.

The definitions of training evaluation generally falls in one of two categories (Singh, 2013): 'congruent', when the definition alludes to meeting designed objectives (i.e. when training evaluation is viewed as a process of collecting information, judging the worth or value of the training program and ensuring that training objectives are met); 'contemporary', when the definition of evaluation places emphasis on scientific investigation and in facilitating decision making (for example, Stufflebeam (2000) defines evaluation as the process of delineating, obtaining and providing useful information for judging decision alternatives).

Different perspectives or philosophies on training evaluation configure the scholars' proposals on evaluation models which can be divided in two major types: 'hierarchical' or goal-based and 'contextual' or system-based (Kucherov & Manokhina, 2017). An example of the former category is the four-level evaluation model of Kirkpatrick, developed during the 1950s (e.g. Kirkpatrick, 1996; Kirkpatrick & Kirkpatrick, 2009) and probably the most used and acknowledged hierarchical model that has significantly influenced the development of others (e.g. Philips, 1998). The Kirkpatrick s' model foresees the measure of four levels of outcomes: Level 1 (the reactions criteria), evaluates trainees' affective and attitudinal reactions to a

training program, informing if trainees are motivated and interested enough to learn; Level 2 (learning criteria), ascertains the learning that took place by determining the knowledge/skills acquired and improved and attitudes changed as a result of training; Level 3 (behavior criteria), focus the changes observed in performance after taking training activities; Level 4 (results criteria), evaluates the effects of training on business results such as, for example, productivity increase, cost reduction, quality improvement.

An essential assumption, and simultaneously a target of the many criticisms Kirkpatrick's model has received over the years (e.g. Holton, 1996; Giangreco, Carugati & Sebastiano, 2008; O'Toole, 2009), is that each level builds on the last. Contextual evaluation models seek to circumvent the limitations pointed to the previous category by trying to embrace the net of individual and environmental influences and to sustain processes of decision making (Holton, 1996; Bates, 2004). A representative example of the system-based evaluation approach is the Stufflebeams' (2000) CIPP model, which comprises four different types of evaluation: 'contextual' - serves planning decisions by identifying needs, opportunities and underlying problems; 'input' - to project and analyze alternative procedural designs; 'process' -to implementing decisions by monitoring project operations; 'product' - to recycle decisions by determining the degree to which objectives have been achieved and the causes of the obtained results.

Taken together, the several definitions and models of training evaluation reflect the complexity of the process and the role of evaluation in supporting an accountability approach to training effectiveness.

Responsibility in the transfer process

Burke and Saks (2009), and more recently also Grossman and Burke-Smalley (2017), proposed the 'Triangle Model of Responsibility' (TMR) of Schlenker, Britt, Pennington, Murphy & Doherty (1994) as a theoretical framework to the analysis of accountability (the authors use the terms accountability and responsibility interchangeably) in the TT process. Outside of the transfer literature, Schlenker and colleagues (1994, 2001) proposed the TMR to describe and examine the social judgments associated to the attribution of causal responsibility (Figure 3).

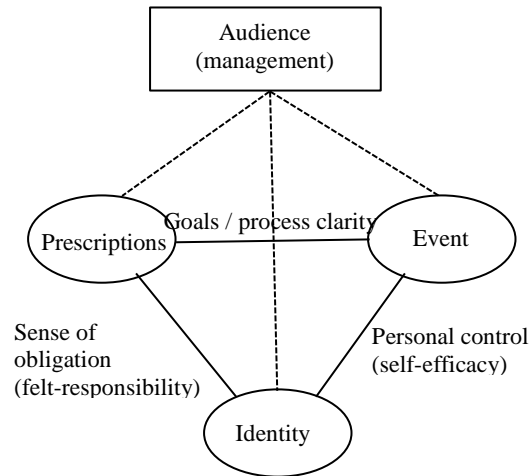


Figure 3. The Responsibility Triangle and the Accountability Pyramid (adapted from Schlenker, Pennington, Murphy, & Doherty, 1994)

The authors' main thesis is that responsibility is a component of the process of holding people accountable for their conduct. Such process involves 'evaluative reckonings' (p.634) that requires information about: 'Prescriptions', regards the implicit or explicit codes or rules for conduct that serve to guide, to expect or to evaluate behaviors (i.e. organizational regulations or guidelines for TT, for example, producing a transfer briefing report); 'events' or "units of action and their consequences that actors and observers regard as a unified segment for purposes of some evaluation" (Schlenker et al., 1994, p. 635), for example, the transference of a training intervention; 'identity', concerns the components of the actors' role, qualities, commitments, and pretensions (e.g. how trainers define their role in the transfer process).

In the TMR, responsibility functions as a 'psychological adhesive' (Schlenker et al., 1994, p.636) that joins the three elements of all evaluations, establishing the basis for judgment by allowing information to travel from one location to another through three links: 'Prescriptions-event', regards the existence of specific goals and a clear process regarding the event (e.g. to what extent there are clear prescriptions to trainees and trainers regarding the transference of training to the job); 'Prescription-identity' or the actors' sense of ownership or perceived obligation for the event, a concept similar to felt-responsibility which can be defined as a sense of internal obligation and commitment to produce or prevent designated outcomes (e.g. applying the training in the job) or that these outcomes should have been produced or prevented (Lauermann & Karabenick, 2011; 2013). In terms of TT, for example, it is unlikely

that in the absence of rules or goals for supporting TT a trainer will feel personally responsible for assuring that trainees use in the work context what was learned in training; 'Identity-event', concerns the actors' connection to the event. This link increases in strength if, for instance, a trainee perceives to have personal control or a high sense of self-efficacy over their actions in the transfer process. Overall, the 'responsibility triangle' prompts subjects to engage self-regulatory mechanisms, spring into action, and sustain efforts necessary for goal completion.

In two conceptual articles, Burke and Saks's (2009) and Grossman and Burke-Smalley (2017) contend that research should help organizations improve transfer by targeting variables, including the sense of ownership or felt-responsibility, that promote accountability. The present thesis responds to those calls and extends them by looking for the role played by felt-responsibility in the trainees and trainers' attitudes and actions toward the transfer of safety training.

In balance, the literature review performed in this chapter provided several essential ideas to the design and development work:

- Training brings large positive effects to individuals, teams and organizations, once transferred to the work context.
- The expectations on the effects of training creates a need for a profound understanding about how transfer works and the factors that influence it.
- TT has a multidimensional nature and it is generally accepted the existence of three major predictors – individual characteristics, the design / delivery of the training and the work environment. Findings on the latter gather more doubts and raised questions, in particular due to inconsistencies and contradictions on the detected effects.
- There is the conviction that there are some essential but hidden variables and/or interactions between environmental factors that can probably explain disparities in the results.
- Very much unexplored as a source of influences on TT is the accountability or the perceptions of accountability. Post training measures and/or of a training evaluation practices seem to be linked to the level of TT. Though, other facets of accountability have been neglected from research, namely the influence of psychological mechanisms

as the personal control and the personal responsibility for transfer, despite some calls for research on the topic (e.g. Burke & Saks, 2009).

- Along with trainees, other stakeholders, as the trainers, should be involved when training effectiveness is scrutinized (e.g. Kopp, 2006).

The next chapter provides an overview on the phenomenon 'transfer of training' in the specific context of occupational and health safety where training is used as an important tool to protect workers from occupational hazards.

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Chapter 2. Safety training

Safety training is widely regarded and developed as an important and common part of OHS programs, aimed at reducing the risk of work-related injury and disease. Frequently, organizations implement health and safety training interventions as a compliance with national laws and guidelines which are formulated on the belief that training interventions are able to promote safe work behaviors and to reduce negative outcomes such as accidents, illnesses, and injuries.

2.1. Goals and types of safety training

The goals and types of safety training can be defined according to the nature of the workplace hazards and, as so, can be very different across companies and industries. Nevertheless, it is frequent to find in safety literature a classification of safety training according to four types of training goals and contents (e.g. Cohen & Colligan, 1998; Burke & Sarpy, 2003; Burke & Sockbeson, 2016):

Fundamental programs – the most basic type of safety training, conducted within many different types of works, intends to provide workers with knowledge on specific rules and procedures regarding known hazards to prevent work-related illness and injury (e.g. the use of protective equipment, the proper use and maintenance of potentially hazardous tools; knowledge of emergency procedures);

Recognition programs – are designed to allow the recognition and appropriate report of workplace hazards by workers. To do so, this type of programs emphasize the knowledge of methods for hazard control or elimination, the collection of information about workplace hazards, the observation or informal inspecting of potential hazards in the work context. Recognition and awareness programs also provide workers with knowledge on their rights and responsibilities, according to current legislation and regulations;

Problem-solving programs – provide workers with information and skills enabling them to participate in hazard recognition and control activities, to identify/solve problems through teamwork and using mechanisms or channels as unions and/or management and/or outside agencies (e.g. in Portugal, the Authority for Working Conditions);

Empowerment programs – include knowledge and skills, associated with the problem-solving programs, that allow workers to prevent work-related illness and injury in their workplaces as well as to defend themselves and expand their rights to a safe and healthy workplace, through collective actions (e.g. Lippin, Eckman, Calkin, & McQuiston, 2000; Weinstock & Slatin, 2012).

Overall, safety training interventions lie on the assumption that once used by employees will protect them from existent and probable occupational hazards.

2.2. Effects of safety training

Safety-related criteria

The criteria used for rating training effects are a concern (Cohen & Colligan, 1998) and generally assumes four major categories: safety knowledge, safety motivation, safety performance and/or on more distal outcomes as accidents and injuries (Robson et al, 2012; Burke & Sockbenson, 2016):

Safety knowledge includes the declarative or factual knowledge (the understanding of safety and health-related work requirements and the labels, facts and principles of work) and the procedural knowledge and skills (i.e. how to appropriately engage in work behavior or carry out the procedures of a defined task) necessary to conduct safety-related work (M. J. Burke & Sarpy, 2003). It is usually measured by testes of knowledge or self-rating (Smith-Crowe, Burke, & Landis, 2003);

Safety motivation can be defined as “an individual’s willingness to exert effort to enact safety behaviors and the valence associated with those behaviors” (Neal & Griffin, 2006, p.947) and includes three types of motivation (Pederson & Kines, 2011): ‘normative’ - internalization of civil/ideological values reflected in an intrinsic sense of duty towards safety activities; ‘social’ - primarily extrinsic and based on perceived acceptance, approval of significant parties, e.g. co-workers, leaders; and ‘calculated motivation’ - related to the rewards and punishment (e.g. gains vs. losses, economics, injury). Safety motivation has been found to function an antecedent of safety behavior (Christian, Bradley, Wallace, & Burke, 2009) and as a mediator of the relationship between safety training and safety performance (Vinodkumar & Bhasi, 2010);

Safety training effects can also be measured in terms of increased/improved workers’ *safety performance*: The actions or behaviors performed by individuals to promote the

health and safety of workers, clients, the public, and the environment (Burke, Sarpy, Tesluk, & Smith-Crowe, 2002). Safety performance includes two categories of behaviors, the *safety compliance* and the *safety participation*, whereas the first regards expected or required behaviors and the second more discretionary action (Griffin & Neal, 2000); tangible events or results as accidents, near misses, injuries, illness/disease or fatalities are considered to be *safety outcomes* (Christian et al., 2009). From an economic point of view, negative OSH training outcomes are important as they entail significant direct and indirect economic costs at both an individual and societal level (Pouliakas & Theodossiou, 2013).

Effects of safety training

A very recent review of Hofmann, Burke and Zohar (2017, p.282) clearly stated that "safety training works" since the overall reviews provide substantial support of its efficacy. Nevertheless, there are some divergences between authors regarding the strength and consistency of the observed effects (e.g. Cohen & Colligan, 1998; Robson et al., 2012; Ricci et al., 2016; Burke & Sockbeson, 2016).

Cohen and Colligan (1998) performed a comprehensive review of 80 studies, from 1986 to 1996, and found that the majority were successful in reporting the merits of safety training in increasing workers' knowledge of job hazards and in affecting safety behaviors. However, as the authors later recognized (Colligan & Cohen, 2004b), workplaces evaluations of training present challenges in terms of controlling variables that can influence both the learning process and its outcomes. Due to methodological limitations of the selected studies (e.g. self-selection bias, training coupled with other forms of intervention making attribution difficult, prevalence of case studies), the authors avoided drawing conclusions about health-related outcomes.

The work developed by Burke and colleagues (2006, 2007, 2008, 2011) over the years have given important contributions to the knowledge of safety training effects. The studies departed from the assumption that more inclusive training methods translate into more effective training. However, the results have not always been corroborated by other researchers:

The Burke et al (2006) meta-analysis involved 95 studies from 15 countries and tested the hypothesis that higher engaging training is more effective than lesser engaging

training in improving safety performance. The authors confirmed their hypothesis and extended the conclusions to three levels of outcomes: knowledge acquisition, behaviors, and accidents and health (i.e. symptoms, injuries and/or illnesses);

The previous results were questioned by the systematic review of Robson et al. (2010, 2012) on safety training effectiveness. The authors intended to update the Cohen and Colligan (1998) previous work and analyzed 22 studies, a very small sample due to the sampling criteria (i.e. studies that met criteria of internal validity and used of randomized controlled trial and measures of training-related outcomes, e.g. knowledge, health, both before and after the training). Robson et al. found positive effects of training on knowledge, attitudes and behavior. However, the health effects were too small and inconsistent in direction to be considered effective. The relationship between trainings methods (with more vs. less engagement) and safety training effectiveness outcomes, as advocated by Burke et al (2006, 2007), were also analyzed but Robson and colleagues considered the evidenced to be weak. This last pattern in findings was corroborated latter by other reviews and meta-analysis (e.g. Ricci et al., 2016; Clemes, Haslam, & Haslam, 2010);

In response to Robson et al. (2010, 2012) critics regarding the lack of experimental quality of the studies on safety training effectiveness, Burke et al. (2011) replicated the previous meta-analysis of 2006 with a larger sample (113 studies, from 1996 to 2005) and with more rigorous inclusion criteria (e.g. only quasi-experimental and experimental study designs). This second meta-analysis also included the level of workplace hazardous event/exposure as a moderator variable between learner engagement and safety performance. The results confirmed the previous results, more engaging training leads to greater improvements in terms of safety knowledge and safety performance. Additionally, Burke et al. (2011) defended that highly engaging training is more effective, in terms of knowledge acquisition and safety performance, than less engaging training when hazardous event/exposure severity is high; on other hand, highly and less engaging training have comparable levels of effectiveness when hazardous event/exposure severity is low.

More recently, Brahm and Singer (2013) contributed to the debate by claiming that safety training is effective in reducing firm accidents. After analysing the effects of training on firm-level accidents in a sample of 2787 firms, the authors found that training effect is weakly mediated by the level of engagement of the training methods,

and that the selection of training methods by firms may be contingent on their stage of OHS capabilities and commitment to safety. Therefore, no single training method seems to be superior to any other.

2.3. Factors that affect safety training effectiveness

The literature on OSH training effectiveness appears to recognize the influence of those major predictive factors already identified and confirmed by general research in TT and incorporated in theoretical models (section 1.3.3.). However, a special influence is attributed to training design and delivery, compared to factors related to the trainees' individual characteristics and to the work environment. This last category is usually pointed as a source of moderating influences over the transfer process.

2.3.1 Predictive influences

Safety training design and delivery methods

Training design and delivery methods is an important dimension of factors that may predict the success of safety training (e.g. Burke et al, 2006, 2011; Robson et al., 2012 - section 1.3.3). Choices about the methods and techniques more able to foster training effectiveness are also a reflection on the state of knowledge in more basic sciences such as cognitive and behavioral psychology (Chen & Klimoski, 2007). Advances in these scientific areas led to different orientations and preferences in terms of the design of (safety) training (Burke, Holman, & Birdi, 2006) or ‘generations of instructional models’ (Kraiger, 2008a, 2008b, 2014). Each generation emphasizes a set of theoretical principles that are translated in terms of design and delivery methods and approaches.

Reinforcement and feedback. Structured safety training interventions aimed at modifying specific safety-related behaviors (e.g. keeping work areas clean and clear obstacles) by using positive reinforcement (e.g. praise) and feedback intervention as learning mechanisms (e.g. Kluger & DeNisi, 1996, 1998), illustrates the influence of behaviorist theories of learning. These approaches of training design are included by Kraiger (2008a, 2008b) in the “1st generation of instructional models”: Training content is built around objectively defined knowledge and skills, presupposing a specific and unique way of performing professional activities/tasks; the trainer is the

first responsible for the trainees' learning. In accordance, training methods usually require a low level of engagement, meaning little participation by the trainees who are put in a passive role, absorbing the information previously selected by the trainer or the instructional designer. A safety training intervention where workers listen to a lecture followed by a video or by the trainers' demonstration (e.g. Chan & Ng, 2010) and take away documentation like pamphlets, is an example of a "1st generation" of safety training design.

Applications of reinforcement and feedback theories to safety training may be effective in modifying specific and simple behaviors (Ray, Bishop, & Wang, 1997) like the use of personal protective equipment. However, those approaches may not be able to promote the development of more advanced skills, with an implicit and anticipatory nature (Burke et al, 2007).

Approaches based in social learning and action-regulated theories. Theories of social learning, mainly represented by Bandura (1977, 2001), provided an alternative framework to understand the learning of more elaborate behaviors, not explainable by reinforcement principles, such as those occurring in social situations. In synthesis, learning can happen vicariously, by observing others' (models) behaviors and their consequences; the reproduction of the observed behaviors is not a mere imitation because there are cognitive processes that intervene between environmental stimuli and the actions - the way subjects respond to certain stimuli depends on how they interpret it, their motivation and self-efficacy. Behavior-modeling is an application of social learning theory that has been showed to be a very effective method of safety training due to its high engaging qualities (e.g. Taylor, Russ-Eft, & Chan, 2005; Burke, Holman, & Birdi, 2006). Basically, behavior modeling method integrates three steps or phases: first, a model (the trainer or other expert) demonstrates the target behavior/skill; second, the trainee rehearses and practices the models' behavior; third, feedback is provided as the trainees' behavior approximates closer to the target behavior.

Action regulation theory is another information processing theory of learning and behavior, also concerned with the processes that intervene in the interplay stimuli-actions (e.g. Hacker, 2003). It argues that actions are controlled by goals or intentions, anticipations of the results that trainees, individually or in group, intend to accomplish. Another assumption of action regulation theory is the existence of an 'operative-

imaging system' that functions as a cognitive base, incorporating all knowledge gained, like a long-term memory of condition-action-consequence relations, enabling the person to act. Experiencing errors, along with acting in relevant environments, helps to construct realistic operative-imaging systems and facilitates anticipatory thinking and the development of strategies for handling non-routine and dynamic emergency situations or critical incidents. Furthermore, errors can have an informative function for the learner, since pinpoint where knowledge and skills need further improvement (Keith & Frese, 2008).

Both social learning and action-regulated theories of learning brought important implications to the design and of safety training, including (Burke et al, 2008): to provide trainees with opportunities to practice, with proper feedback, the targeted behaviors; to incorporate error training or positive/negative role models into the training intervention; to set goals (e.g. through learning contracts, behavioral check lists, actions plans) for the transfer of safety training, particularly for routine safety behaviors; to promote trainees' self-efficacy through different types of training activities as mastery, vicarious learning, verbal persuasion and positive emotional arouse.

Stage approaches. The stage-learning theories (e.g. Kolb, 1984) see learning as a process with several different and progressive stages: initially (phase 1) trainees acquire the facts (declarative knowledge); then (phase 2) become more capable at recalling and sequencing the necessary steps to a skilled performance (knowledge compilation); (in phase 3) the performance becomes automated (procedural knowledge development). Scholars have found evidences on the progressive nature of the skills acquisition and showed that extra learning opportunities subsequent to phase 3 may have a positive effect on retention, in particularly for infrequently tasks (e.g. Driskell et al., 1992), for example, emergency procedures.

Stage theories imply that a safety training program use different kinds of methods, in accordance to each phase of learning (Burke et al., 2006). For example, initiating the training process with a passive presentation (e.g. lecture, slides, video or pamphlets) of fundamental information, followed with more engaging methods as hands-on practice in order to develop recognition, problem-solving and/or decision-making skills (e.g. Perry & Layde, 2003);

Cognitive / constructivist approaches. Constructivist theories of learning (e.g. Bruner, Piaget) and theoretical assumptions of adult learning (e.g. Knowles, Holton III, & Swanson, 2005) underlie a second family of training approaches or “generation of instructional models” (Kraiger, 2008, 2008a) that emphasize the active involvement of the learner in selecting, acting upon, and organizing new knowledge, and training activities that stimulate the learner exploration and sense making. Constructivism presumes that learners actively “build” structures of knowledge and skills, linking prior knowledge and skills to the new learning experiences. Therefore, the design of a (safety) training program inspired by constructivism departs from the trainees’ previous knowledge/skills for selecting the training contexts/activities, assures a learning environment that maintains the trainees’ motivation as well as tools for them to explore, solve problems, discover meanings, and create an understanding of how to apply knowledge and skills in their daily lives (Burke, Holman & Birdie, 2006).

The web-based instruction (WBI) is also considered a constructivist learning context that provides learner with a high level of control over their own learning, regarding the choice of the pace, the topics and the training in the content sequencing (e.g. Stuart, 2014; Brown, 2001). By adapting to individual learners and offering the opportunity to drill down more information as they progress, WBI may enhance the learning significance and the trainees’ motivation. However, despite being helpful in training relatively large numbers of individuals in a self-paced manner and the technological improvements in the last years (e.g. Ho & Dzung, 2010; Calandra & Harmon, 2012), online safety training still faces several challenges to its’ effectiveness, namely issues related with the trainee’s degree of formal education, computer experience, and learning style. Safety training research has not yet produced sufficient results regarding the influences generated by those individual characteristics (e.g. Anger et al., 2006; Arcury, Estrada, & Quandt, 2010);

Social constructivist approaches. Social constructivism inspired a 3rd generation of instruction models (Kraiger, 2008a, 2008b, 2014) by assuming learning as dynamic and socially negotiated and by placing knowledge/skill acquisition and social competencies as joint objectives for training. Skilled activity is understood not simply as an outcome of knowing the rules and how to apply them to a particular situation or context, but instead as a social and shared accomplishment in a process containing experience, dialogue, reflection and action (Holman, 2000; Cunliffe, 2002). Training

design with a social constructivist orientation aims to create an interactive learning environment in which participants, including the trainer, learn from each other.

Consistent with Kraigers' 3rd generation learning models is the Burke et al. (2007) defense of a dialogue approach (dialogue as intrapersonal and interpersonal discussion) in safety training, especially appropriate to develop more advanced analytical, decision-making and problem-solving skills that underlie safety performance. Along with role playing and hands-on activities, dialogue and reflection are high engagement methods that can stimulate trainees to infer conditional and casual associations between actions and events, helping them in developing an anticipatory thinking for avoiding accidents and unwanted exposures in all kinds of safety work (Burke & Sockbeson, 2016). The workers' empowerment through training for work safety purposes incorporates much of the social-constructivist philosophy of training - it includes real-life experiences, dialogue between and among trainers and workers and reflection about contradictory or dilemmatic situations and possibilities as well as critical analyzes of organizational and system-wide causes for problems (e.g. Weinstock & Slatin, 2012).

For Kraiger (2008a, 2008b) a web-based networked instruction (WBI) and learning offers both a technology and an environment ideally suited to the social constructivist approach: When carefully designed, WBI offers more opportunities for individual customization and adaptation than regular classrooms; it places importance on the learners-learners' interaction increasing the participants to continue negotiating meaning and learning back on the job.

In sum, training methods are not mutually exclusive. In practice, most of safety training is based on multiple training methods and it is not linked directly to a particularly learning theory (Burke, Holman & Birdi, 2006). It is not uncommon to find a safety training intervention with lectures and debates/discussions followed by role-playing/behavioral modeling and feedback, simulations, practice or some kind of hands-on experiences. According to Burke and colleagues (2006, 2007, 2011, 2016), the choice of the training method (or of the combination of training methods) should privilege its level of engagement which functions as a key driver to the relative effectiveness of safety training. The authors define engagement as the degree to which training integrates or promotes action (e.g. practice), dialogue (i.e. intra or

interpersonally and regarding certain actions taken or considered) and reflection about contradiction, dilemmas or possibilities. Traditional methods as lectures or some forms of computer-based learning may be classified as lower in engagements but they need not to be low in engagement characteristics as long the safety trainer incorporates action, dialogue and reflection.

Cohen and Colligan (1998; 2004) reviews identified other factors related to training design that, despite not being theory-related, were found to affect safety training effectiveness by shaping the opportunities for effective learning experiences: The group size (fewer than 25) and homogeneity in terms of professional activities and exposure to occupational hazards; the training length and frequency, more training attendance increases/improves the workers' safety knowledge and safety behaviors; increasing the trainers' time per unit group of workers and use of frequent and short training sessions can increase the workers' recognition of hazardous exposure situations and compliance with safe practices.

Individual and environmental predictors

Despite the importance of the instruction process, authors also recognize that the success of safety training may depend on factors lying outside the design and delivery dimension, and be associated with the workers' and/or the work environment characteristics.

Demographic variables as age, ethnicity, and primary language are pointed by some scholars as potential influences on the effectiveness of safety training interventions (e.g. Burke & Sockbeson, 2016). Ricci et al (2006) reviewed 28 studies looking for evidences of the efficacy of OHS training in terms of knowledge, attitude and beliefs, behavior and health. The authors found that workers with less than 30 years old exhibited only a single training effect, a shifting toward more secure attitudes. Nyateka, Dainty, Gibb, and Bust (2012) also noted to how little is known about the relationship between age and safety training effectiveness, while there is a conviction that traditional interventions are ineffective with younger workers. Along with younger workers, migrants appear to be particularly vulnerable because, among other factors, they are relegated to the most hazardous jobs (e.g. Kosny et al., 2012). Frequently, migrants experience cultural and language difficulties which may result in

ineffective safety training (e.g. Prendergast, 2016; Guldenmund, Cleal, & Mearns, 2013; Ahonen et al., 2007). Migrants are a large and growing part of the workforce and it is important to understand how to provide appropriate safety training and how to foster its transference to the workplace. The educational level is another demographic variable neglected by (safety) training transfer research, despite some signs in training literature of its influence and calls for research on the topic (e.g. Chen, Holton, & Bates, 2006; Bates & Holton, 2004 – section 5.5). Anger et al. (2006) enhanced that most of training research has been conducted with well-educated, white-collar workers, and scant attention has been paid to safety training with workers on the ‘shop floor’.

There are also evidences on the literature about the predictor effect on safety training transfer of work environmental-related variables. Pidd (2004) tested and confirmed in a paired sample of 222 individuals the hypothesis that social support in the workplace has an indirect effect on post training attitudes and behaviors. In their literature review, Colligan and Cohen (2004) found evidences that feedback in the work environment and management support to safety training and/or its application greatly affects the nature and durability of its impact.

2.3.2 Moderating influences

Safety literature suggests that safety climate, workplace hazards and cultural characteristics have a moderate effect in the transfer of safety training programs (e.g. Burke & Sockbeson, 2016; Burke & Sarpy, 2003).

Safety climate refers to the shared employee perceptions about safety-related policies, practices, and procedures pertaining to safety matters that may affect personal well-being at work (Neal & Griffin, 2006). For Hofmann, Burke, and Zohar (2017) ‘shared’ is a key term since it emphasizes an agreed cognition regarding the relative importance or priority of acting safely *versus* meeting other demands such as productivity or cutting costs. Such perceptions are built through social interactions in which employees share personal experiences informing the extent to which management cares and invests in their protection (as opposed to cost cutting or productivity). Examples of these social interactions are the daily and small decisions, such as to use (or not) of the correct personal protective equipment, or how new employees are socialized with respect to safety (Hofmann, Burke, and Zohar, 2017)

The concept was originally proposed at the organizational level and posteriorly redefined as a multilevel construct: when the perceptions are shared among individuals in a particular work environment (e.g. a work group/subunit), emerges a group-level climate (Zohar, 2008, 2010). More than 35 years of research on safety climate validated the construct as a robust predictor of safety outcomes across industries and countries (Griffin & Curcuruto, 2016).

Studies have provided support for the moderating role safety climate plays in the relationship between safety training and safety performance and safety outcomes. For example, the study of Smith-Crowe, Burke and Landis (2003) examined the moderator role of the organizational climate for the transfer of safety training in the relationships between safety knowledge (provided by safety training) and safety performance. The authors combined the ‘perceived importance of safety training’, a safety climate dimension representing the degree to which individuals think that safety training is valued within their organizations (Zohar, 1980), and the transfer climate (a work environment-related variable regarding the level of the existent support for transfer - section 1.2.3). The results showed that the relationships between safety training and safety performance were stronger in a more supportive organizational (safety) climate. The review performed by Burke et al. (2008), involving data from 68 organizations embedded within 14 nations, confirmed the hypothesis concerning the moderating role of safety climate on the transfer of safety training with respect to both engaging in safe work behavior and reducing accidents and injuries;

These research results are consistent with others that support the influence of safety climate as a key situational moderator of the relationships between individual-level and organizational-level variables (e.g. Probst & Estrada, 2010; Sinclair, Martin & Sears, 2010). As a multidimensional construct, safety climate contains several facets that should be considered in its measurement (Griffin & Curcuruto, 2016) including perceptions on the adequacy of the organizational safety training (Griffin & Neal, 2000) as a managements’ action related to safety promotion in the workplace.

The predictive power of safety training on safety-related criteria seems to be also influenced by the nature of the occupational hazardous and by the national culture. Burke et al. (2008) meta-analysis investigated how safety training and workplace hazards impact the development of safety knowledge and safety performance and

found an interaction between safety training and hazardous event/exposure severity in the promotion of safety knowledge and performance. In another study, Burke et al. (2011) used data from 68 organizations embedded within 14 nations, and examined the hypothesis concerning the moderating roles of national culture and organizational climate on the TT to the work context. The authors found that uncertainty avoidance, a dimension of national culture, and safety climate moderated the effects of safety training on accidents and injuries and on work behaviors.

2.3.3. The in-house safety trainer

Safety training (in particular, fundamental and recognition programs) is usually provided in organizations by certified safety professionals and/or safety practitioners⁸ who differ from one and another in various aspects, including the educational background and level of specialization (the first has a higher education in Occupational and Health Safety (OHS) and the second a diploma obtained via vocational training) (Pryor, Hale, & Hudson, 2015). There are a diverse group of professionals working in the OHS field (e.g. psychologists, physicians, nurses, engineers) although some of them are mainly dedicated to safety which why are frequently designated by safety professionals (Arezes & Swuste, 2012). In this thesis, the two terms ‘safety’ and OHS are used interchangeably given the operational proximity between the two domains. In Portugal, as in other countries (e.g. UK, Spain, Netherlands) of the European Union, the safety profession is regulated by a national governmental agency⁹ that coordinates the education and certification of the safety professionals (Hale & Harvey, 2012). The Portuguese OHS framework law¹⁰ requires that large organization (over 400 workers), or smaller ones but with high hazards risks, have an internal or shared OHS unit. This means that the existence of OHS professionals as internal resources is more common

⁸ According to the European Qualification Framework, OHS practitioners are at the 4th level of OHS specialization and OHS professionals at the 5th and 6th level (www.ec.europa.eu/ploteus/en/content/descriptors-page).

⁹The Authority for Work Conditions (Autoridade para as Condições de Trabalho - ACT) is a Portuguese public organism, aimed at assuring safe and healthful working conditions for workforce and to promote the improvement of work conditions through the control of law compliance in both public and private sectors.

¹⁰Law 102/2009, from 10th September, altered by Law 42/2012, from 28th August and by Law 3/2014, from 28th January.

in large companies then in medium ones where services as safety training are frequently assured by external consultants.

The limited interest shown by research on safety professionals has mainly focus their education as well as their activities and tasks (e.g. Chang, Chen, & Wu, 2012; Hale, et al. 2006). The latter studies enhance training as a core activity, commonly associated with communication activities (e.g. Wu, 2011; Daud, Ismail, & Omar, 2010; Jones, 2005; Brun & Loisel, 2002). In the last years, some researchers have begun exploring the practice of safety professionals from an organizational and social perspective and with the use ethnographic research methods (e.g. Olsen, 2012; Daudigeos, 2013). A renewed interest in the OHS profession seems to emerge (Provan & Rae, 2017) which will hopefully uncover the strategies these professionals use to influence processes intra-organizational, as the transfer of safety training, in order to maintain, improve or create a safe working environment.

Overall, this chapter enhances the importance of safety training in promoting a safe work environment, by providing safety knowledge, by fostering safety motivation and the proper safety performance that will be reflected in positive organizational safety outcomes. Research on safety training effectiveness has especially focused on the predictor properties of training design and delivery methods, viewing work environment mainly as a source of moderator variables, in particular the safety climate. An element of the employees' work context, although absent from previous safety training research, are the OHS professionals who prepare and deliver training as part of their activity in organizations and to fulfill safety goals. It is plausible to expect that in-house safety trainers may play a decisive part in facilitating the transfer of safety knowledge and skills to the work context. It will be enlightening, both for research and practice, to identify to what extent safety trainers/OHS professionals assure that workers apply the learned safety knowledge/skills in the job, what individual and contextual factors influence their efforts toward training success, and the influence their actions have in the transfer process. For this purpose, three studies were performed, each one aimed at answering different research questions as described in Table 1.

Table 1. *Research overview*

Studies	Research questions	Methods	Participants
1.	What are the in-house safety trainers' views on the best practices for enhancing safety TT and its consistency with the existing theoretical transfer models? How do they perceive themselves in the transfer process?	Qualitative study, non-probabilistic sampling, semi-structured interviews and qualitative analyses.	In-house safety trainers (OHS professionals)
2.	To what extent in-house safety trainers consider supporting TT to be in-role? Is the role orientation toward transfer affected by felt-responsibility for transfer and socio-structural work-related variables?	Correlational study, cross-sectional sampling, quantitative analysis.	In-house safety trainers (safety professionals)
3.	To what extent in-house safety trainers influence TT? Does felt-responsibility mediate the interplay between workplace safety players (coworkers, supervisors, safety professionals) and safety TT? Is the relationship moderated by supervisors' influence?	Correlational study, cross-sectional design with data collected in two-time periods, quantitative analysis.	Blue-collars' employees from four city councils

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Chapter 3 - Exploring OHS trainers' role in the transfer of training¹¹

Safety training is an important preventive measure and a common element in safety management systems, hazard control and preventive programs. Research results already presented evidence regarding supporting the effectiveness of OHS training on targeted OHS behaviours and attitudes of workers (e.g. Colligan & Cohen, 2004; Robson et al., 2012; Ford, Henderson, & O'Hare, 2014). There are high expectations regarding the transference of ST to the workplace since it involves the appropriate application of learned safety knowledge and skills to protect workers from existent or probable hazards. The transfer of training (TT) has been studied for almost thirty years and literature reviews and meta-analyses (e.g. Grossman & Salas, 2011; Blume et al., 2010) report important advances in the knowledge of transfer predictors. However, the trainer's role in the transfer process remains very unexplored, without disregarding the few and meritorious studies and the calls for research on the subject: namely, the trainer's knowledge, beliefs and best practices in fostering training success (e.g. Hutchins & Burke, 2007; Burke & Hutchins, 2008; Hutchins, 2009) or the 'self-perceived responsibility' and 'self-efficacy' regarding training transfer (e.g. Kopp, 2006; Burke & Saks, 2009).

The present study extends previous empirical work on trainers' role on TT (Burke & Hutchins, 2008; Hutchins, 2009) through a deeper and more comprehensive understanding of the trainers' practices toward training success, including: the trainers' perceptions of themselves in the transfer process i.e. their senses of responsibility and control over it; also, previous works did not consider the specificity of the trainers' areas of expertise and the possibility that it could add some insights. In the present study participants are in-house first-line safety trainers, all OHS professionals, departing from the assumption that the particularities associated with safety training will reveal new or neglected facets of TT. To these ends, the following research questions were formulated: (1) What are trainers' views on the best practices for enhancing safety TT? (2) Is there a consistency between the trainers' suggestions and existing theoretical transfer models? Do they add any new aspects to the phenomenon? (3) How do trainers perceive themselves in the transfer process? Do they feel they can

¹¹ This empirical study is published in an international journal: Freitas, A.C. & Silva, S.A. (2017). Exploring OHS trainers' role in the transfer of training. *Safety Science*, 91, 310–319

control it and manifest some sense of obligation regarding safety training effectiveness?

To answer these questions, an exploratory and qualitative study was designed, supported by the accounts obtained during semi-structured interviews of OHS professionals who are also responsible for activities as in-house trainers.

3.1. Transfer of (safety) training

Transfer of training (TT) is a complex, dynamic concept and means the extent to which an individual can generalize the knowledge and skills acquired in a learning context to a performance context (Baldwin & Ford, 1988). Efforts have been made to understand how safety TT can be promoted and evaluated. For example, Cohen and Colligan (1998) examined how organizational and social/psychological factors affect safety training effectiveness and Burke and Sarpy (2003) enhanced a linkage between fundamental training programs and worker's behaviours/attitudes. The systematic reviews on safety training effectiveness of Clemes et al. (2010) and Robson et al. (2012) found evidences of training interventions effects on workers. More recently, Laberge et al. (2014) departed from the ineffectiveness of safety training traditional approaches (cognitive and behavioural) to proposed a training design based on a socio-constructivist paradigm. All these studies noted gaps in the available information and other limitations suggesting a need for further research into the effectiveness of training interventions in attaining OHS objectives.

Baldwin and Ford' (1988) theoretical model, probably the most prevalent reference for general research on transfer, presents three main influences: 'work environment' –includes the existent climate and support for transfer, the workers' opportunities for transfer and training and follow-up initiatives; 'individual characteristics' – the trainees' previous competencies, personality traits, motivation to learn and transfer this knowledge and their attitudes to their job and 'training design' – the most studied (Blume et al., 2010) source of transfer influences, which includes the appropriateness of training contents and methods.

Research has gathered a considerable body of information on transfer predictors (e.g. Grossman & Salas, 2011). One could suppose that an increase in knowledge about the transfer process would result in its effectiveness but this seems not to be happening

because organizations still find TT difficult, leading to the belief, among others, that practitioners are not using the available information. In consequence, training is not applied to the job and the “transfer problem” (Baldwin & Ford, 1986) remains. This gap between research and practice has motivated authors to seek alternative perspectives (e.g. Segers & Gegenfurtner, 2013) and to examine what happens in organizations and what professionals believe and do to bolster transfer (e.g. Donovan & Darcy, 2011; Hutchins, 2009).

3.2. Trainers ‘role in transfer

The trainers’ role on the training effectiveness is not a new topic (e.g. Anouli, 1994; Harris, Simons, & Bone, 2000). However, as Gauld and Miler (2004) noted, most of the arguments presented in the training literature have been mostly based on experience, intuition, and observation and less in empirical research. The authors reviewed training studies between 1938 and 2001 looking for competencies held by effective trainers. After a Delphi process, Gauld and Miller (2004) obtained a final list of 27 competencies with all but two (‘needs assessment’ and ‘evaluate effects and impacts of training’) centred in the delivery phase. More recently, Gauld (2015) reviewed 12 studies on training seeking for the characteristics of effective trainers and found 25 competencies, 11 processes and 29 trainers’ personal characteristics. None mentioned directly a support of the training transfer to the job, although Gauld (2015, p.127) recognized that the effective trainer is one “who can identify opportunities and activities that promote the transfer of learning before, during, and after the training process, including a comprehensive evaluation of training effectiveness”. Chukwu (2016) developed a qualitative study to identify the trainers’ characteristics that act as drivers of training effectiveness. Data was collected by focus group and individual interviews from 26 former trainees who selected 7 major trainers’ attributes, all related to training delivery and to the trainees’ learning. The trainers’ role in TT emerged in the study of Wong and Lee (2017) who used a qualitative and quantitative data to identify the trainers’ roles in the hotel industry. The authors identified 28 roles, among each the trainers’ role as ‘transfer agent’.

There are suggestions in literature that the trainers’ role in training effectiveness has changed significantly in terms of what and how trainers carry out job responsibilities (e.g. Wong & Lee, 2017). Though, Auluck (2007) stated that the

arguments for the ‘new roles’ derive more from the academic and professional rhetoric and less from practice. Significant changes take time and the way the role is packaged and presented to the world has not been much altered. In a very recent and conceptual article, Baldwin, Ford, and Blume (2017) called for more research into trainers’ strategies to foster transfer, their motives and expectations regarding the TT. Most trainers have specific competencies, for example, in identifying performance needs, designing and delivering training (Gauld & Miller, 2004; Gauld, 2015), collaborating with other stakeholders to support transfer and evaluate training outcomes (Hutchins, 2009). Therefore, it is natural to assume that trainers may exert a decisive influence in the transfer process. In the case of in-house trainers, their contribution to TT is potentially larger since they can be intimately involved in several stages of the training process (before, during and after training) that can influence successful training application, in particular related to work environment and to the transfer climate, for example: preparing activities for after training to facilitate training transfer (e.g. individualized follow-ups); promoting a “transfer agreement” among stakeholders (trainee, trainer, and supervisor) for commitment to applying trained knowledge and skills on the job (Salas et al. 2012; Burke & Salas, 2009).

The present study is focused in a trainer, the in-house safety trainer, who is also an in-house OHS professional. To report and to compare safety trainers' transfer practices may stimulate a greater use of research findings by OHS professionals since the data have been gathered from those who they may closely identify with and value their opinion. Special attention to trainers' good practices and their strategies to increase training effectiveness should be expected but, as Burke and Hutchins (2008, p. 108) noted, “Best practices reports in training transfer are limited and often anecdotal” and outdated. In two related qualitative studies, Burke and Hutchins (2008) and Hutchins (2009) analyzed, respectively, trainers’ suggestions to enhance transfer and their self-reported practices for supporting it. The authors compared the data gathered by open-ended survey questions with established transfer models and the results highlighted the trainers’ skills and attributes as an emergent factor. Using a qualitative approach and 16 in-depth interviews, Khamarko and colleagues (2012) also found three main transfer enhancing strategies used by clinical trainers: tailoring training activities to trainees’ needs; previous knowledge of trainees’ work environment; and post-training support.

Therefore, research results suggest that the trainer's role in the transfer process is a promising avenue that may lead to a deeper understanding of TT.

3.3. Trainers 'felt-responsibility and self-efficacy in TT

Burke and Saks (2009) proposed that future research should appraise training stakeholders, such as trainers (trainees and supervisors), their feelings of accountability to external parties and their sense of responsibility for the application of their training. Before them, Kopp (2006, p. 353) holds trainers as "primarily accountable" whose role should also ensure training application. Although recognizing that the trainer alone cannot guarantee TT, Kopp (2006) views this professional as being absolutely necessary and therefore not free from primary accountability. Departing from accountability as a powerful engine to foster transfer, Burke and Saks (2009) proposed the study of related psychological mechanisms: 'sense of control or efficacy' and 'sense of obligation or personal responsibility' for transfer actions and outcomes.

Personal or felt-responsibility is an internal state reflecting how much a person feels personally accountable and responsible for her/his work results (Hackman & Oldham, 1976; Behson & Eddy, 2000). If individuals (e.g. safety trainers) feel responsible for a past or future situation/event (e.g. safety training effectiveness), they are essentially holding themselves accountable for it. Additionally, Schlenkers' et al. (1994) theoretical model views responsibility as a transaction between an event/situation (e.g. TT), the prescriptions or rules that govern it (e.g. organizational regulations regarding training effectiveness) and the individuals' image of his/hers' own identity relevant to an event and prescriptions (e.g. perception of the trainers' role). The trainers' felt-responsibility for transfer can be understood as their perception of the results of the combined strength and links between these three elements. Furthermore, it is assumed that felt-responsibility can be influenced by diluting or mitigating circumstances of a personal (e.g. perceived organizational support) or contextual nature (e.g. access to resources) (Lauermann & Karabenick, 2011, 2013).

Few studies have examined the training stakeholders' (trainees, supervisors, trainers) sense of responsibility and accountability regarding training results: Burke and Saks (2009) identified a positive relationship between training evaluation frequency and TT. In Burke and Hutchins' (2008) work, training professionals

reported post-training measurement as a best practice for supporting transfer. Both qualitative studies suggest that evaluation creates greater accountability among stakeholders for training outcomes, besides improving the training program. Related to self-responsibility is self-efficacy, a concept derived from Banduras' (1977) social cognitive theory: behaviour influences and is influenced by individuals' beliefs in their ability to perform certain tasks and the environmental consequences of their behaviour. Trainers' self-efficacy beliefs concerning transfer are judgments about their ability to help trainees apply what was learned during work training. Research has scrutinized the role of self-efficacy as a transfer predictor but has mainly focused on trainees (e.g. Simosi, 2012; Chiaburu & Lindsay, 2008), ignoring trainers' self-efficacy regarding the transfer process and training success.

Stimulating TT to the workplace is a natural concern to the community of trainers, including individuals who sometimes develop training activities to achieve organizational health and safety goals: OHS professionals.

3.4. OHS professionals and trainers

OHS professionals play an essential role in safety training, management and implementation. Specifically, studies on OHS professionals' roles and tasks (e.g. Hale & Guldenmund, 2005; Hale et al., 2006) and competencies (e.g. Daud et al., 2010; Chang, Chen & Wu 2012) confirmed training as a core activity and a major competency. Moreover, different research, aimed at revealing OHS professionals' strategies to promote new organizational practices, identifies training as a strategy to influence the players' knowledge, behaviour and attitudes (e.g. Olsen, 2012; Ford et al., 2014). The OHS profession is still understudied yet it is rapidly expanding, posing new research challenges (e.g. Olsen, 2012; Minnick, 2013).

Currently, there is sufficient evidence to emphasize the important role training plays in fulfilling safety goals while it remains a lack of knowledge concerning OHS professionals' dynamics in organizations, i.e. the strategies used by these professionals to exert influence in intra-organizational processes in order to maintain, improve or create a good working environment (Olsen, 2012; Daudigeos, 2013). For instance, regarding initiatives they develop to foster training success. It is intended that the study contributes to filling this gap.

This study was designed to answer our research questions by analysing OHS professionals' views on the best practices to enhance safety TT and also their self-representation in the process to uncover potential factors not provided by theoretical models.

3.5. Method

3.5.1. Participants

Participants were selected from the database of a public health organization that provides continuous OHS training (OHS professionals from 2010 to 2013). The first sample contained 68 individuals. External consultants (29) were excluded assuming that direct employees would provide a more detailed picture of safety training dynamics in organizations. The remaining 39 were invited by email to participate in the study. The message presented a broad study goal (to identify OHS professionals' experiences and opinions regarding safety training) and a selection criterion: being an in-house OHS trainer. A second message was sent one week later to individuals who had not responded to the first. Ten days later, we had 20 positive answers, all confirming the internal trainer criterion.

The group of participants included: employees in private companies (5), public hospitals (10), and local government (5). All the companies/organizations were large, comprising between approximately 750 (local government) and 3500 (public hospital) workers. Eight were heads of OHS units. The average age was 36. Twelve were female and 8 male. Nineteen had a degree plus a post-graduation in OHS and one a degree in safety engineering. All 20 were experienced (9 year average) and certified safety trainers but only one stated to be familiarized with the TT concept. As required, all participants had operational roles in performing training activities and were first-line safety trainers. Training activities occupied different amounts of time in the participants' global working schedules: 8% for the participants from local government, 17% and 25% for participants from, respectively, hospitals and private companies.

Along with training delivery as in-house trainers, all individuals designed training programs, prepared learning materials (e.g. handouts, slides) and assessed training needs. Only participants from private companies stated performing tasks related to organizing training (e.g. contacting trainees or supervisors) or maintaining

records on workers' training, tasks usually performed by the HR department in local government and public hospitals.

3.5.2. Data collection

Face-to-face semi-structured interviews were conducted in each participant's organization by a single researcher, thus avoiding interviewer variability in data collection. An interview schedule (Table 2) was followed to strengthen data reliability and comparability:

Table 2. *Interview schedule*

Content topics	Description
A – Training related activities	Topic aimed at identifying training related tasks developed by the participants, and some characteristics of the organizational training system, such as the existence of training evaluation procedures.
B – Best practices in supporting transfer	It asks about participants' experiences and approaches to stimulate the transfer of the training they provide in their work organizations. It seeks to identify factors that appear to exert a decisive influence on the application of the workers' learning in job contexts.
C and D –Self-efficacy and sense of responsibility in supporting transfer	Follows Burke and Saks' (2009) suggestions for the study of trainers' psychological accountability mechanisms: their felt-responsibility and perception concerning the organization's judgment regarding safety training success; their perceived ability to help trainees to apply the safety knowledge and skills they learned to the job.
E – Statements on internal trainers' role in the transfer process	Intended to summarize the participants' views on how they approach the transfer process. The statements were based on the three items Burke and Saks (2009) proposed to measure the trainers' sense of responsibility and self-efficacy concerning transfer. Subject were asked to respond, justifying, to each statement (e.g. I have some degree of control over trainees' applying what they learn in this training program in their job).

Topical trajectories flowed according to participants' responses and pursuing their lines of thought, returning to each theme whenever appropriate (Gillham, 2000).

Typically, the interview started with the question: “Could you please tell me about your professional trajectory till this present job? I would like to know you a little better. “By interview number 15, it was clear that saturation had been achieved, i.e., extending the sample and collecting new data would not shed any further light on the issues under investigation (Mason, 2010). However, the initial objective of 20 interviews was achieved. The interviews lasted an average of 45 minutes, were recorded with the interviewees’ permission and fully transcribed, comprising a total of 13 hours and 50 minutes of conversation and 159 A/4 pages with a standard layout.

3.5.3. Design and data analysis

A mixed qualitative-quantitative content analysis procedure was used, guided by the research questions, due to its advantages in efficiency and empirical grounding (Krippendorff, 2013). All questions meet Krippendorff’s (2013) quality criteria: be answerable, concern inaccessible phenomena and permit, at least in principle, (in)validation. CAQDA (MaxQDA, version 11) was used to categorize the 20 transcribed interviews. Stand-alone and smallest meaningful text segments were considered as a coding unit, to facilitate further agreement among different analysts, fostering reliability (Krippendorff, 2013). The previous question and/or the participant’s full answer and/or earlier portions of the interview were defined as a context unit.

Based on the literature and research questions, an initial category scheme was developed. It was expected that some categories would be found resulting from the interview schedule. Criteria of mutual exclusiveness and exhaustiveness were established to enhance empirical validity, i.e. “the degree to which available evidence and established theory support intermediate stages of a research process and its results” (Krippendorff, 2013, p.334). To verify semantic validity, an experienced TT researcher, expert on content analysis, was consulted and confirmed the appropriateness and accuracy of the analytical categories. Furthermore, procedures and findings are fully detailed in this study, to make validation viable.

The initial category scheme was allowed to expand, as themes emerged from data (i.e. inferred categories) to capture relevant aspects (White & Marsh, 2006) from the participants’ reports. The list of the emerged categories is presented in Table 3.

Coding scheme

The first aprioristic categories to contextualize the accounts in participants 'work organizations and to provide scenarios for a better description and understanding of their training dynamics were:

'Trainers' training related activities'. Considers as least four core tasks -setting safety training policy; designing training programs; delivering training; maintaining and updating records of workers' safety training- inventoried by Hale et al. (2005, 2006);

'Organizational training system'. Intends to capture the existence of formal regulations or procedures to foster training effectiveness or to evaluate it (Burke & Saks, 2009).

The following aprioristic codes were developed to identify factors related to three primary influences, widely accepted in existing and recognized TT theory (e.g. Baldwin & Ford, 1988; Blume et al., 2010):

'Individual characteristics'. Includes trainees' psychological traits or aspects with a strong and consistent relationship with transfer, such as cognitive ability, self-efficacy and motivation to learn;

'Design and delivery'. Concerns those options with a significant impact on learning and transfer outcomes, such as behavioural modelling, error management and realistic training environment;

'Working environment'. Regards critical components (transfer climate, social support, opportunity to transfer and follow-up) that interfere in the trainees' ability to use the targeted behaviours.

The last two aprioristic categories are inspired in Burke and Saks' (2009) proposal to study the influence of sense of responsibility and self-efficacy on trainers' actions to enhance training success:

'Transfer stakeholders'. Feeling responsible and accountable for training success may explain trainers' investment in helping trainees apply newly acquired skills and knowledge. Also, trainees and their supervisors can be made accountable for TT;

‘Self-efficacy in supporting transfer’. Relies on Banduras’ (1977) self-efficacy theory but from the trainer’s point of view, i.e., the individual’s beliefs in their ability to foster transfer.

A sample of 200 coding units was selected and examined for intra-observer inconsistencies between two categorizations (test-retest) with an interval of 20 days to calculate coding scheme stability/reliability. The final score was an agreement of 91%. Although necessary, stability is too weak as a reliability measure (Krippendorff, 2013) so interrater agreement was also analysed with an external researcher, working independently with another random sample of 200 segments. Krippendorfs’ alpha (Kalpha) reliability in SPSS (version 20) was computed with Hayes’ macro (Hayes & Krippendorff, 2007). Initially, a Kalpha of. 64 (for nominal variables and with a bootstrap sample of 2000) was obtained, a low reliability attributed to scheme extension and possibly unclear category definitions. The scheme was revised leading to the collapse of inferred subcategories into larger and broader ones, followed by a revision of the definitions. Kalpha was again calculated and a coefficient of. 76 was obtained, an acceptable reliability.

Table 3 presents the final list of emerged categories.

Table 3. Dictionary of emergent categories

Theme:	(Sub)Categories	Definition	Coding unit sample
Transfer predictor factors	OHS professionals' support	When they're in the work environment, trainees feel pressured and tend to apply what they have learned in training. Also, OHS professionals complement previous work as trainers.	"For their part, there has to be a concern like 'she'll come here to see how we are doing. So, it is better to do it properly'..."
	Trainers' qualities	Mainly, a speech easily understood by trainees, and a genuine concern with workers well-being and safety.	"If the trainer is sufficiently clear and explicit in training, the worker, when in the workplace, has ... will naturally remember those words"
	Timely training	Training should happen in a timely manner for the trainees and organization.	"And waiting for the opportunity means, for example, waiting for a unit to start a quality certification process"
	Short sessions	Long sessions are not suitable due to the trainees' discomfort and lack of availability.	Normally, the longest training is in a classroom... using slides and all of that... they are not used to that routine."
	Retraining	The need to repeat the training with and without additional elements to promote TT.	"In terms of a hospital environment, I think you need a lot of training: repeat, repeat, repeat"
Transfer stakeholders 'personal responsibility in transfer	Trainers are <u>accountable</u> , according to <u>oneself</u>	As a trainer, he/she must support transfer through proper training design and delivery decisions. As an OHS professional, he/she must ensure that training, like other safety interventions, is successful. However, he/she only feels partially accountable for the training success.	"I think I have some responsibility, specifically in this area given my function, my function as a safety professional"
	Trainers are <u>not accountable</u> , according to <u>oneself</u>	As a trainer and even as an OHS professional, he/she cannot support workers in the transfer process because he/she cannot oversee the workplace on a daily basis.	"Responsibility can never be mine because I'm not there [in the workplace] and I do not check whether it is being applied or not"
	Trainers are <u>accountable</u> , according to <u>others</u>	The organization implicitly considers trainers to be accountable for transfer and training effectiveness.	"If we are OHS technicians they expect us to help those workers".
	Trainers are <u>not accountable</u> , according to <u>others</u>	The organization is not expecting trainers to support transfer or to be responsible for it.	"I have the impression that this is the view, nobody will tell me anything. Blame the trainer? No."
	Trainees are accountable	Workers should be answerable for their own behaviour, including applying the newly acquired skills and knowledge on the job.	"All workers are adults and responsible, yes sir."
	Supervisors are accountable	Ultimately, top managers are responsible, but mostly it should be the direct supervisor who follows daily work that should ensure workers transfer the acquired training.	"The direct supervisor knows what they are doing, therefore, he/she has an obligation to report, to ask for help if needed".

Theme:	(Sub)Categories	Definition	Coding unit sample
OHS professionals' organizational dynamics concerning training	Convincing supervisors	It concerns the OHS professionals' initiatives to convince supervisors that safety training is relevant and that workers should participate.	"Sometimes I have to force myself to show them that it is worth doing [training] that it is good to do it and we have advantages or we will have advantages in the short or medium term".
	Training organization	When the training is on the job, it is the OHS professionals who organize it, instead of the organic unit with formal responsibilities for the organization's training system.	"In these situations [on the job training] we do the planning, the organization ...it means a lot of work".
	Workplace visits	Monitoring workplaces is an OHS professionals' activity and despite not being a training procedure it allows us to gather information to design and develop it as well as to appreciate its impact.	"Imagine I give training on cleaning in the organization, if I get to the place and it is disorganized and dirty the training was not effective, period".
	Positive balance as an internal trainer	Makes a global positive assessment of his/her role as an internal trainer, emphasizing the differences from an external trainer.	"I'm also an external trainer... and it's completely different, completely".
	Unsupportive senior management	Supervisors do not communicate safety information to others or reinforce interventions, cooperating with the OHS professionals' efforts.	"And sometimes they [management] think safety technicians only come to ask for things for them to spend more money on".
	Workers' unavailability for safety training	Workers are overloaded, with no availability and motivation to engage in OSH training.	"They do 24 hours a day frequently. How is it then possible to attend training?! They don't go!".
	Direct supervisors not receptive to OHS training	When supervisors resist collaborating with OHS professionals, for example, by facilitating workers' access to training.	"There are supervisors who literally say" if you want to go, go in your own time, go in your holidays."
	Complex organization	The organization is very large and complex, with many professional groups and units, very different from each other including the receptiveness and transfer of safety training.	"Because there are so many professionals, each unit has its peculiarities: Internal Medicine [unit] is different from Surgery [unit], from the Infirmary ... it is very different".
Lack of (human, financial, and material) resources	The lack of human, financial and material resources in the field of OHS makes it difficult to act, including doing OSH training.	"The physical conditions and the surroundings, because sometimes we are encouraging certain kinds of attitudes and behaviours in a given task and then they often say they have no resources or something like that."	
Organizational OHS training policy	Training has instrumental value	Training helps to achieve OHS goals, as well as others' safety interventions.	"Training is a way for us to communicate with the workers, to explain how to work safely so we don't get there and point the finger – 'you are doing this wrong'."
	Training fulfils formal requirements	It is mainly developed to respond to legal and certification requirements.	"Due to the lack of time, often the methodology is based on [legal or certification compliance], this is also true."

3.6 Results

Our data were very rich and diverse and lead to a large number of emergent categories with a different heuristic value. This section examines the results regarding our three main research questions as follows: Subsection 3.1 reports the trainers’ views of best practices for enhancing transfer as well as the consistency between their suggestions and the current theoretical framework models (research questions 1 and 2); subsection 3.2 presents participants’ perceptions of themselves in the transfer process (question 3). The results of the content analysis are outlined in Tables 2, 3 and 4 indicating the number of subjects sharing a view or opinion (“n”) and the total of coding units (“freq.”) for each category. The dictionary of emergent categories is in chapter appendices (Table 3).

Training transference, best practices

The participants reported best practices for enhancing safety training success based on their own experiences as trainers, indicating specific factors believed to exert a positive influence on transfer. Only one safety trainer was familiarized with the TT topic. However, results showed that their perceptions were very consistent with literature and common transfer models, falling into one of three known transfer dimensions: individual characteristics, work environment and particularly training design and delivery which represented over half of all the unit codes related to predictor factors. Table 4 presents in italic the transfer influences that emerged.

Table 4. *Transfer predictor factors*

Category	Subcategory	n	Freq.
Individual characteristics *	Age	14	44
	Cognitive abilities	11	30
	Personality	9	27
	Motivation to learn	6	16
Work environment*	<i>OHS professionals’ support</i>	12	43
	Supervisor support	16	78
	Peer support	9	25
	Opportunity to transfer	9	44

Table 4. *Transfer predictor factors*

	Performance assessment	4	9
	Organizations' safety culture	8	28
			227
Training design and delivery*	<i>Trainers' qualities</i>	13	50
	Tailored contents	13	83
	<i>Timely training</i>	5	15
	Realistic training environment	13	62
	Error management	6	27
	<i>Short sessions</i>	7	21
	Engaging methodology	17	84
	<i>Retraining</i>	10	29
			715

Note: *aprioristic (sub)categories; emergent (sub)categories in *italic*

Four individual characteristics of the trainees were reported as influences on the transfer process, all well known by TT literature (e.g. Blume et al., 2010; Yamkovenko & Holton, 2010). The participants recognized some less well-explored factors that enhance training success, for example:

- trainers' qualities or attributes - in particular, clarity of speech and use of easily understood language,

In terms of language, a very accessible language.

If the trainer is clear enough in training....

A genuine concern for the employees' safety was also considered a trainer quality, enhancing the trainees' motivation to learn, a well-known transfer key predictor (Gegenfurtner, 2011):

This is important because they feel that someone is taking care of them: - maybe she's right, this cannot be like that, I have to see how I can do better

- *timely training* (time chosen for training), *short sessions* and *retraining*, together with trainers' characteristics, represent almost half of the coding units in the category training design and delivery, suggesting a considerable weight in the participants' reported best practices. Segment examples are:

It has to be short for them to pay attention.

In terms of hospital environment, I think you need to do a lot of training: repeat, repeat, repeat....

The importance of trainers' characteristics is not completely unfamiliar to research (e.g. Ghosh et

al., 2012; Khamarko et al., 2012), nor training length/frequency (Colligan & Cohen, 2004). However, in both cases persists a need for more studies and knowledge.

Twelve participants reported their presence in workplaces as having a positive effect on workers 'behaviours and being stronger than peer support although not as powerful as supervisor support (*Work environment* - Table 2), two well-known transfer factors (e.g. Blume et al., 2010). OHS practitioners perform field visits to monitor work conditions and workers 'behaviours and despite being routine and not part of the training procedures it makes it possible to gather information for its further development and analyse its effectiveness (*Workplace visits* – Table 5, in appendices). Participants interpreted their effect on the workers' behaviour in two different ways:

- an accounting influence regarding safety rule and procedure compliance. OHS professionals are not workers' peers or supervisors but must report all safety non-compliances identified, including workers' irregular safety behaviours,
And monitoring work also for them to feel a bit of pressure;
- a reinforcement of the workers' previous learning,
When we go to the field...it's what I always say, we keep doing the training, making them aware of what we talked about before, a little bit so they don't forget.

This interpretation is discussed further in the Discussion section.

Safety trainers' perceived role in the transfer process

Results regarding trainers' perceived self-efficacy in supporting transfer (Table 5) ranged from low to very low according to one of two roles: as safety trainers, they feel the ability to influence transfer but only through training design/ development,

I have some degree of control because if I do it right as a trainer during training, I am sure that they will strive to apply it.

as OHS professionals, they see monitoring visits (*Workplace visits* – Table 3) as opportunities to follow and support transfer. However, previous training is never the primary motive for being in the trainees' workplace and observations of behaviour related to training contents are unstructured and unplanned:

Usually what we do is, within a visit that has to be made for any other reason, occasionally we observe these behaviours as part of the visit.

Table 5. *Self-efficacy and stakeholders' personal responsibility concerning transfer*

Category	Subcategory	n	freq.
Sense of control over the transfer process*	With (some degree of) control*	13	46
	With no control*	16	53
			99
Trainers *	<u>Accountable</u> , according to <u>others</u>	12	30
	<u>Not accountable</u> , according to <u>others</u>	12	28
	<u>Accountable</u> , according to <u>ones' self</u>	20	147
	<u>Not accountable</u> , according to <u>ones' self</u>	15	36
			241
Trainees *		9	19
Supervisors *		12	40
			399

Note: *aprioristic (sub)categories; emergent (sub)categories in *italic*

These results reflect the participants' perceptions of their and other stakeholders' (trainees and supervisors) responsibility for transfer. All interviewees expressed being partially accountable for training success (according to ones' self and according to others): an OHS professional's role implies developing tasks or interventions to create a safe environment. Thus, safety-training interventions implicitly create an organizational expectation concerning their effectiveness, although never formalized as a standard or goal.

Results confirmed the *training related activities* (Table 6) usually performed by the OHS professional (e.g. Hale, 2005). Most participants reported their routine in the *training delivery* and their efforts toward a *definition of a safety training policy*:

So, last year we defined that this would be our direction, [to intervene] at the level of the special facilities, the showers and the washing uniforms and we are doing it [training] internally.

Additionally, the participants mentioned other activities (*Convincing supervisors, workplace visits*) they reported as necessary to promote safety training effectiveness. These aspects will be further developed in the Discussion section. The participants' evoked certain organizational obstacles and circumstances that diminish their ability to support, or be accountable for, transfer (*Main obstacles*, Table 6). The most cited obstacle was supervisors' negative attitude toward

training (*Direct supervisors not receptive to OHS training*) by constraining workers' access to training opportunities,

There are heads of unit that literally say: "if you want to go, go in your own time, go in your holidays".

Table 6. *OHS professionals' organizational dynamics concerning training*

Category	Subcategory	n	freq.
Training related activities*	<i>Convincing supervisors</i>	7	14
	Definition of safety training policy*	16	91
	Program design*	10	35
	Training delivery*	20	67
	<i>Training organization</i>	12	25
	<i>Workplace visits</i>	15	77
			309
Main obstacles*	<i>Unsupportive senior management</i>	8	17
	<i>Workers' unavailability for safety training</i>	10	32
	<i>Direct supervisors not receptive to OHS training</i>	14	60
	<i>Complex organization</i>	11	41
	<i>Lack of (human, financial, and material) resources</i>	12	32
			182
Training regulations or procedures*	There are formal training procedures*	15	53
	There are formal training evaluation procedures*	5	22
	There are no formal training procedures*	5	10
	There are no formal training evaluation procedures*	15	43
			128
<i>OHS training organizational policy</i>	<i>OSH training has an instrumental value</i>	8	24
	<i>Training fulfils formal requirements (e.g. legislation, accreditation)</i>	11	50
			74
			693

Note: *aprioristic (sub)categories; emergent (sub)categories in *italic*

The absence of an evaluation system of training in their organizations (*Training regulations and procedures*), despite the existence of *formal procedures for training activities* was reported by most participants, and when asked to describe their training related tasks, participants also

described some of the main characteristics of the safety training systems in their organizations (*OHS training organizational policy*). Training interventions related to the bureaucratic accountability of safety (Dekker, 2014) were emphasized, i.e., the use of safety training to fulfil formal legal requirements and ongoing accreditation processes:

In some cases, [training is provided] because some units are in a certification process and must have a certain number of safety training hours

Due to lack of time, often the methodology is based on legislation compliance, which is also true.

No differences were found in trainers' perspectives according to their working organization (private companies, public hospitals and local government).

3.7. Discussion

Overall, the results enabled us to achieve this study's objectives. They highlighted safety trainers' role as a transfer process facilitator in the work environment, although only perceiving themselves as being able to control it through training design and delivery. This is a well-studied source of positive influences on transfer and using an engaging methodology is a recognized factor. Our participants' beliefs in the power of behaviour modelling principles, hands-on demonstrations associated with behavioural simulations and the trainees' active participation, are consistent with guidelines in the literature (e.g. Burke et al., 2006; Brahm & Singer, 2013).

Safety trainers' qualities emerged from the data as having a positive influence on TT, although it is an aspect related to training delivery but, so far, underestimated as a transfer factor by major research reviews (e.g. Blume et al., 2010). The scholars who have sought to identify which trainers' attributes or skills contribute to an effective performance, assumed trainers' effectiveness as a key instructional factor in facilitating transfer (e.g. Ghosh et al., 2012; Gauld & Miller, 2004). Among other attributes, the quality of trainers' communication skills is referred to as influencing the training process, for example, by using the appropriate intonation and speech fluency. This study's participants emphasized speech organization, i.e., the safety trainers' ability to provide a clarifying and tailored content that is easy to follow (Towler, 2009; Towler & Dipboye, 2001).

Timely training was referred to as a good practice fostering TT but not in the sense that skill decay is reduced by people attending training shortly before they start applying it, as Salas) proposed. Our participants' sense of "timely "concerns organizational factors' (i.e. the trainees'

and supervisors’) availability and openness for training which will be higher if there is no conflict with the functioning of work units or if it facilitates the fulfilment of certain organizational goals, such as quality certification.

Training length and *frequency* are not particularly valued aspects in general transfer literature (e.g. Blume et al. 2010; Grossman & Salas 2011). However, authors such as Burke and Sarpy (2003) emphasize the significance of these two variables and Colligan and Cohen (2004, p. 238) argue that “frequency-and-length factor is the basis for defining refresher [safety] training needs as well as establishing the type of training regimen necessary to meet and sustain standards of performance in critical-skills/emergency situations”.

Workplace environment is a recognized transfer predictor (e.g. Blume et al., 2010; Chiaburu et al., 2010) that includes a social dimension: peers can encourage the application of learning; supervisors can be supportive in a variety of ways before, during and after training. Govaerts and Dochy (2014) proposed 24 behaviours and attitudes to describe "supervisors’ support", all aimed at optimizing the trainees’ use of knowledge, skills and attitudes gained in training. In our study, supervisors’ support was understood as an important influence, mainly through encouragement and by providing opportunities (e.g. individual protective equipment) to apply safety knowledge and skills. But supervisors’ support goes beyond training and covers a global contribution to achieving the OHS organizations’ goals, which is also a perspective consistent with the literature (e.g. Fruhen et al., 2014).

Another influence on the application of training and also related to the social dimension of the work environment emerged from our data: OHS professionals’ support. Their (predictable) presence in the work context, for monitoring purposes, appears to function both as a motivational antecedent, prompting workers to act according to what was learned in training, and as an opportunity to act as an ‘informal trainer’ (Poell et al., 2006).

Informal trainers (facilitators, coaches) are organizational actors who significantly contribute to the workers learning in their workplace, although with no formal position in the organizational learning system (Poell et al., 2006). Usually, experienced colleagues and direct supervisors occupying a formal position related to the employees’ work, perform such roles. By promoting a safe working environment, OHS professionals can influence the workers’ behaviours by reinforcing previous training and contributing to the workers’ learning of safety issues.

Examining OHS professionals' influence on the transfer process, by using the existent knowledge on the role of informal trainers and actions as a theoretical framework, might be a promising line of research.

However, as our study participants noted, the power of influence over TT will be different in the case of an in-house or external OHS professional/trainer: employees hold an organization-specific knowledge that can be used to create more tailored and personalized training interventions (Martin & Hrivnak, 2009), which in turn is a well-known transfer predictor (e.g. Grossman & Salas, 2011).

The participants' perception of various constraints such as the organization's complexity and lack of resources, among others, may be in accord with their sense of inability to support safety TT. As self-efficacy influences perceived felt-responsibility (Dose & Klimoski, 1995), it was thought unlikely that our participants would feel personally responsible for safety TT. However, all the interviewees reported feeling partially accountable for the success of the training, which is only apparently a contradiction: the trainers' role is interpreted as being limited to planning and delivery activities. When safety training ends, the OHS professionals' role takes over, sharing a responsibility in the workers' safety performance with the trainees and especially with supervisors.

The belief that following the trainees' return to the workplace exceeds the trainers' role did not take us by surprise nor their unfamiliarity with TT issues, despite all being certified safety trainers. This certification is obtained through an almost standardized program that ignores transfer mechanisms. The results of our study emphasize the need to revise the theoretical framework of trainers' certification programs to integrate contents on transfer and its promotion: trainers are less likely to foster transfer if they consider it an extra-role activity.

The participants' reserves in accepting responsibility for transfer should also be interpreted remembering the (almost total) absence of training evaluation systems in their working organizations to track and measure post-training behaviours (*Training regulations or procedures* – Table 6). The literature recognizes a relationship between transfer and training evaluation and suggests that feedback on training evaluation enhances the stakeholders' 'sense of accountability and transfer (e.g. Burke & Hutchins, 2008; Burke & Saks, 2009; Saks & Burke, 2012). Lack of post-training feedback creates an alibi in the sense of "if you cannot know, you cannot answer for it".

As in Daudigeos' (2013) qualitative study, our participants reported spending time and energy convincing direct supervisors of the relevance of safety training and the need for the workers to attend it (*Convincing supervisors* – Table 3 and Table 6). The supervisors' low receptiveness to OHS training, constraining the workers' access to training opportunities, is a familiar situation in the literature which considers the supervisors' support to be a key determinant of TT (e.g. Scaduto, Lindsay & Chiaburu, 2008; Govaerts & Dochy, 2014).

Management commitment to OHS is also a necessary requisite for positive organizational safety performance, an idea supported by studies on leadership and its role in safety performance (e.g. Hofmann & Morgenson, 2004; Fruhen et. al., 2014) and mostly by research on safety climate and culture recognizing management/supervisors' attitudes and behaviours regarding safety as major factors (e.g. Zohar, 2010; Frazier et al., 2013). Only eight participants reported having no support from top and middle management for safety issues (*Main obstacles* - Table 6) but as Vecchio-Sadus and Griffiths (2004, p. 608) note, even when senior managers show personal commitment to OHS it currently “loses impact as it filters down through the organization to the point where it may not be all evident on the shop-floor”.

Limitations

Our study limitations are mainly associated with sample selection constraints due to researcher availability, time and resource limitations. However, considering the characteristics of our sample, it is possible to anticipate that similar results will be obtained from other studies with other OHS professionals. Other limitations of this study are consistent with qualitative research and the scope of the researchers' interpretations. Future research can compare our results with other studies on trainers' practices that highlight the ones with a positive impact on transfer. Also, further studies should extend this work by exploring the possibility of generalization and prevalence.

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Chapter 4 - Predictors of safety training transfer support as in-role behavior of Occupational Health and Safety professionals¹²

Safety training is an important part of occupational health and safety (OHS) programs that contributes to fulfilling the organizational safety goals (e.g. Robson et al. 2012; Hoffman, Burke & Zohar, 2017). Fundamental and recognition safety programs are the most basic and common safety training interventions (the differences between programs/contents rely on the specificity of the occupational hazards) in an OHS management system. The first provides knowledge on specific rules and procedures (e.g. the use of protective equipment and emergency procedures). The second enables workers to recognize and report workplace hazards (e.g. methods for hazard control or elimination; observation or informal inspecting of potential hazards in the work context) (Burke & Sarpy, 2003; Burke & Sockbeson, 2016). Problem-solving and empowerment safety training programs are less common, but equal important to the organizational safety performance, by enabling workers to have a more participative and powerful role in the collective defence of their rights to a healthy and safety environment (Lippin et al., 2000; Weinstock & Slatin, 2012).

As a technical safety activity, the delivery of safety training to workers is under the direct responsibility of OHS professionals who usually perform activities as in-house safety trainers, and as part of their jobs in organizations. Although, training interventions will only contribute to a safer working environment if workers transfer the learned safety knowledge and safety skills to the workplace. The transfer of training (TT) can be defined as the generalization to the job and maintenance over time of the knowledge and skills acquired in training (Baldwin & Ford, 1988; Baldwin, Ford, & Blume, 2009). The study of the predictors of the TT have so far primarily focused on managers, trainees, peers and customers, on the basis that these sources offer a comprehensive view of the problem, its antecedents and outcomes (Hutchins, 2009). Although true, this assumption is also incomplete. It is also important to deepen the knowledge about how trainers' influence in the training success (e.g. Baldwin, Ford, & Blume, 2017; Khamarko et al., 2012; Russ-eft, Dickison, & Levine, 2010) including in the field of safety training (e.g. Haas, Hoebbel, & Rost, 2014; Demirkesen & Ardit, 2015). The present study adds an unexplored

¹² Freitas, A.C., Silva, S.A. & Santos, C.M. (2017). Predictors of safety training transfer support as in-role behaviors of Occupational Health and Safety professionals. *European Journal of Training and Development*, 41(9), 776-799.

perspective to existing research on TT: the scope of the role that in-house trainers believe they should have in helping trainees transferring what they have learned.

Role theory framework (e.g. Katz & Kahn, 1978, seminal work) anticipates that in-house trainers may have different views regarding their role in the transfer process, even if they perform similar tasks. Differences in role definitions will have an impact on job performance since employees are more willing to make efforts concerning tasks they consider in-role. The broader their role definition in the TT, the more trainers will invest in the transfer process (e.g. Morrison, 1994; Parker, 2007) and, therefore, the greater the likelihood of the success of the training. To date, no study has investigated this facet of the transfer process.

We intend to examine the mediating effect of in-house safety trainers' feelings of personal responsibility on training results in the relationship between a set of job resources (autonomy, organizational support, access to resources and access to information) and the trainers' role orientation toward the TT. Differences in role interpretations may be due to diverse socio-structural job characteristics that can influence how employees define their role by affecting their sense of responsibility toward work outcomes (e.g. Morgeson et al., 2005). In consequence, if trainers believe they do not have access to the necessary resources and organizational support to perform their tasks well, they will avoid assuming responsibility for the work results and tend to narrow their role definition in the transference process. This expectation is based in the assumptions of the Job-Demand Resources (JD-R) model (Bakker & Demerouti, 2007, 2008) and the Job Characteristics Theory (JCT) (Hackman & Oldham, 1975, 1976, 1980; Oldham & Hackman, 2010), since both consider that certain job resources or attributes may interfere in the individual's motivation and engagement.

Definitions of work role may also be affected by contextual conditions such as the organizational climate. Past research has pointed out the moderating influence of safety climate in the relationship between other variables and employees' attitudes and role definition (Hoffman et al., 2003; Clark et al, 2014). Following these studies, we investigate how safety climate exerts a moderator effect in the interplay between job resources, felt-responsibility and role definition. We focus on a particular safety climate dimension especially linked to safety trainers' activities: the importance/adequacy of the organizational safety training (safety training climate).

4.1. Role definition

According to role theory, individuals performing similar activities may conceptualize their work roles differently and form idiosyncratic views about the job requirements or expectations (e.g. Katz & Kahn, 1978 seminal work). In other words, even with the same job title, in-house trainers may differ from each other according to their role orientation or definition and how they perceive the boundaries of their role within the organizations (e.g. Ebbers & Wijnberg, 2017; Sluss, van Dick, & Thompson, 2011; Morrison & Phelps, 1999). Thus, we may find an in-house trainer who believes that carrying out transfer supporting activities after training is an in-role activity and another one only feeling responsible for fostering transfer during the design and delivery phases. The variations in role definitions are reflected in the individuals' behaviors because the motivation to engage in behaviors within ones' job is greater than the motivation to engage in behaviors outside ones' job (Morrison, 1994). Therefore, it is important to understand the antecedents of the role definition as well as the psychological mechanisms involved in the process (e.g. Chiaburu & Byrna, 2009).

Some scholars found that individual characteristics such as the levels of self-efficacy and felt-responsibility concerning the results of their work (e.g. the training transference and success) may predict broader in-role definitions. Other studies suggest, as source of predictors, environmental characteristics as, for example, the perceived organizational support and other job resources (Grant & Hofmann, 2011; Turner, Chmiel & Walls, 2005; Parker, 2007).

4.2. Job resources

Job resources are those physical, psychological, social or organizational aspects of work “that are either/or: functional in achieving work goals; reduce job demands and the associated physiological and psychological costs; stimulate personal growth, learning, and development” (Bakker & Demerouti, 2007, p.302). The Job Demands-Resources Model (JD-R), developed by Bakker and Demerouti (2007, 2008), considers job resources as predictors of engagement, playing a motivational role. A resourceful work environment fosters the willingness to dedicate more effort and abilities to the work task and thereby achieving work goals (Schaufeli & Taris, 2014; Taris & Schaufeli, 2016). For example, for an in-house safety trainer this could mean performing diverse activities in order to guarantee the effectiveness of the training intervention. Job resources may

also play an intrinsic motivational role because resources fulfil basic human needs, such as, the need for autonomy. The motivational potential of resources is also recognized by the Job Characteristics Theory (Hackman & Oldham, 1975, 1976, 1980, 2010) which predicts that the presence of certain job attributes, including autonomy, increases the probability of individuals becoming internally motivated to perform well. Our study considers four types of job resources: autonomy, organizational support, access to information, and access to resources.

Job autonomy concerns “the degree to which the job provides substantial freedom, independence and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out” (Hackman & Oldman, 1976, p.258). Autonomy is the only core job characteristic of the Hackman and Oldman (1976, 1980) work design theory that fosters feelings of responsibility. More discretion at work allows employees to believe their role allows them to have more scope to influence their work behavior (Parker, 2007). Also, enhanced autonomy can increase ownership of problems and stimulate employees to recognize a wider range of skills and knowledge as being important for their roles, expanding their job and role breadth (Parker, 1998). Therefore, when perceiving more autonomy in their work, safety trainers are more likely to feel personally responsible for their work results and to include transfer-supporting behaviors in their overall role.

Perceived organizational support (POS) designates the beliefs that employees form about the organizational support, commitment and concerns toward their well-being (Eisenberger et al., 1986). The employees’ perceptions of this positive or favorable treatment are composed of general beliefs about how much the organization values their contributions and cares about them (Eisenberg et al, 1986, 2001). Organizational support, expressed by supervisors or upper management, can be perceived by a safety trainer as a form of “caring”, generating a sense of obligation to reciprocate through desired work-related attitudes and a better performance (Hofmann & Morgeson, 1999; Michael et al., 2005; Mearns & Reader, 2008).

Access to information refers to an employee being equipped with the knowledge of organizational decisions, policies and goals, as well as data on technical knowledge and expertise, required to be effective within the broader context of the organization (Bish, Kenny, & Nay, 2014). The knowledge of such information allows employees (Spreitzer, 1996) to develop alternative frameworks to understand their roles within the functioning of the organization; to create a sense

of meaning and purpose; to take and influence decisions, aligned with the organization's goals and mission. Besides facilitating cognitions of empowerment, access to information also enhances individuals' senses of efficacy and control as well as access to resources.

Having access to resources includes having the necessary time, materials, funds, personnel, and space to accomplish organizational goals (Wagner et al., 2010). Lack of access to critical resources (e.g. individual protective equipment) contributes to feelings of powerlessness, dependency and avoidance of responsibility.

4.3. The mediating effect of felt-responsibility

Burke and Saks (2009) argued for research on felt-responsibility as a psychological mechanism of the transfer process but few studies responded to the call (see Freitas & Silva, 2017). Felt-responsibility is a critical psychological state that reflects how an individual feels personally accountable and responsible for the results of his/her work (Hackman & Oldham, 1976). The concept is distinguished from felt-accountability, an external and imposed sense of responsibility (Lauermann & Karabenick, 2011), although some authors (e.g. Seibert, 2004) combine both constructs in the same dimension. Behaviors performed due to felt responsibility are self-directed, driven for internal reasons ("simply because it is the right thing to do") (Károlyi, 1993). When assuming responsibility for training transference and success, safety trainers are holding themselves accountable for current and future training interventions and it is likely that they experience a sense of failure if the results are not achieved, even in the absence of an external accountability system (Pearce & Gregersen, 1991; Fuller et al., 2006).

Hackman and Oldham's (1976, 2010) job characteristics theory (JCT) is probably the most used work design theory to discuss the felt-responsibility construct, one of the models' conceptual "motors". In JCT, felt-responsibility mediates the relations between a core job dimension, autonomy (i.e. degree of independence and freedom concerning how people do their work) and personal and work outcomes. Research has already gathered evidence for the JCT assumptions (e.g. Humphrey, Nahrgang & Morgeson, 2007) and for other socio-structural antecedents of employees' felt-responsibility, including the perceived organizational support and the access to resources and strategy-related information (Lauermann & Karabenick, 2011, 2013; Fuller et al., 2006). If safety trainers feel they are appreciated by the organization, they will feel an internal

obligation to reciprocate, leading to an increased commitment and willingness to develop efforts for the organizations' benefit. A facilitated access to resources signals the organizations' trust in individuals, increasing their feelings of responsibility for its use and the access to information allows employees to understand how their performance contributes to strategic goals and objectives, enhancing their feelings of responsibility for work results (Bish, Kenny & Nay, 2014; Wagner et al, 2010).

Combining the above theoretical assumptions on role-definition, job resources, and felt-responsibility, we propose the following hypothesis:

Hypothesis 1: Felt-responsibility acts as mediator in the relationship between job resources, namely (a) autonomy, (b) access to resources, (c) access to information, (d) organizational support, and role definition in the TT.

4.4. The moderator effect of safety climate

Safety climate is a multidimensional construct defined as the 'individual perceptions of policies, procedures and practices relating to safety in the workplace' (Neal & Griffin, 2006, pp.946-947). The link between safety climates and the transfer of safety training is well established by empirical research (e.g. Burke et al., 2008; Martin, 2010) but, just as other influences on the TT, it is usually studied and measured through trainees, leaving out other stakeholders, such as the trainers (Burke & Saks, 2009). Also, positive perceptions of safety climate (e.g. Oliver et al., 2006; Neal & Griffin, 2004) are likely to instil feelings of responsibility because they may reduce the sense of vulnerability associated with taking responsibility (Lauermann & Karabenick, 2013).

In sum, there is strong evidence about safety climates' properties as a higher order contextual variable. It acts as a frame of reference that moderates influences over workers' attitudes and behaviors (e.g. Hofmann et al. 2003; Parker et al., 2003; Clarke, 2006) and other forms of organizational outcomes, for example, role definitions or the way workers perceive job requirements and expectations, which is a factor that can have impact on work behaviors (Morrison, 1994; Clark et al, 2014).

One of the safety climate dimensions concerns the employee's perceptions of the importance of the company's safety training (Christian et al., 2009). Huang et al. (2006) defines the construct

as the effectiveness of formal orientation programs and subsequent follow-up training pertaining to safety practices at work.

Therefore, we can assume that:

Hypothesis 2: Perceptions on safety training climate moderate the influence of job resources - namely (a) autonomy, (b) access to resources, (c) access to information, (d) organizational support - on felt-responsibility.

The social exchange and reciprocity frameworks (Clark et al., 2014; Mearns et al., 2010; Hofmann, Morgeson & Gerras, 2003), as well as the individuals' natural desire to attain or maintain an equilibrium with their environment (Smith-Crowe et al., 2003), may elicit a positive response to a positive safety climate. In consequence, safety trainers who perceive safety training as an organizational priority will feel more responsible for the training results and will be more likely to include diverse activities aimed at supporting the TT in their overall role. This means that safety-training climate may also exert a moderated influence not only on the relationship between job resources and felt-responsibility, but also on how trainers' sense of responsibility toward training results affects their role orientation in the transfer process. Thus, we hypothesize:

Hypothesis 3: Perceptions of safety training climate moderates the mediating influence of felt-responsibility in the interplay between job resources and trainers' role orientation in the TT.

4.5. In-house safety trainers' role in the transfer of training

The trainers' role on the training effectiveness is not a new topic (e.g. Anouli, 1994; Harris, Simons, & Bone, 2000). Scholars have shown a concern in identifying the core competencies or essential skills held by effective (workplace) trainers (e.g. Gauld & Miller, 2004; Gauld, 2015). Identifying performance needs, designing and delivering training are competencies usually enhanced (e.g. Chukwu, 2016) while others, related to the direct support to the training transfer, are rarely mentioned or explored by research. Recognized instruments for measuring the transfer system, for example, the Learning Transfer System Inventory of Holton et al (1997, 2000), consider the trainers' role in the TT but within the 'transfer design' (i.e. the degree to which the training design and delivery stimulate trainees to apply the learned knowledge/skills in the job).

However, it is natural to assume that trainers may exert a broader influence in the transfer process, especially if they are in-house trainers.

The present study involves a specific group of in-house trainers: OHS professionals who provide safety training to workers as part of their job in work organizations. OHS professionals is an understudied group of organizational actors that frequently use training to fulfil safety goals (e.g. Daudigeos, 2013; Pryor, Hale & Hudson, 2015). As internal resources, safety trainers scope of influence over transfer is greater, compared to external safety trainers (Martin & Hrivnak, 2009), since they are better positioned to collaborate with other training stakeholders and more familiarized with the organization functioning (Martin & Hrivnak, 2009; Hutchins, 2009), especially in the OHS field. This knowledge facilitates the tailoring of the training toward voluntary transfer and enables trainers to act as “managers of training transfer” (Kopp, 2006, p.353) or “transfer agents” (Wong & Lee, 2017). In-house safety trainers are likely to find opportunities to promote “transfer agreements” among stakeholders (trainee, trainer, and supervisor) for commitment to apply trained safety knowledge/skills on the job (Salas et al. 2012; Burke & Salas, 2009) and to provide post-training activities to facilitate TT (e.g. individualized follow-ups). By collaborating with supervisors and trainees, in-house safety trainers may create a supportive climate for transfer (e.g. Martin, 2010), which is a decisive factor for training effectiveness (e.g. Evans & Kersh, 2015; Massenber, Spurk & Kauffeld, 2015). Such behaviors are desirable within the role of a trainer (Burke & Saks, 2009). However, there are some signs that in-house safety trainers do not share the same perceptions about their role in promoting the TT and face several obstacles, for instance, the lack of resources and support from management and supervisors (Freitas & Silva, 2017).

In sum, the present study sought the views of in-house safety trainers, all OHS professionals, regarding their role in supporting TT. We depart from the theoretical assumption that job resources predict how trainers define their role in the transfer process through the mediating influence of felt-responsibility and under the moderating effect of safety climate.

Our research model is summarized in Figure 4:

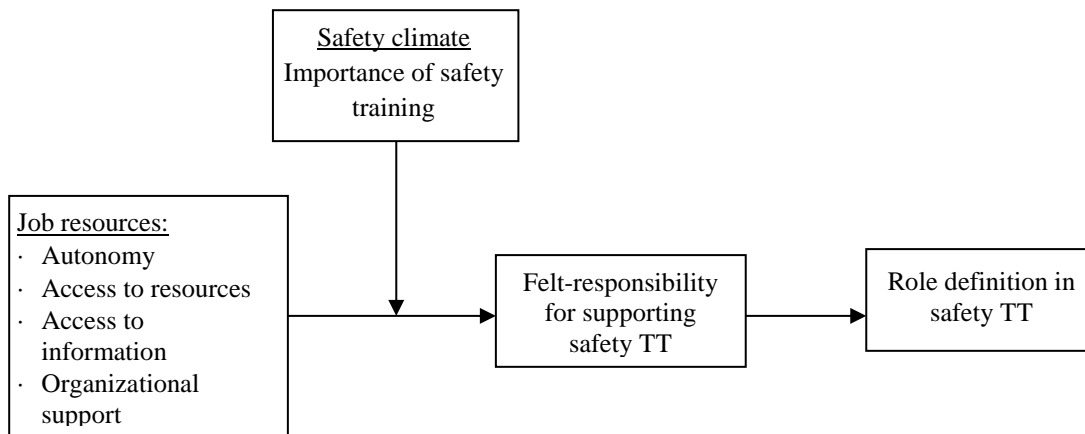


Figure 4. Proposed conceptual model

4.6. Method

4.6.1. Measures

Role definition of transfer supporting behaviours.

To measure trainers' role in the TT we formulated four items based on the TT Accountability Scale and the TT Accountability Strategies proposed by Burke and Saks (2009). Following Kwantes et al. (2008) procedure, we asked participants to indicate the extent to which they believed that several particular transfer supporting behaviors were in-role. The scale initiates with a general sentence 'As an in-house safety trainer, it is part of my role to...' followed by four items: 'to ensure a commitment among stakeholders, trainees, trainer and managers to apply trained knowledge and skills on the job'; 'prepare a list of activities to commit to after training for facilitating training transfer (e.g., booster sessions or e-mails; individualized follow-ups); 'evaluate training transfer at several time periods following training and present results to the top managers'; 'design safety training programs that facilitate the use of the learned safety knowledge/skills in the workplace. A seven-point Likert scale was used to measure the frequency participants attributed to the development of each behavior (1 = never; 7 = always). The reliability (Cronbach's alpha) of the scale was .85.

Felt-responsibility.

Felt-responsibility for supporting safety TT was measured by two items of the Hackman and Oldman (1975, 1980) Job Diagnostic Survey, slightly adapted to the subject of safety training: ‘I feel a very high degree of personal responsibility for the safety training I deliver in this job’; ‘I feel I should personally take the credit or blame for the results of the safety training I deliver in this job’. A seven-point Likert scale was used (1=never; 7=always). To estimate reliability we followed the Eisinga, Grotenhuis and Pelzer (2013) instructions and used the Spearman-Brown statistic for calculating the reliability of a scale with two items. The reliability for the felt-responsibility scale was $r_{SB}=.64$. The same procedure was used in all the following scales.

Importance of safety training.

To measure perceptions of the importance of safety training, a dimension of safety climate, we used 2 items from the Brondino et al. (2013) Integrated Organizational Safety Climate Questionnaire (‘My company provides an adequate safety training’; ‘Safety training is provided to workers on a regular basis’) measured on a seven-point Likert type scale (1=strongly disagree; 7=strongly agree) ($r_{SB}=.78$).

Job resources: access to resources, access to information, job autonomy and perceived organizational support.

To measure perceptions of the access to resources and access to information, we selected and adapted four items created by Spreitzer (1996). Sample items include ‘When I need additional resources I can usually get them’ and ‘I have access to the strategic information I need to do my job well’. Responses were assessed on a seven-point scale (1=never; 7=always). The reliability of the access to resources and access to information scales was, respectively, $r_{SB}=.72$ and $r_{SB}=.64$.

To measure job autonomy we used two items from Karaseks' et al. (1998) Job Content Instrument adapted by Castanheira (2009) with a good reliability ($\alpha=.81$) (‘I have the opportunity to decide how to organize my work’; ‘On my job, I have freedom to decide how I do my work’). A seven-point scale (1=strongly disagree; 7=strongly agree) was used ($r_{SB}=.68$).

Perceived organizational support was measured by two items from the short version scale of Eisenbergers' et al. (1986) adapted by Tavares, van Knippenberg and van Dick (2016). We chose the items with a superior factor loading (‘The organization cares about my opinions’ and ‘The

organization really cares about my well-being’). Safety trainers responded using a 7-point scale that ranged from 1 (strongly disagree) to 7 (strongly agree) ($r_{SB} = .79$).

4.6.2. Procedures and participants

Data was collected using an on-line survey. The target population was the Portuguese OHS professionals who also developed activities as in-house safety trainers, as part of their job in organizations. We selected only companies with more than 750 workers because in Portugal only large organizations are required by law to have an OHS unit and OHS professionals/practitioners (the minimum is 1 OHS professional and 1 OHS practitioner for each 1.500 workers). To select the companies, we consulted the Economias (<https://www.economias.pt>), a *website* dedicated to economics and business in the country. About 350 invitation emails were sent to OHS units of private and public hospitals, local governments and companies from the construction, transportation and food sectors. The invitation presented the study’s broad goal, the criteria for participating in the study (to be an internal OHS professional who usually develops activities as in-house safety trainer) and a link to the instrument. The link was active for 3 months. Incomplete data was excluded from analyses. The final data set included 201 participants. The respondents were mainly male (69%), aged between 33 and 43 years old (50%), and work experience as OHS practitioners of between 6 and 15 years (54%). One hundred and fifty-six (78%) participants were working as OHS technicians and the rest were heads of OHS units. All participants developed activities as first line in-house safety trainers.

4.6.3. Data analysis

Given the nature of our theoretical model, we decided to implement structural equation modelling (SEM) methods to test our hypotheses. For that purpose, we used statistical software Mplus (Muthén & Muthén, 1998-2010). Similar to prior studies (Nübold, Muck, & Maier, 2013; Santos et al., 2016; Zhou, 2003), one-tailed significance tests were used for all the analyses as the direction of the hypotheses was specified a priori. To test the hypotheses, we created 5000 bootstrap samples, and used 95% confidence intervals (CI) (Preacher & Hayes, 2008). We tested four different models – one for each type of job resource (autonomy, access to resources, access

to information, and organizational support). In each model, we tested the mediation, moderation, and moderated mediation hypotheses.

4.7 Results

Descriptives

The table 8 provides the means, standard deviations, correlations and reliabilities for all the variables. Excepting for safety training climate, significant positive correlations were found among the job resources types (autonomy, access to resources, access to information, and organizational support), and between job resources dimensions, felt-responsibility and role definition. We performed a set of one-way ANOVA analysis to detect eventual differences in the criterion according to the type of sector (hospitals, local government, food, transportation, and construction). No significant differences were found.

Table 8. *Means, standard deviations, correlations and reliabilities*

Variables	M	SD	1	2	3	4	5	6	7
1. Autonomy	5.09	1.09	(.68)						
2. Access to resources	4.95	1.17	.55***	(.72)					
3. Access to information	4.90	1.21	.55***	.76***	(.64)				
4. Organizational support	4.84	1.28	.64***	.78***	.72***	(.79)			
5. Safety training	4.03	1.19	.12	.13	.18**	.13	(.78)		
6. Felt-responsibility	5.35	1.02	.29***	.40***	.40***	.36***	.13	(.74)	
7. Role definition	5.94	0.94	.35***	.41***	.37***	.28***	.07	.61***	(.85)

Note. n = 201 individuals. ** $p < .01$, *** $p < .001$. Reliabilities in ()

Common method bias

As the present study uses same-source and self-reported data, our data might be subject to the common method bias (MacKenzie & Podsakokk, 2012). In order to deal with this potential problem, we used the Harman's one-factor test to evaluate the level of common method variance

(Fuller, Simmering, Atinc, Atinc, & Babin, 2016; Podsakoff, MacKenzie, Lee & Podsakoff, 2003). In a recent data simulation paper, Fuller et al. (2016) conclude that the Harman's one-factor test fails to detect common method bias only for high levels of common method variance (i.e., above 70%). The results reveal that the highest covariance explained by one factor is 36.16%. Therefore, these results suggest that common method bias does not compromise the reliability of the results.

Confirmatory factor analysis

The four types of resources present, in some cases, relatively high correlations, although differing in the correlation patterns with the remaining study variables. Despite being solid constructs built upon empirical evidence, we decided to verify whether the four types of resources were independent of one another in our sample. For that purpose, we conducted a confirmatory factor analysis (CFA) in Mplus using the maximum likelihood estimation method to distinguish the four constructs (Muthén & Muthén, 2012). To evaluate the models fit, we used the χ^2/df ratio, the Akaike information criterion (AIC), the Bayesian information criterion (BIC), the Tucker-Lewis index (TLI), the comparative fit index (CFI), the standardized root mean square residual (SRMR), and the root mean square error of approximation (RMSEA). For acceptable fit, the χ^2/df ratio should be less than or equal to 3, the TLI, CFI should be greater than or equal to .95, SRMR should be less than or equal to .08, and RMSEA should be less than or equal to .08 with confidence interval. AIC and BIC are good indicators for model comparison and smaller values indicate better fit (Hu & Bentler, 1999; Schreiber, Stage, King, Nora, & Barlow, 2006).

First, a one-factor model, in which we included all of the four variables in one factor, was tested, showing an inadequate model fit (Table 9). Then, we tested an alternative two-factor model, in which we included autonomy and access to information in one factor, and access to resources and organizational support in another factor. The model showed an inadequate fit. Thirdly, we tested a three-factor model, in which we included autonomy in one factor, access to resources and organizational support in a second factor, and access to information in a third factor. The models also showed an inadequate fit. Then, we tested a four-factor model that showed a better, although inadequate, fit. We analyzed the Modification Indexes (MI) to understand whether the model fit could be improved. According to the MI, we allowed the errors of item 1 of Access to Resources and item 2 of Autonomy to correlate (MI = 38.98), as well as the errors of item 1 of Organizational Support and item 1 of Autonomy (MI = 21.76). Although the errors refer to different dimensions

of job resources, this post-hoc modification does not affect the theoretical model because all of the scales measure the same variable – job resources. The model 5, which allowed the errors to correlate, presented a good fit to the data: AIC = 4796.23; BIC = 4902.09; $\chi^2 / df = 1.90$, RMSEA = .07 [90% Confidence Interval = .02 – .11], CFI = .99, TLI = .97, SRMR = .03. Therefore, the CFA results suggest that autonomy, access to resources, access to information, and organizational support functioned as distinct constructs.

We also performed a set of one-way ANOVA analysis to detect eventual differences in the criterion according to the type of sector (hospitals, local government, food, transportation, and construction). No significant differences were found.

Table 9. *Model fit indexes*

Models	AIC	BIC	χ^2	df	χ^2 / df	RMSEA [90% CI]	CFI	TLI	SRMR
Model 1	4864.75	4944.15	107.35	20	5.37	.15 [.12 – .18]	.89	.85	.06
Model 2	4865.83	4948.54	106.43	19	5.60	.15 [.12 – .18]	.89	.84	.06
Model 3	4853.28	4942.60	89.88	17	5.29	.15 [.12 – .18]	.91	.85	.05
Model 4	4846.54	4945.78	77.14	14	5.51	.15 [.12 – .18]	.92	.84	.05
Model 5	4796.23	4902.09	22.83	12	1.90	.07 [.02 – .11]	.99	.97	.03

Note. Model 1: One-factor model. Model 2: Two-factor model. One factor comprising both Autonomy and Access to Information; and another factor comprising both Access to Resources and Organizational Support. Model 3: Three-factor model. One factor comprising Autonomy; another factor comprising both Organizational Support; and another factor comprising both Access to Resources and Access to information. Model 4: Four-factor model. Model 5: Four-factor model allowing the errors of item 1 of Access to Resources and item 2 of Autonomy to correlate (MI = 38.98), as well as the errors of item 1 of Organizational Support and item 1 of Autonomy (MI = 21.76).

We also performed a CFA for all of the constructs of the study (i.e., the job resources variables, felt-responsibility and role definition). The six-factor model presented a good fit to the data: AIC = 9600.40; BIC = 9838.59; $\chi^2 / df = 1.67$, RMSEA = .06 [90% Confidence Interval = .04 – .08], CFI = .96, TLI = .95, SRMR = .05.

Validity and reliability of the scales

To assess convergent validity, the average variance extracted (AVE) and the composite reliability (CR) of all of the scales were calculated (Hair et al., 2014): Autonomy: AVE .47, CR .64; Access to resources: AVE .58, CR .73; Access to information: AVE .49, CR .80; Organizational support: AVE .66, CR .79; Safety training: AVE .65, CR .79; Felt-responsibility: AVE .32, CR .48; Role definition: AVE .63; CR .87.

To assess discriminant validity, the heterotrait-monotrait (HTMT) ratio of correlations was calculated (Henseler, Ringle, & Sarstedt, 2015) The HTMT refers to the “average of the heterotrait-heteromethod correlations (i.e., the correlations of indicators across constructs measuring different phenomena), relative to the average of the monotrait-heteromethod correlations (i.e., the correlations of indicators within the same construct)” (Henseler et al., 2015, p. 121). In order to support discriminant validity, the HTMT ratios of correlations should be less than .90 (Henseler et al., 2015). All of the HTMT ratios were less than .90, except for the ratios between access to resources and access to information (.92), between access to resources and organizational support (.97), and between access to information and organizational support (1.027). Although these three values are above the recommended threshold, we decided not to eliminate the items that are strongly correlated with items in other constructs. If we have eliminated these items, content validity could be threatened (Henseler et al., 2015), particularly because the variables were measured with two items.

To test reliability, the Cronbach alpha (α) was used for the felt-responsibility scale (4 items), and the Spearman-Brown statistic (r_{SB}) was used for the scales with two items, following Eisinga, Grotenhuis, and Pelzer’s (2013) recommendation. All of the scales presented acceptable internal consistency: Autonomy: r_{SB} .68; Access to resources: r_{SB} .72; Access to information: r_{SB} .64; Organizational support: r_{SB} .79; Safety training: r_{SB} .78; Felt-responsibility: r_{SB} .64; Role definition: α .85.

Main effects

The results of the SEM procedures showed that the models for autonomy and organizational support present a good fit (Hu & Bentler, 1999; Schreiber et al., 2006) – Autonomy: $\chi^2_{(1)} = 0.081$, $p > .05$; RMSEA = 0.000; CFI = 1.000; TLI = 1.051; SRMR = .003; Organizational support: $\chi^2_{(1)} = 0.069$, $p > .05$; RMSEA = 0.000; CFI = 1.000; TLI = 1.053; SRMR = .003. The models for access

to resources and access to information were just-identified with zero degrees of freedom; as such, the overall model fit cannot be assessed (Muthén & Muthén, 1998-2010).

Hypothesis 1 states that felt-responsibility mediates the relationship between types of job resources dimensions and role definition. The results show that felt-responsibility mediates the relationship between the four types of job resources and role definition (autonomy: .12 [CI = .07, .20], $p < .01$; access to resources: .16 [CI = .10, .23], $p < .01$; access to information: .16 [CI = .10, .24], $p < .01$; organizational support: .14 [CI = .09, .20], $p < .01$). Thus, hypotheses 1a, 1b, 1c, and 1d were supported.

Hypothesis 2 proposes a moderating effect of safety training on the relationship between job resources and felt-responsibility. We centered the independent variables, and calculated the interaction term prior to the analyses (Aiken & West, 1991; Dawson, 2013). Regarding the model with autonomy as a predictor variable, the unstandardized parameter estimates showed positive and significant main effects of autonomy ($B = .25$, [CI = .15, .35], $p < .01$) and safety training ($B = .10$, [CI = .01, .20], $p < .05$) on felt-responsibility. The interaction effect between autonomy and safety training was negatively and significantly related to felt-responsibility ($B = -.13$, [CI = $-.22$, $-.05$], $p < .01$). In order to test the conditional indirect effect, we used bias-corrected bootstrap confidence interval methods, which provide more accurate confidence intervals (Preacher, Rucker & Hayes, 2007; Shrout & Bolger, 2002). Similar to prior studies, we tested the conditional indirect effect for very high (+2 *SD*), high (+1 *SD*), low (−1 *SD*), and very low (−2*SD*) levels of safety training (Valls et al., 2016). Figure 5 shows the regression slopes for the effect of very high, high, low, and very low safety training on felt-responsibility.

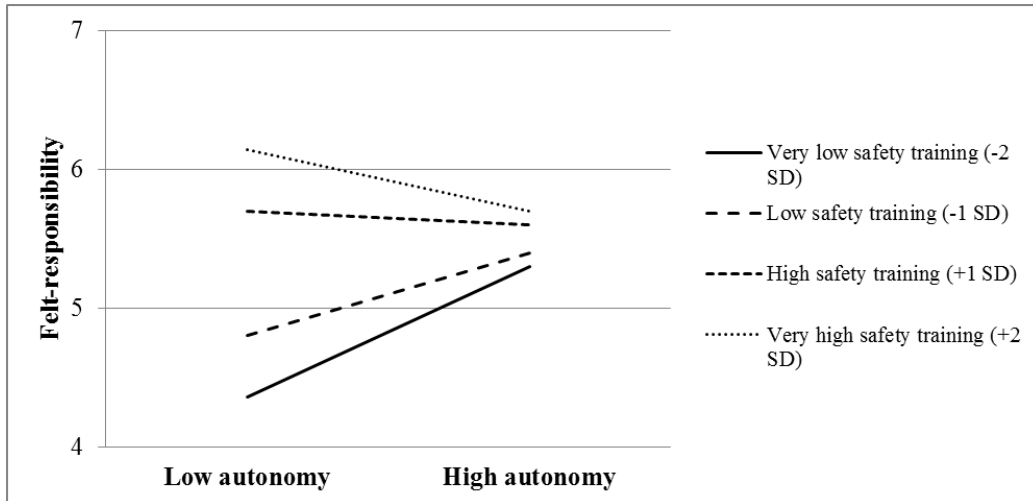


Figure 5. The interaction effect between autonomy and safety training on felt-responsibility.

When safety training was low and very low, autonomy was significantly related to felt-responsibility ($B = .41$, [CI = .26, .55], $p < .01$; $B = .57$, [CI = .34, .80], $p < .01$, respectively). This means that when safety training is low, high levels of autonomy improve felt-responsibility. When safety training was high and very high, autonomy was not significantly related to felt-responsibility ($B = .09$, [CI = $-.04$, .24], $p > .05$; $B = -.07$, [CI = $-.29$, .16], $p > .05$, respectively). That is, when safety training is very high, regardless of the level of autonomy, felt-responsibility is also high. In order to improve the interpretation of our findings, we used Johnson-Neyman technique to decompose the interaction (Hayes, 2013). The Johnson-Neyman technique identifies the region(s) of the moderator variable continuum where the effect of the predictor variable on the outcome is statistically significant and not significant (Bauer & Curran, 2005; Hayes, 2013; Hayes & Matthes, 2009). The results revealed that for safety training scores below 4.82, the effect of autonomy on felt-responsibility is statistically significant (Figure 6). Thus, hypothesis 2a was supported.

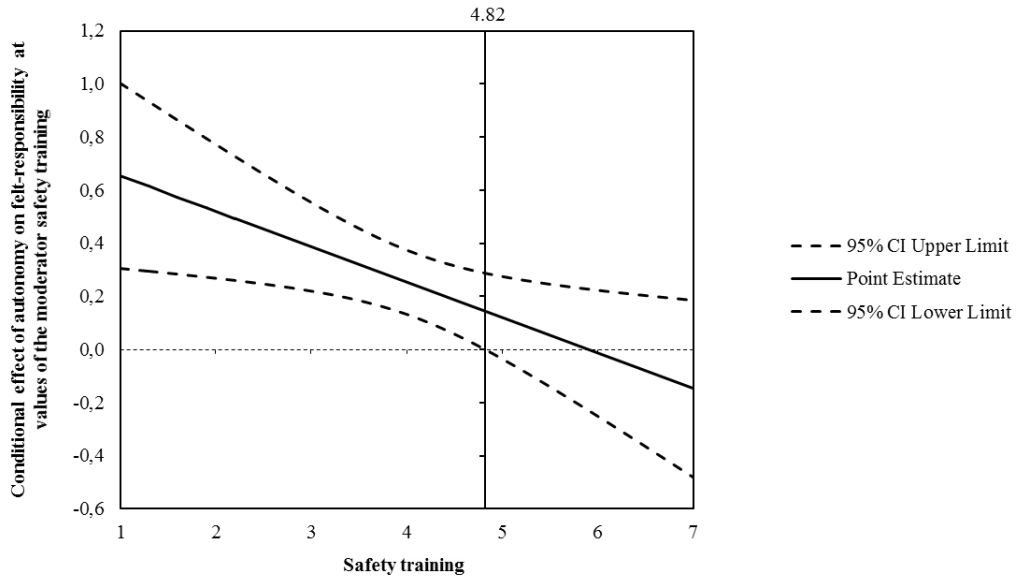


Figure 6. The conditional effect of autonomy on felt-responsibility at values of safety training.

Regarding the model with access to resources as a predictor variable, the results show a significant and positive main effect of access to resources ($B = .33$, [CI = .24, .42], $p < .01$) and a non-significant main effect of safety training on felt-responsibility ($B = .07$, [CI = $-.02$, .17], $p > .05$). The interaction effect between access to resources and safety training on felt-responsibility was negative and non-significant ($B = -.04$, [CI = $-.11$, .02], $p > .05$). Thus, hypothesis 2b was not supported. The results of the model with access to information as a predictor variable show a significant and positive main effect of access to information ($B = .32$, [CI = .22, .42], $p < .01$) and a non-significant main effect of safety training on felt-responsibility ($B = .05$, [CI = $-.04$, .15], $p > .05$). The interaction effect between access to information and safety training on felt-responsibility was negative and non-significant ($B = -.01$, [CI = $-.09$, .07], $p > .05$). Therefore, hypothesis 2c was not supported. Regarding the model with organizational support as a predictor variable, the results show a significant and positive main effect of organizational support ($B = .27$, [CI = .18, .35], $p < .01$) and a non-significant main effect of safety training on felt-responsibility ($B = .09$, [CI = $-.01$, .18], $p > .05$). The interaction effect between organizational support and safety training was negatively and significantly related to felt-responsibility ($B = -.08$, [CI = $-.16$, $-.02$], $p < .05$). We tested the conditional indirect effect for very high (+2 SD), high (+1 SD), low (-1 SD), and very low (-2 SD) levels of safety training. Figure 7 shows the regression slopes for the effect of very high, high, low, and very low safety training on felt-responsibility.

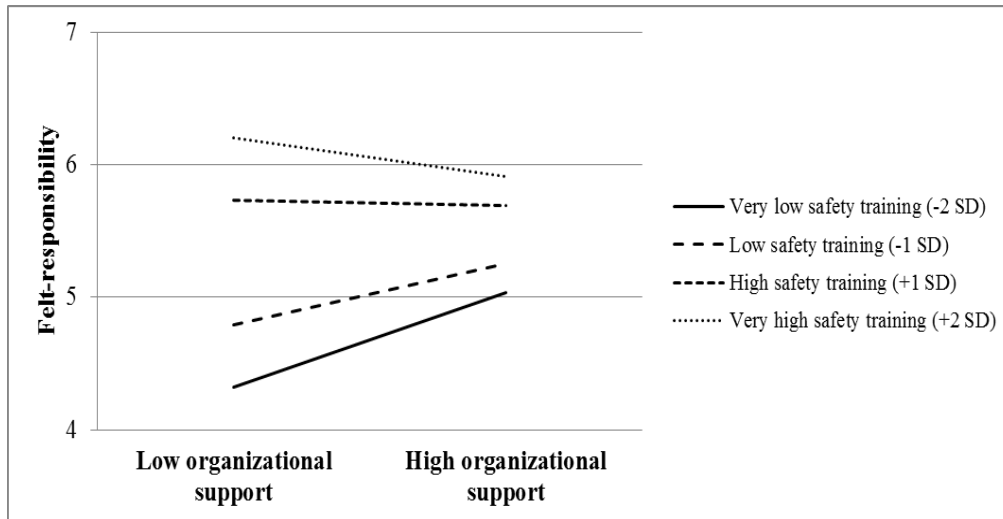


Figure 7. The interaction effect between organizational support and safety training on felt-responsibility.

When safety training was low and very low, organizational support was significantly related to felt-responsibility ($B = .37$, [CI = .26, .50], $p < .01$; $B = .47$, [CI = .31, .69], $p < .01$, respectively). This means that when safety training is low, high levels of organizational support improve self-responsibility. When safety training is high, organizational support was still significantly related to felt-responsibility ($B = .17$, [CI = .06, .29], $p < .05$). However, when safety training is very high, organizational support was not significantly related to felt-responsibility ($B = -.07$, [CI = $-.11$, .25], $p > .05$). That is, when safety training is very high, regardless of the level of organizational support, felt-responsibility is high. The Johnson-Neyman technique was used to decompose the interaction (Hayes, 2013). The results revealed that for safety training scores below 5.38, the effect of organizational support on felt-responsibility is statistically significant (see Figure 8). Thus, hypothesis 2d was supported.

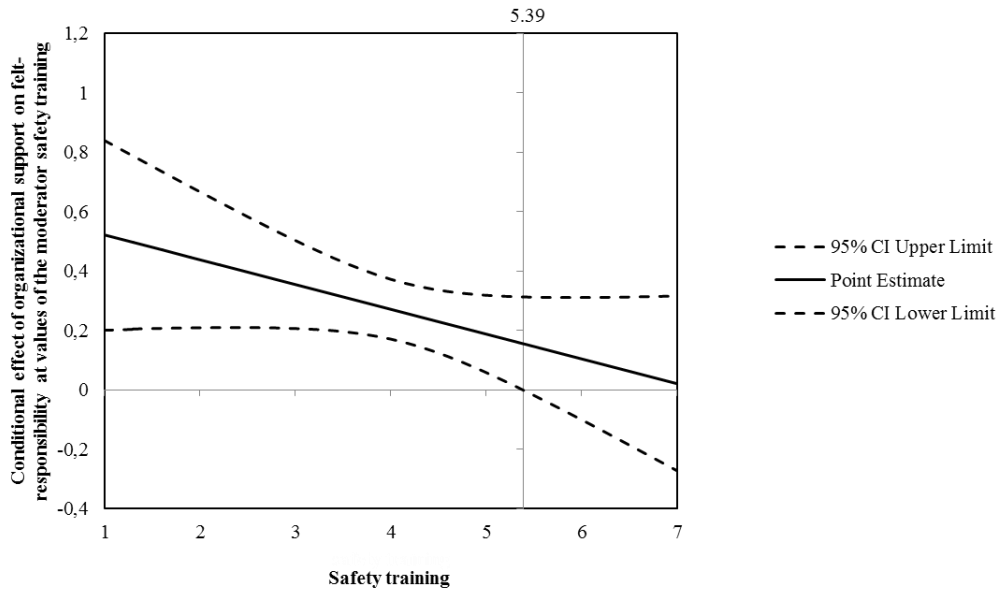


Figure 8. The conditional effect of organizational support on felt-responsibility at values of safety training.

Hypothesis 3 proposes that the indirect effect of the four types of job resources on role definition through felt-responsibility is moderated by safety training. For the model with autonomy as a predictor variable, the results show that the indirect effect of autonomy on role definition through felt-responsibility moderated by safety training is negative and significant ($-.07$ [CI = $-.12, -.03$], $p < .01$). We tested the conditional indirect effect for very high (+2 *SD*), high (+1 *SD*), low (-1 *SD*), and very low ($-2SD$) levels of safety training. The results show that the indirect effect of autonomy on role definition through felt-responsibility is positive and significant for very low ($.29$ [CI = $.16, .45$], $p < .01$) and low levels of safety training ($.21$ [CI = $.12, .31$], $p < .01$). It is positive and non-significant for high levels of safety training ($.05$ [CI = $-.12, .13$], $p > .05$) and negative and non-significant for very high ($-.04$ [CI = $-.15, .08$], $p > .05$) levels of safety training. Thus, the results support hypothesis 3a. For the model with access to resources as a predictor variable, the results show that the indirect effect of access to resources on role definition through felt-responsibility moderated by safety training is negative and non-significant ($-.02$ [CI = $-.05, .01$], $p > .05$). Thus, the results do not support hypothesis 3b. For the model with access to information as a predictor variable, the results show that the indirect effect of access to information on role definition through felt-responsibility moderated by safety training is negative and non-

significant ($-.01$ [CI = $-.05, .03$], $p > .05$). Thus, the results do not support hypothesis 3c. Finally, for the model with organizational support as a predictor variable, the results show that the indirect effect of organizational support on role definition through felt-responsibility moderated by safety training is negative and significant ($-.04$ [CI = $-.09, -.01$], $p < .05$). The results show that the indirect effect of organizational support on role definition through felt-responsibility is positive and significant for very low ($.25$ [CI = $.15, .39$], $p < .01$), low ($.20$ [CI = $.12, .29$], $p < .01$) and high levels of safety training ($.09$ [CI = $.03, .17$], $p < .05$), whereas it is positive and non-significant for very high levels of safety training ($.04$ [CI = $-.06, .14$], $p > .05$). Thus, the results support hypothesis 3d.

4.8 Discussion

The present study contributes to the existing knowledge in this area by addressing a major gap in the literature on training transfer: how in-house trainers see themselves in supporting TT, including outside the training design and delivery. In the light of role theory assumptions (e.g. Biddle, 1986), in-house safety trainers may define their responsibilities toward the success of the training they provide differently, despite having similar jobs. Empirical evidence on the relationship between role orientation and performance (e.g. Parker, 2007), suggests that such differences may determine their efforts and behaviors toward transfer success and consequently training outcomes.

Our main goal was to find individual and contextual influences regarding how in-house safety trainers perceive their role in the TT. For that purpose, we tested a model where job resources (i.e. autonomy, access to resources and to information and organizational support) influence the trainers' role orientation toward the TT, through the mediating influence of felt-responsibility for training results and under the moderated effect of perceptions on the importance of the organizational safety training.

Firstly, our results highlight the importance of the effect of job resources on individuals' definition of their role in the TT, through the mediating influence of felt-responsibility. It is a finding consistent with JCT and JD-R models which anticipate, respectively, that job characteristics and job resources initiate a motivational process that increases the likelihood of personal outcomes and work engagement (Oldham & Hackman, 2010; Schaufeli & Taris, 2014, 2016). Our findings suggest that in-house safety trainers who perceive more discretion and support

in their occupation will be more motivated, both intrinsically and extrinsically, to assure training effectiveness and, therefore, perceive their role in supporting the transfer process more extensively.

Felt-responsibility is a critical psychological state whose influence in the transference process is almost unexplored, despite some calls for research (Burke & Saks, 2009) and the relatively few attempts to uncover its' weight on in-house safety trainers' perspectives and actions concerning the TT (Freitas & Silva, 2017). Our findings are also consistent with several studies that confirmed the mediating properties of felt-responsibility over the influence of job characteristics on employees' attitudes and behaviors (e.g. Fuller et al, 2006; Humphrey et al., 2007). More precisely, the results suggest that when the socio-structural characteristics of the job are perceived as favorable, trainers tend to feel a stronger sense of responsibility toward the effects of their training, which in turn stimulates a broader scope of their personal definition of their role in assuring the effectiveness of their training in the transfer process.

Secondly, in our findings, the importance of the company's safety training moderates the influence of job resources over both felt-responsibility and role orientation toward the TT. This means that when trainers perceived safety training as adequate as well as being a priority for the organization, the negative effects of adverse job characteristics, such as lack of autonomy and organizational support, seem to be attenuated. Autonomy, as well as the organization's support, are well recognized as antecedents of employees' senses of ownership and responsibility for work outcomes (e.g. Christian et al., 2011) but none of these variables have been linked before to safety trainers' attitudes and behaviors concerning the TT.

We also tested the effects over felt-responsibility for the interactions between access to resources and access to information and the importance of safety training but the results were not significant, contrary to our expectations. Lack of resources (e.g. safety protective equipment) and critical information (e.g. budget for safety interventions) can contribute to responsibility avoidance (e.g. Wagner et al., 2010), and we expected to see this effect moderated by safety training climate. However, the hypotheses were not supported, i.e. the relationship between available resources/strategic information and felt-responsibility seemed not to be affected by fluctuations in the safety training climate. One possible explanation relies on the nature of the resources involved: Access to resources and access to information are two structural components (Spreitzer, 1996) in the OHS profession, essential to a work context favorable to safety and, as such, are less sensitive to differences in the safety training climate, compared with autonomy and/or organizational

support. Explainable by the social exchange framework, autonomy and organizational support may exert both influences on felt-responsibility through a motivational process that is more permeable to perceptions on the importance of safety training. The specificity of our sample also contributes to other possible explanations: in addition to being safety trainers, our subjects are mostly OHS professionals, which means that their responses may have been influenced by their predominant role in organizations. Naturally, these are conjectures and further research will be needed to explore and understand the interactions between types of resources and safety training climate. It would be also interesting to verify if the same pattern of results is present in a sample of OHS professionals who do not exercise functions as safety trainers. Nevertheless, the results confirm the properties of safety climate in establishing a context that emphasizes favorable trainers' dispositions and attitudes toward their work (e.g. Clarke, 2006) such as considering several transfer supporting behaviors as being in-role.

The nature of the (fundamental and recognition) safety training programs may be seen, at a first glance, as a study limitation since they are very normative, aiming the knowledge and compliance of rules and procedures. However, several other important organizational training areas such as, for example, Total Quality Management or Environmental Management, have similar goals (i.e. compliance of rules and procedures) and are frequently designed/delivered by in-house trainers. By comparison with training interventions focused on soft skills, it is easier for in-house trainers to control the transfer process, before and after training. It would be interesting for further research to explore the influence of skills nature (soft vs. hard) over the in-house trainers' felt-responsibility for transfer and on their role definition toward transfer support

Limitations

As any other study, the present one is not without limitations. Firstly, the self-report nature of the data might cause common method variance (CMV) and common method bias (CMB). However, due to the perceptual nature of the variables involved, self-reported responses represent a reasonable option. Information regarding the in-role nature of the transfer supporting behaviors might have been obtained from managers or trainees but the perceptions would certainly been different. Van Dyne and LePine (1998, p.118), regarding the characterization of extra-role behaviors, proposed the use of multiple source of ratings but for different purposes and stated that self-reports should be appropriate for studies that involve "self-conceptualization, self-image, self-

representation, or self-development”. In a more recent work, Fuller et al. (2016) presented empirical evidence that concerns about CMV are likely to be overstated and that a relatively high level of CMV would have to be present to bias true relationships among substantive variables at typically reported reliability levels. The authors argued for greater caution and concerns when near-perfect reliabilities exist, which was not the case in the current study. Nevertheless, we cannot completely rule out that single-source bias could be responsible, at least in part, for the relationships observed.

As another limitation, the study was cross-sectional, a relatively common practice in training transfer research (Blume et al., 2010) but we still should be careful about drawing causal inferences from the present data. Although we found no differences between sectors, it is possible that the type of company and, more specifically, the nature of the occupational hazards may constitute a source of influences in how in-house safety trainers define their role in TT and in their degree of felt-responsibility for the training success. Additionally, we cannot exclude the possibility that the way our participants defined their role as in-house safety trainers may reflect the influence of their predominant role in organizations, as OHS professionals. This is simultaneously a sample characteristic (OHS professionals are inherently safety trainers) and a study limitation.

Chapter 5. The roles of co-workers, supervisors, safety professionals, and workers' felt-responsibility on safety training transfer¹³

Training is an important component of occupational health and safety programs, developed to increase workers' safety knowledge, to improve their safety attitudes and behaviors and to protect their health. The beneficial effects of safety training interventions depend on the degree to which the knowledge and skills learned in training are applied, generalized and maintained in the work context (Baldwin & Ford, 1988; Baldwin, Ford, & Blume, 2009; Baldwin, Kevin Ford, & Blume, 2017). The transfer of training (TT) is a complex process due to the interference of many variables, related to individual characteristics, training design and delivery and the work environment and is still far from being fully understood (e.g. Blume, Ford, Baldwin, & Huang, 2010). Research has been challenged to spot essential hidden variables (Cheng & Hampson, 2008) and to unveil the influence of work context-related factors, including in the field of safety (Burke & Sockbeson, 2016). Most of the empirical evidence on the TT has been conducted with employees with higher educational attainment (e.g. Taylor, Ayala & Pinsent-Johnson, 2009; Taylor, Evans & Pinsent-Johnson, 2010) and very little has been done from the perspective of the low qualified, despite representing a large part of the workforce. However, there are signs that qualifications and literacy skills may have an influence in the workers' perceptions of the social dimension of the workplace and in the TT (e.g. Chen, Holton & Bates, 2006; Michael et al, 2006).

The current study is intended to respond to these challenges by providing new insights concerning the transfer process, namely related to the influence of safety climate, a recognized work environment predictor of safety-related behaviors (e.g. Griffin & Curcuruto, 2016) such as the transfer of safety training (e.g. Burke, Chan-Serafin, Salvador, Smith, & Sarpy, 2008; Smith-Crowe, Burke, & Landis, 2003). Transfer studies usually measure the safety climate construct at the organizational level, overlooking the responses of those safety agents closer to employees (in comparison with management), such as co-workers and supervisors, whose roles in influencing

¹³ Freitas, A.C., Silva, S.A. & Santos, C.M. (2017). Safety training transfer: the roles of coworkers, supervisors, safety professionals and felt-responsibility [under review in an international journal]

safety performance have already been reinforced and successfully tested (e.g. Brondino, Silva, & Pasini, 2012; Griffin & Hu, 2013; Meliá, Mearns, Silva, & Lima, 2008).

Another player in the employees' work environment is the safety professional, an essential element of an organizational safety system and commonly involved in training activities to promote safety practices and fulfill safety goals (e.g. Hale & Guldenmund, 2005; Provan & Rae, 2017). Surprisingly, although a recent study suggests that employees' sense of responsibility plays an important role in transference through interactions with other employees' in the workplace (Freitas & Silva, 2017), the safety professionals' role in safety training effectiveness is still to be unveiled. Our contribution to filling this gap is to analyze how safety professionals' reactions, along with co-workers and supervisors' safety responses, influence the TT by stimulating the trainees' sense of obligation to apply the safety training in their job.

Even feeling motivated to use the training on the job, employees may choose not to transfer (e.g. Yelon, Ford, & Bhatia, 2014). Job performance and transfer activities happen in a context, where individuals find situational opportunities and constraints that may affect their willingness and efforts to use their training on the job (e.g. Massenberg et al. 2015). One of the most important work environment transfer factors is the influence of the supervisor (e.g. Blume et al, 2010; Pham, 2012). Supervisors may reinforce and support the employees' efforts to transfer the training or instead they may act indifferently, give negative feedback or demonstrate an active opposition to the use of training (e.g. Govaerts & Dochy, 2014). These dimensions of the social support provided by the supervisors toward the TT are two sides of the same coin (Holton, Bates, Seyler, & Carvalho, 1997; Holton, Bates, & Ruona, 2000), the 'supervisor support', a construct with an ability to moderate the transfer process by interfering with the individuals' willingness to transfer (e.g. Lancaster et al., 2013). The moderating properties of supervisor support in the TT are tested in the present study: (1) in the relationship between the employees' sense of obligation for transfer and the TT; and (2) in the indirect effect on the TT of the safety players' safety-related actions and omissions in the workplace, through felt-responsibility. The sense of obligation or felt-responsibility is a critical psychological state with the potential to explain employees' motivation and performance (Hackman & Oldham, 1975, 1976), but its role in the transfer process has not been explored yet, despite some calls for research (Burke & Saks, 2009). In this study we respond

to such calls by investigating how felt-responsibility exerts its influence in the transfer of safety training, in a sample of low-qualified and lower-skill workers.

5.1. The transfer of safety training

Safety training goals and types vary according to the nature of the workplace hazards and programs can be classified as (e.g. Cohen & Colligan, 1998;2004; Burke & Sarpy, 2003): fundamental (providing knowledge on specific rules and procedures, e.g. the use of protective equipment); recognition (aimed at the recognition and reporting of workplace hazards by workers); problem-solving (encouraging the participation in hazard recognition and control activities and the solving of problems through teamwork) and empowerment programs (to extend workers' rights to a safe and healthy workplace, through collective actions). Overall, safety-training interventions rest on the assumption that once transferred to the workplace they will protect workers from existent and probable occupational hazards. Therefore, there is a natural concern about the scientific evidence regarding the impact of safety training on the employees' behaviors, attitudes, and health (e.g. Robson et al., 2012).

Frequently, research on safety training effectiveness emphasizes the training design and delivery as transfer inputs (e.g. Burke et al., 2006) and work environment variables, such as occupational hazards, cultural characteristics and, especially, safety climate (e.g. Burke & Sockbeson, 2016) as moderator variables. However, research also recognizes a direct effect between safety climate and outcomes as safety-related attitudes and behaviors (Fogarty & Shaw, 2010; Griffin & Neal, 2000) which presumably covers the workers' sense of responsibility, efforts and actions towards the transfer of safety training. This last assertion is examined in the present study.

In this study, we designed and tested a model (Figure 1) where co-workers and supervisors' safety responses and safety professionals' reactions act as transfer predictors through the mediating influence of felt-responsibility for transfer and under the moderator effect of the supervisor support and sanctions. The theoretical and empirical evidence for the proposed model is as follows.

5.2. The influence of safety agents' responses in the transfer of safety training

Safety agents can be defined as those individuals involved in the definition and/or implementation of safety policies and procedures inside the organization (Meliá, 2004). Four safety agents are usually pointed: top management, supervisors, co-workers and workers. Their safety responses, meaning their actions or omissions toward safety-related issues in the organization, contribute to the overall safety climate (Meliá, 2015; Brondino, Pasini & Silva, 2013; Meliá et al., 2008). Safety climate is a subset of the organizational climate and a multidimensional and multilevel concept (Griffin & Curcuruto, 2016), concerning the shared perceptions about the organization's safety policies, procedures and practices (Zohar, 1980). The construct is a leading indicator of safety performance, with an ability to predict safety behavior, accidents and injuries (e.g. Beus et al, 2010; Christian et al, 2009). Scholars suggest a positive association between safety climate and the employees' commitment to workplace safety (e.g. Mearns et al., 2010) and a moderating role on safety training-outcome relationships (e.g. Burke & Sockbeson, 2016). Safety climate can be measured by capturing the workers' perceptions of the top managements' policies and procedures (e.g. Zohar, 2008) which represent an organizational level of analysis, or by adopting a group level approach (i.e. based on the "agent" or subject that performs or is responsible for each safety process, action, omission inside the organization), centered on the safety responses of: *Top management, supervisors, co-workers* (Brondino et al., 2012; Meliá et al., 2008).

We started from the assumption that supervisors and co-workers can exert a greater influence on the transfer process than senior managers because they are operationally and cognitively closer to concrete concerns and are more likely to be on the front line, directly in contact with workers (Turner et al, 2010). Supervisors play a decisive role in implementing organizational safety policies and procedures, in translating organizational processes into more locally specific safety practices (e.g Zohar & Luria, 2003). In their relationship with the workers, supervisors provide: a model of (un)safe behavior, communicate safety policy, safety procedures/rules and safety instructions, control workers' behaviors, deliver feedback, encouragement, and social contingencies (Meliá & Sesé, 2007). The interactions and exchanges with co-workers allow individuals to develop beliefs about what they should or should not do in their work role (e.g. Chiaburu & Harrison, 2008). The co-workers' influence is also favored by their familiarity or expertise in the work tasks, their closer proximity to other workers, and their larger number when

compared with supervisors (Tucker et al., 2008). They can also provide information and advice about proper behavior in face of a conflict between different job requirements such as productivity and safety (Lingard et al., 2011) and offer lateral mentoring (Chiaburu & Harrison, 2008).

Several theoretical frameworks support the assumption that supervisors and co-workers may function as sources of influence concerning the use workers give to safety training on the job and how the influence may take place:

- The social learning theory (Bandura, 1977, 2001) posits that individuals learn through the reinforcement of the desired behaviors and vicariously, for example, when supervisors, co-workers and even safety practitioners encourage safe work practices and when they act consistently (and according to what was learned in training);
- The social information processing (SIP) theory (Salancik & Pfeffer, 1976) suggests that individuals use information in their work environment to identify and understand the expectations about their behavior, especially in certain circumstances as, for example, the extent to which the new safety knowledge/skills should be transferred to the job. Consequently, if employees receive social cues from supervisors and co-workers that safety is important, they are more likely to act accordingly by transferring what they have learned in safety training to the job;
- The self-determination theory establishes that motivation underlies ones' behavior in a continuum of relative autonomy (Ryan & Deci, 2000; Deci, Olafsen, & Ryan, 2017). For example, the transference of the learned safety rules/procedures can be explainable by its instrumental value as to obtain the approval of the coworkers or to avoid a reprimand from the supervisor / the safety professional (external regulation). Also, if workers perceive through safety responses that safety in the workplace is valued and matters, they are more likely to internalize safety values and to apply the safety training due to a more self-regulated kind of motivation;
- The social exchange framework and the norm of reciprocity (Blau, 1964; Gouldner, 1960) suggest that employees may interpret safety players' emphasis on safe work as a form of caring and concern about their well-being and feel a sense of obligation and motivation to reciprocate (Hofmann et al., 2003), for example, through safety TT.

In sum, there is strong theoretical and empirical evidence to propose that the responses of those safety agents most frequently present in the employees' work environment, the supervisor and the co-workers, will affect the transfer of safety training. Our first hypothesis is:

Hypothesis 1: Trainees' perceptions of (1a) supervisors and (1b) co-workers' safety responses are positively associated with the transfer of safety training.

5.3. Effects of safety professionals' reactions on safety TT

Safety professionals are employed in nearly every aspect of business (e.g. manufacturing, hospitals, oil and gas, insurance groups, construction) and serve all levels of the organizational hierarchy in the identification, evaluation, and control of workplace hazards. Their presence in organizations is due to organizational safety concerns in developing and maintaining a safe and healthy work environment (Pryor et al., 2015). However, research on safety professionals appears to be dominated by studies concerning tasks and education (e.g. Chang, Chen, & Wu, 2012; Hale & Guldenmund, 2005; Wu, 2011) and little is known from an organizational and social perspective (Provan, Dekker & Rae, 2017). Recently, some studies have begun to explore the strategies safety professionals use to fulfill their job role (Olsen, 2012), the processes by which they influence safety performance and/or safety outcomes (Daudigeos, 2013) and there are suggestions that safety professionals exert an influence in the organizational safety culture and climate (Wu, Liu, & Lu, 2007; Nielsen, 2014). Safety training is a core task in the safety professionals' overall activity, used to: promote new organizational practices, to exert an influence and change players' knowledge, behavior and attitudes (e.g. Brauer & Schoolcraft, 2008; Daud et al, 2010; Chang et al., 2012). The safety professionals' presence on the shop floor and their interactions with workers (e.g. to understand the nature of occupational risks, their emergence, their changes, how they are understood and mitigated and also to monitor them) (Provan, Dekker & Rae, 2017) creates opportunities to support the transfer of safety training. In a qualitative study, Freitas and Silva (2017) interviewed 20 safety professionals, all in-house safety trainers, and found that they use their monitoring visits and their interactions with employees to reinforce what was learned in training, although in an informal and unplanned way. Based on the preceding discussion, we believe that there are strong reasons to expect that safety professionals' reactions to workers' safety

related behavior and attitudes influence the transfer of safety training. We therefore set the second hypothesis:

Hypothesis 2: Trainees' perceptions of safety professionals' reactions are positively associated with the transfer of safety training.

5.4. Trainees' felt-responsibility as a mediator of safety TT

Personal or felt-responsibility is a cognitive-emotional state by which an individual feels a sense of obligation to a situation or event (Cummings & Anton, 1990). Behaviors performed due to felt-responsibility are self-directed and not driven by an external accountability system or other external reasons (e.g. Dose & Klimoski, 1995). In Hackman and Oldham's (1976, 1975) Job Characteristics Theory (JCT), felt-responsibility is a critical psychological state reflecting the extent to which the person feels personally accountable and responsible for the results of his/her work. According to JCT, if trainees feel more responsible for the TT, they will experience greater intrinsic motivation to use the knowledge/skills acquired in training on the job. Since felt-responsibility is a key to understanding and predicting behavior (Cummings & Anton, 1990), it is important to identify the factors that optimize its properties. However, empirical investigation of this construct has not been particularly extensive, including in the field of the TT (Burke & Saks, 2009) and so there are still many unanswered questions regarding the determinants of felt-responsibility.

In their initial proposal, Hackman and Oldham (1975, 1976) pointed out autonomy as a single job design characteristic that functioned as an antecedent of felt-responsibility but later recognized that social or relational aspects of jobs may also play a significant role in shaping individuals' psychological responses to their work (Oldham & Hackman, 2010). There is enough research-based evidence to sustain a potential relationship between supervisor and co-workers' safety responses and felt-responsibility for job performance. For example, Morrison and Phelps (1999) found that perceptions of a more supportive and safe environment were associated to reports of greater felt-responsibility (for change). Hofmann et al.'s (2003) study revealed that in response to the leadership's safety-related actions and support, subordinates felt a sense of obligation and were motivated to reciprocate (through organizational citizenship behaviors). Using the Job Demands-Resource model (Bakker & Demerouti, 2007) as a theoretical reference, Turner

et al. (2005) suggested that safety-related support, as a type of job resource provided by members of the work environment, can lead to a greater willingness to put extra effort into work tasks (e.g. by transferring the safety training to the job) and to job engagement. The presumed role of felt-responsibility, as a cognitive-motivational state between perceptions of safety agents' responses and the transfer of safety training, is also consistent with social–cognitive theory, which proposes that humans are reflective, self-regulating agents who are not only products but also producers of their environment (Bandura, 2001).

In conclusion, we assert that felt-responsibility is an internal state directed at a specific organizational process, the transfer of training, and subject to environmental influences. We expected that, by the end of training, the employees' felt-responsibility to apply the safety knowledge/skills learned would reflect an internalization of safety values, as a result of perceptions regarding the safety players' (co-workers, supervisors and safety professionals') responses and reactions that would influence the TT, three months later. Therefore, we set the following hypotheses:

Hypothesis 3: Felt-responsibility acts as a mediator in the relationship between trainees' perceptions of (3a) supervisors and (3b) co-workers' safety responses and the transfer of safety training

and

Hypothesis 4: Felt-responsibility acts as a mediator in the relationship between trainees' perceptions of safety professionals' reactions and the transfer of safety training.

5.5. Moderating effects of supervisors' support and sanction

When re-entering the workplace after training, trainees have to cope with characteristics and dynamics that might support or inhibit the use of the knowledge and skills learned. The employees' perceptions of the work environment are acknowledged as an important source of influences on the transfer process, particularly the level of social support (e.g. Grossman & Salas, 2011; Blume et al, 2010). Social support for transfer refers to the extent to which supervisors reinforce and support the TT, a factor capable of increasing the employees' desire to use the skills gained on the

job and frequently pointed out as a moderator in the transfer process (e.g. Van den Bossche et al., 2010; Massenberg et al., 2015; Chauhan et al., 2016).

The reciprocity norm of social exchange theory (Blau, 1964; Gouldner, 1964) has been used to explain the moderating role of social support in the TT (e.g. Homklin, Takahashi, & Techakanont, 2014; Simosi, 2012). After training, employees return to the workplace. If they have already feelings of personal obligation or responsibility to reciprocate, the sense a social support for transfer will increase the impact of that felt-responsibility on the employees' efforts to use the newly acquired knowledge/skills when working.

Supervisors play a more intense and central role in blue-collar workers' tasks, than in white-collar workers' tasks, because of stricter regulations and more checks regarding the product quality (e.g. Ersoy et al, 2011; Michael, Guo, Wiedenbeck, & Ray, 2006). Therefore, their actions and omissions in the workplace, including during the transfer process, are likely to influence the workers' willingness to apply what they learned in training. The support provided by the supervisor can assume a diversity of forms as, for example, feedback and encouragement, that will affect the trainees' motivation to transfer (e.g. Massenberg et al., 2015; Govaerts & Dochy, 2014). However, despite being a prevalent factor in transfer models (e.g. Baldwin & Ford, 1988; Cheng & Hampson, 2008; Burke & Hutchins, 2007), research has so far gathered contradictory results. Some findings suggest that the supervisor directly affects the TT (e.g. Saks & Belcourt, 2006), others point to an indirect influence, through mediating variables such as transfer motivation (e.g. Chiaburu et al., 2010) and there are also studies that did not find a link between supervisor support and the TT (e.g. Velada et al., 2007). This study sought to contribute to the existent knowledge on the role of supervisor support in the TT.

Another dimension of social support for transfer, although underexplored by research, is the construct 'supervisor sanctions' defined as "the extent to which supervisors are indifferent to or actively oppose the use of training" (Bates et al, 2000, p. 33). Perceived negative responses from the supervisors include an opposition to the use of training, negative feedback, lack of assistance or interest (e.g. Holton et al, 2010; Yamkovenko & Holton, 2010; Russ-Eft, 2002) that may reduce the trainees' motivation to transfer (Clarke, 2002), mitigating the effects of the felt-responsibility for transfer. Bates and Holton (2004) noticed that individuals with low literacy skill levels were more sensitive to supervisor sanctions than to supervisor (and co-workers') support. The authors compared perceptions of the transfer system variables of two groups of individuals with different

workplace literacy skills and found that the group with lower basic math and reading skills reported more active resistance in the workplace. Chen, Holton, and Bates (2006) also examined the effect of the employees' educational level on transfer systems perceptions and found a significant relationship with supervisor sanctions, but when considered jointly with other situational variables it had little influence. Unfortunately, the transfer literature is sparse in studies with lower skilled or low-qualified individuals and we could not confront the above research results with other research findings. We hope to contribute to fill this gap by using a sample of low-qualified individuals.

Overall, we have presented enough evidence to suggest that supervisor support for transfer moderates the transfer process by interacting with safety players' responses and reactions to employees' and with employees' felt-responsibility for transfer. Additionally, previous research has signaled differences in how blue-collar, low-skilled/low-qualified employees respond to support from their supervisor. Since our study involved employees with such characteristics, we also examined the less explored dimension of supervisor sanction for transfer. Therefore, we propose the following hypotheses:

Hypothesis 5a: Supervisor support moderates the relationship between felt-responsibility and the TT, such that the relationship is positive under high support (vs. low support), and negative under low support (vs. high support).

Hypothesis 5b: Supervisor sanctions moderate the relationship between felt-responsibility and the TT, such that the relationship is negative under high sanctions (vs. low sanctions), and positive under low sanctions (vs. high sanctions).

Hypothesis 6a: Supervisor support moderates the positive and indirect effect of supervisors' safety responses on the TT. Specifically, felt-responsibility mediates the indirect effect when supervisor support is high but not when it is low.

Hypothesis 6b: Supervisor sanctions moderate the positive and indirect effect of supervisors' safety responses on the TT. Specifically, felt-responsibility mediates the indirect effect when supervisor sanctions are low but not when they are high.

Hypothesis 7a: Supervisor support moderates the positive and indirect effect of co-workers' safety responses on the TT. Specifically, felt-responsibility mediates the indirect effect when supervisor support is high but not when it is low.

Hypothesis 7b: Supervisor sanctions moderate the positive and indirect effect of co-workers' safety responses on the TT. Specifically, felt-responsibility mediates the indirect effect when supervisor sanctions are low but not when they are high.

Hypothesis 8a: Supervisor support moderates the positive and the indirect effect of safety professionals' reactions on the TT. Specifically, felt-responsibility mediates the indirect effect when supervisor support is high but not when it is low.

Hypothesis 8b: Supervisor sanctions moderate the positive and indirect effect of safety professionals' reactions on the TT. Specifically, felt-responsibility mediates the indirect effect when supervisor sanctions are low but not when they are high.

Figure 9 summarizes the conceptual model and design of our study.

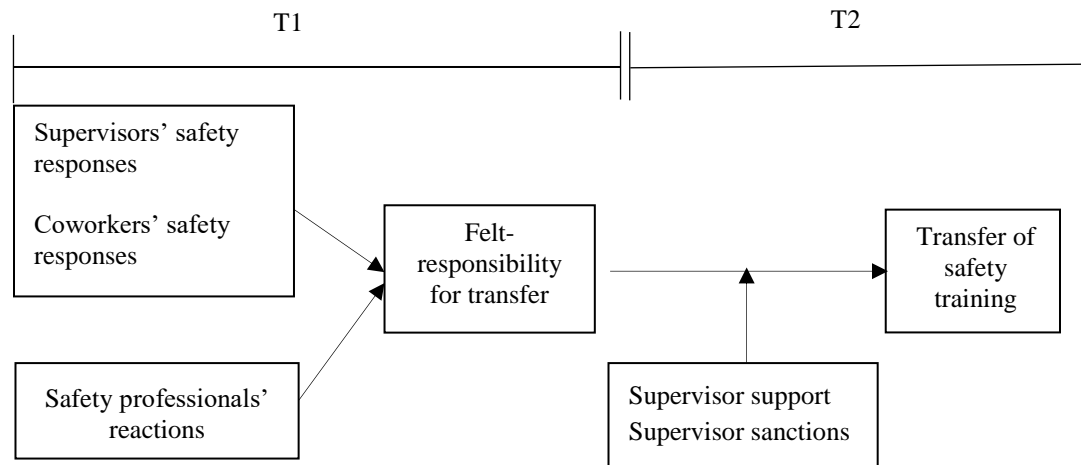


Figure 9. Proposed conceptual model and study design

5.6 Method

5.6.1 Participants and procedures

The targeted population was the employees of four city councils, undergoing one day of mandatory safety training provided by their employers. The participants were all blue-collar council workers with low-skilled jobs (e.g. gardening, cleaning, in public cemeteries, refuse collection etc.), mainly male (91%) and with a mean age of 47 years ($SD=10.1$) in a range of 26–63. The average tenure in the organization was 16 years ($SD=9.9$) with 8.6% having been employed for less than 5 years. All participants were low-qualified, meaning that their highest level of education did not exceed Level 2 (education at the lower secondary level) of the International Standard Classification of Education (UNESCO, 2012)¹⁴: 85% had 9 years of schooling or less and 15% had 11 years of schooling or less. None of the participants were in supervisory roles.

The safety training interventions were planned and organized by the HR department of each city council, with no interference from the researchers, and focused on basic safety knowledge, skills and values, recognition and awareness. The topics were related to the prevention of physical injuries and fall hazards, proper machinery use, toxics exposure, and emergency procedures. We selected initiatives with a proximal duration (between 6 and 12 hours), targeted only to blue-collar council workers. For example, we excluded fundamental training on the prevention of ergonomic risks targeted to office workers. All the training groups were heterogeneous, composed by workers from different operational units.

The training sessions occurred on different days, in each city council's facilities, and were delivered by in-house safety trainers, all safety professionals.

Data were collected through two self-report questionnaires at two different points of time (T1 and T2) with an interval of three months. Because of the population's general profile, especial attention was given to the elaboration of both questionnaires, namely the wording and length. Each instrument was pre-tested to verify its comprehensiveness and the respondents' reactions.

¹⁴ UNESCO (2012). *International Standard Classification of Education - ISCED 2011*. Montreal, Canada: UNESCO Institute for Statistics.

For that purpose, we involved a fifth city council and two of the programmed fundamental safety training interventions. The 31 trainees were asked to fill the questionnaires and to help in their improvement (e.g. the items wording or the instructions). No adaptations to the phrasing seemed necessary and we did not identify any negative reactions to the instruments' length. The final sample did not include workers nor safety trainers from the pilot city council.

At the end of the selected training, each group of trainees was invited to participate in the study. A general goal was described - to improve further safety training interventions – and the anonymity and confidentiality of the participation were assured.

During the administration of both surveys, the respondents were given the opportunity to clarify any doubt or anything they did not understand individually.

At the end of the training programs, each group of trainees completed the first self-report survey (T1) to assess their perceptions of co-workers and supervisors' safety responses, safety professionals' reactions, and felt-responsibility for transfer. We assumed that during the training process the trainees would experience several influences that might affect perceptions on the training utility, namely the training content and design, the trainers-trainees and trainees-trainees interactions. Additionally, if measured a few months later, the trainees would have the opportunity to experience whether the training was, in fact, useful. Therefore, we measured the TT three months after training (T2) and the supervisor support and sanctions with a second self-report survey. The T1 and T2 samples were matched by a self-generated code based on replies to a series of questions (e.g. What are the first two letters of the place where you were born?) only known to the respondent. Of the 242 surveys filled at T1, we could match 203 (84%) at T2.

5.6.2 Measures

The measures used in this study were adapted from previous studies and used a seven-point Likert scale (1 = totally disagree; 7 = totally agree).

Transfer of training.

To measure perceptions of the transfer of safety training we used two of the three items by Tesluk et al. (1995). A sample item is: 'I incorporate skills learned in the safety training course into my daily work activities'. To estimate reliability we followed the Eisinga et al. (2013)

instructions and used the Spearman-Brown statistic for calculating the reliability of a scale with two items. The reliability for the transfer of training scale was $r_{SB}=.83$.

Co-workers' and supervisors' safety responses

Perceptions regarding the co-workers and supervisors' safety responses were measured by two subscales (six items) of the Integrated Organizational Safety Climate Questionnaire (Brondino et al., 2013). Three items measured *supervisor's effort to improve safety* – a sample item is 'My supervisor controls the compliance of all the workers' ($\alpha =.86$). Three items measured *safety mentoring* – 'Team members mentor peers about working safely' is a sample item ($\alpha=.86$).

Safety professionals' reactions.

To measure the safety professionals' reactions we used three of the four items of Brondinos' et al. (2013) scale *supervisors' reactions to workers' behavior* and only replaced the word 'supervisor' with 'safety professional'. A sample item is 'The safety professional discusses safety improvement with workers' ($\alpha =.84$).

Felt-responsibility.

To measure felt-responsibility we used three items of Hackman and Oldman's (1975, 1976) Job Diagnostic Survey, slightly adapted to the subject of safety training, a sample is: 'I feel a very high degree of personal responsibility for using what I learned in training on the job' ($\alpha=.74$).

Supervisor support and sanctions.

Both variables were measured by scales from the Holton III and Bates' (1998) LTSI–version 2. For *supervisor support*, we used three of the six items (a sample item, 'My supervisor lets me know I am doing a good job when I use my training') of the original scale ($\alpha=.88$); and for *supervisor sanctions* we used three of the nine items of the original scale (e.g. 'My supervisor will not like it if I do things the way I learned in this training') ($\alpha=.75$).

Control variables.

We included the four city councils as control variables in our analyses. We transformed the categorical variable city council (with four levels) into three dummy variables (city council 2, city council 3, and city council 4), using city council 1 as a baseline.

5.6.3. Data analysis

We performed a simple mediation model to analyze the direct effect of perceptions of the safety agents' responses and the safety professionals' reactions on the transfer of safety training (hypotheses 1a, 1b, 2), as well as the mediating role of felt-responsibility on the relationship between the perception of the safety agents' responses and the transfer of safety training (hypotheses 3a, 3b, 4). Then, we analyzed the moderating effect of the supervisor support on the relationship between felt-responsibility and the transfer of safety training (hypothesis 5a), and, separately, the moderating effect of the supervisor sanctions on the relationship between felt-responsibility and the transfer of safety training (hypothesis 5b). Finally, we analyzed the overall moderated mediation hypotheses (hypotheses 6a, 6b, 7a, 7b, 8a, and 8b).

In all the analyses, the three city council dummies were entered as control variables. In the moderation analyses, the independent variables were centered (Aiken & West, 1991). The analyses were performed with the PROCESS macro developed by Hayes (2013), using the bootstrapping technique to create 5000 bootstrap samples and using 95% confidence intervals (CI) (Preacher & Hayes, 2008). We can assume that the effects are significant if zero falls outside of the 95 percent confidence interval.

5.7 Results

Means, standard deviations, and correlations among study variables

Table 10 provides the means, standard deviations, correlations, and reliabilities for all the variables. Significant positive correlations were found between all the variables and significant correlations were found between the city councils and the variables of the model.

Table 10. Means, standard deviations, correlations, and reliabilities

Variables	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. CC1	n.a.	n.a.											
2. CC2	n.a.	n.a.	-.58**										
3. CC3	n.a.	n.a.	-.37**	-.25**									
4. CC4	n.a.	n.a.	-.35**	-.23**	-.15*								
5. SSR (T1)	4.59	1.46	-.28***	.15*	.07	.15*	(.86)						
6. CSR (T1)	4.77	1.34	-.22**	.17*	.10	.00	.54***	(.86)					
7. SPR (T1)	5.49	1.19	-.19**	.05	.12	.10	.42***	.23**	(.84)				
8. Fr (T1)	5.15	1.03	-.47***	.20**	.27***	.15*	.56***	.45***	.59***	(.74)			
9. SS (T2)	4.40	1.44	-.29***	.11	.14	.14*	.81***	.49***	.29***	.48***	(.88)		
10. SSc (T2)	3.70	1.59	.17*	-.09	-.11	-.03	-.57***	-.41***	-.23**	-.36***	-.49***	(.75)	
11. TT (T2)	5.27	1.14	-.33***	.13	.23**	.07	.42***	.25***	.34***	.52***	.54***	-.24**	(.83)

Note. n = 203 individuals. ** $p < .01$, *** $p < .001$.

CC – City council; SSR – Supervisors’ safety responses; CSR – Coworkers’ safety responses;

SPR – Safety professionals’ reactions; Fr – Felt-responsibility; SS – Supervisor support; SSc – Supervisor sanctions;

TT – Transfer of training. n.a. = not applicable

Confirmatory factor analysis

The supervisor-related variables are conceptually close in meaning. In particular, supervisors’ safety responses and supervisor support which are also empirically highly correlated. We decided to verify whether the three supervisor-related variables (i.e., supervisors’ safety responses, supervisor support, and supervisor sanctions) were independent of one another in our sample. For that purpose, we conducted a confirmatory factor analysis (CFA) in Mplus using the maximum likelihood estimation method to distinguish the three constructs (Muthén & Muthén, 2012). To evaluate the models fit, we used different criteria: the χ^2/df ratio that for acceptable fit should be less than or equal to 3; the Akaike information criterion (AIC) and the Bayesian information criterion (BIC) that are good indicators for model comparison and smaller values indicate better fit; the Tucker-Lewis index (TLI) and the comparative fit index (CFI) that should be greater than or equal to .95; the standardized root mean square residual (SRMR) that should be less than or equal to .08; and the root mean square error of approximation (RMSEA) that should be less than or equal to .08 with confidence interval 95% CI (Hu & Bentler, 1999; Schreiber, Stage, King, Nora, & Barlow, 2006).

First, we tested a one-factor model, in which we included all the three variables in one factor. The model showed an inadequate model fit (Table 11). Then, we tested an alternative two-factor model, in which we included supervisors’ safety responses and supervisor sanctions in one

factor, and supervisor sanctions in another factor. Although the chi-square difference test showed that the change in chi-square value was significant ($\Delta\chi^2 = 75.26$, $df = 1$, $p < .001$), the model showed an inadequate fit. Thirdly, we tested a three-factor model including each variable in one factor. This model showed a better, although inadequate, fit. The chi-square difference test showed that the change in the chi-square value was significant ($\Delta\chi^2 = 19.56$, $df = 2$, $p < .001$). We analyzed the Modification Indexes (MI) to understand whether the model fit could be improved. According to the MI, we allowed the errors of item 2 and item 3 of supervisor support to correlate (MI = 29.16). The model 4, which allowed the errors to correlate, presented a good fit to the data: AIC = 6097.10; BIC = 6199.66; $\chi^2 / df = 1.98$, RMSEA = .07 [90% Confidence Interval = .04 – .10], CFI = .98, TLI = .97, SRMR = .04. The chi-square difference test showed that the change in the chi-square value was significant ($\Delta\chi^2 = 27.06$, $df = 1$, $p < .001$). Therefore, the CFA results suggest that supervisors' safety responses, supervisor support, and supervisor sanctions are distinct constructs.

Table 11. *Model fit indexes*

	AIC	BIC	χ^2	df	χ^2 / df	RMSEA [90% CI]	CFI	TLI	SRMR
Model 1	6210.99	6300.31	167.33	27	6.20	.16 [.14 – .18]	.87	.83	.07
Model 2	6137.72	6230.35	92.07	26	3.54	.11 [.09 – .14]	.94	.92	.05
Model 3	6122.16	6221.41	72.51	24	3.02	.10 [.07 – .13]	.96	.93	.04
Model 4	6097.10	6199.66	45.45	23	1.98	.07 [.04 – .10]	.98	.97	.04

Note. Model 1: One-factor model. Model 2: Two-factor model. One factor comprising both supervisors' safety responses and supervisor support, and another factor comprising supervisor sanctions. Model 3: Three-factor model. Model 4: Three-factor model allowing the errors of items 2 and 3 of supervisor support to correlate (MI = 29.16).

We assessed convergent validity by calculating the average variance extracted (AVE) and the composite reliability (CR) of the supervisor-related variables (Hair et al., 2014): Supervisors' safety responses: AVE .68, CR .87; Supervisor support: AVE .65, CR .85; Supervisor sanctions: AVE .53, CR .77. Average variance extracted values were all over .50, and composite reliability values were all over .70 (Hair et al., 2014).

Direct and indirect effects of safety players' responses and reactions

Results indicate that the supervisors' safety responses ($b = 0.15$, [CI = .04, .26], $t_{(198)} = 2.75$, $p < .01$) were positively and significantly associated with the transfer of safety training, supporting hypothesis 1a. The co-workers' responses ($b = 0.02$, [CI = -.10, .13], $t_{(198)} = 0.31$, $p = .76$) and the safety professionals' reactions ($b = 0.07$, [CI = -.07, .21], $t_{(198)} = 1.00$, $p = .32$), were not significantly associated with the transfer of safety training. These results do not support hypotheses 1b and 2.

Mediating effect of felt-responsibility

Regarding the mediating effect of felt-responsibility, the results indicate that the supervisors' responses ($b = .13$, [CI = .06, .23]; $F_{(5,197)} = 17.74$, $p < .001$), co-workers' responses ($b = .14$, [CI = .07, .23]; $F_{(5,197)} = 15.65$, $p < .001$), and safety professionals' reactions ($b = .20$, [CI = .11, .32]; $F_{(5,197)} = 15.90$, $p < .001$) have a positive indirect effect on the transfer of safety training (see Table 12). These results support hypotheses 3a, 3b, and 4.

Table 12. Regression results for mediation effects of felt-responsibility

	Effect	Boot SE	Boot LLCI	Boot ULCI	Ratio indirect/total effect [Boot LLCI, Boot ULCI]
Indirect effects					
Supervisors' safety responses → Felt-responsibility → Transfer of safety training	0.13	.04	0.06	0.23	.45 [CI = 0.21, 0.86]
	$F_{(5,197)} = 17.74^{***}$		$R^2 = .31$		
Coworkers' safety responses → Felt-responsibility → Transfer of safety training	0.14	.04	0.07	0.23	.89 [CI = 0.35, 4.43]
	$F_{(5,197)} = 15.65^{***}$		$R^2 = .28$		
Safety professionals' reactions → Felt-responsibility → Transfer of safety training	0.20	.05	0.11	0.32	.74 [CI = 0.39, 1.54]
	$F_{(5,197)} = 15.90^{***}$		$R^2 = .29$		

Note. n = 203 individuals. *** $p < .001$. Bootstrap sample size = 5.000. Boot LLCI = 95% bias-corrected lower limit confidence interval; Boot ULCI = 95% bias-corrected upper limit confidence interval. Ratio indirect/total effect = Ratio of indirect to total effect of the predictor on the outcome

Moderating Effects of Supervisor Support on Felt-Responsibility Influence on TT

The unstandardized parameter estimates showed positive and significant main effects of felt-responsibility ($b = .30$, [CI = .15, .46], $t_{(196)} = 3.84$, $p < .001$) and the supervisor support ($b =$

.28, [CI = .18, .38], $t_{(196)} = 5.38$, $p < .001$) on the TT. The interaction effect between felt-responsibility and the supervisor support was not significantly related to the TT ($b = -.06$, [CI = $-.15$, .03], $t_{(196)} = -1.36$, $p = .17$; $F_{(6,196)} = 21.20$, $p < .001$). These results do not support hypothesis 5a. Although not playing a moderator role, the main effect of supervisor support suggests that the supervisors play an important role in promoting TT.

Moderating effects of supervisor sanctions on felt-responsibility influence on TT

The unstandardized parameter estimates showed a positive and significant main effect of felt-responsibility ($b = .40$, [CI = .24, .56], $t_{(196)} = 4.99$, $p < .001$) on the TT. There was no main effect of the supervisor sanctions ($b = -.05$, [CI = $-.13$, .04], $t_{(196)} = -1.01$, $p = .31$) on the TT. The interaction effect between the felt-responsibility and the supervisor sanctions was positively and significantly related to the transfer of safety training ($b = .14$, [CI = .06, .23], $t_{(196)} = 3.37$, $p < .001$; $F_{(6,196)} = 15.81$, $p < .001$). As the interaction was significant, we analyzed the conditional effects for low ($-1 SD$) and high ($+1 SD$) levels of the supervisor sanctions (Aiken & West, 1991; Dawson, 2013). Figure 2 shows the regression slopes for the effect of low and high supervisor sanctions on the transfer of safety training.

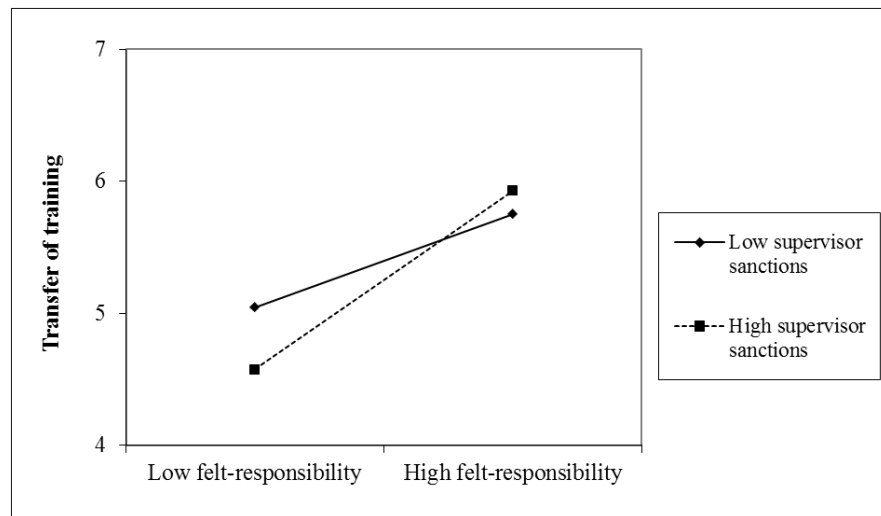


Figure 10. The interaction effect between felt-responsibility and supervisors’ sanction on TT

Felt-responsibility was positively and significantly related to the TT for high levels of the moderator ($b = .63$, [CI = .46, .81], $t_{(196)} = 7.10$, $p < .001$) and was not related for low levels of the

moderator ($b = .18$, [CI = $-.06$, $.41$], $t_{(196)} = 1.48$, $p = .14$). These results partially support hypothesis 5b. We expected a positive and significant relationship between felt-responsibility for transfer and TT for *low* levels of supervisor sanctions. Surprisingly, the results show that the interaction effect occurs for *high* levels of supervisor sanctions. Figure 10 suggests that high sanctions enhance the positive effects of high felt-responsibility, and, importantly, aggravate the negative effect of low self-responsibility on TT. This means that the worst scenario for TT combines low felt-responsibility and high supervisor sanctions.

Moderating role of supervisor support/sanctions on the indirect effects of safety agents' responses

The results show that the indirect effect of the supervisors' safety responses on the transfer of safety training through felt-responsibility for transfer was not significantly moderated by the supervisor support ($b = -.07$, [CI = $-.16$, $.02$], $t_{(195)} = -1.52$, $p = .13$; $F_{(7,195)} = 19.24$, $p < .001$, $R^2 = .41$). These results do not support hypothesis 6a. The indirect effect of the supervisors' safety responses on the transfer of safety training through felt-responsibility for transfer was significantly moderated by the supervisor sanctions ($b = .13$, [CI = $.04$, $.21$], $t_{(195)} = 3.01$, $p < .01$; $F_{(7,195)} = 14.46$, $p < .001$, $R^2 = .34$). As the interaction was significant, we analyzed the conditional indirect effects for mean, low ($-1 SD$) and high ($+1 SD$) levels of the supervisor sanctions (Table 13).

The indirect and positive effect of the supervisors' safety responses on the transfer of safety training through felt-responsibility for transfer was observed for mean and high levels of the supervisor sanctions ($b = .11$, [CI = $.05$, $.20$]; $b = .18$, [CI = $.09$, $.30$], respectively); however, it was not observed for low levels of the supervisor sanctions ($b = .04$, [CI = $-.03$, $.13$]). These results partially support hypothesis 6b. We expected that felt-responsibility mediated the indirect effect when supervisor sanctions were *low*. Surprisingly, as it happens in testing hypothesis 5b, the results show that the indirect effect occurs for *high* levels of supervisor sanctions suggesting that TT is less likely to happen when felt-responsibility is low and supervisor sanctions are high.

Table 13. Regression results for conditional indirect effects of supervisors' safety responses on the transfer of safety training at values of supervisor sanctions.

	<i>b</i>	<i>SE</i>	<i>t</i>	LLCI	ULCI
Outcome: Felt-responsibility					
Constant	-1.90***	.18	-10.39	-2.27	-1.54
City council 2	0.60***	.14	4.39	0.33	0.87
City council 3	0.99***	.17	5.78	0.65	1.33
City council 4	0.59**	.18	3.22	0.23	0.95
Supervisors' safety responses	0.33***	.04	8.41	0.25	0.41
Outcome: Transfer of safety training					
Constant	4.52***	.31	14.65	3.91	5.12
City council 2	0.33	.18	1.87	-0.02	0.68
City council 3	0.67**	.23	2.89	0.21	1.12
City council 4	0.13	.22	0.60	-0.31	0.57
Felt-responsibility	0.33***	.09	3.86	0.16	0.50
Supervisors' safety responses	0.14*	.06	2.15	0.01	0.26
Supervisor sanctions	0.01	.05	0.16	-0.09	0.11
Supervisors' safety responses x supervisor sanctions	0.13**	.04	3.00	0.04	0.21
Conditional indirect effects of safety professionals' reactions on transfer of safety training at values of supervisor sanctions ($\pm 1 SD$)					
	Effect	<i>SE</i>	Boot LLCI	Boot ULCI	
Low supervisor sanctions	0.04	.04	-0.03	0.13	
Average supervisor sanctions	0.11	.04	0.05	0.20	
High supervisor sanctions	0.18	.05	0.09	0.30	

Note. $n = 203$ individuals. * $p < .05$, ** $p < .01$, *** $p < .001$. Unstandardized regression coefficients are reported. Bootstrap sample size = 5,000. LLCI = 95% bias-corrected lower limit confidence interval; ULCI = 95% bias-corrected upper limit confidence interval. Significant conditional indirect effects in bold.

Moderating role of supervisor support/sanctions on the indirect effects of co-workers' safety responses

The indirect effect of the co-workers' safety responses on the transfer of safety training through felt-responsibility for transfer was not significantly moderated by the supervisor support ($b = -.07$, [CI = $-.16, .02$], $t_{(195)} = -1.63$, $p = .11$; $F_{(7,195)} = 19.09$, $p < .001$, $R^2 = .41$). These results do not support hypothesis 7a. The indirect effect of the co-workers' safety responses on the transfer of safety training through felt-responsibility for transfer was significantly moderated by the supervisor sanctions ($b = .14$, [CI = $.06, .23$], $t_{(195)} = 3.39$, $p < .001$; $F_{(7,195)} = 13.51$, $p < .001$, $R^2 =$

.33). As the interaction was significant, we analyzed the conditional indirect effects for mean, low (−1 *SD*) and high (+1 *SD*) levels of the supervisor sanctions (Table 14).

Table 14. *Regression results for conditional indirect effects of coworkers' safety responses on transfer of safety training at values of supervisor sanctions*

	<i>b</i>	<i>SE</i>	<i>t</i>	LLCI	ULCI
Outcome: Felt-responsibility					
Constant	−1.77***	.22	−8.08	−2.21	−1.34
City council 2	0.67***	.14	4.61	0.38	0.95
City council 3	1.03***	.18	5.63	0.67	1.39
City council 4	0.83***	.19	4.39	0.46	1.21
Coworkers' safety responses	0.28***	.05	6.21	0.19	0.37
Outcome: Transfer of safety training					
Constant	5.24***	.30	17.45	4.65	5.83
City council 2	0.36*	.18	2.04	0.01	0.72
City council 3	0.65**	.23	2.80	0.19	1.11
City council 4	0.18	.23	0.79	−0.26	0.62
Felt-responsibility	0.41***	.08	4.88	0.25	0.58
Coworkers' safety responses	−0.02	.06	−0.37	−0.14	0.09
Supervisor sanctions	−0.05	.05	−1.07	−0.14	0.04
Coworkers' safety responses x supervisor sanctions	0.14***	.04	3.39	0.06	0.23
Conditional indirect effects of coworkers' safety responses on transfer of safety training at values of supervisor sanctions (± 1 <i>SD</i>)					
	Effect	<i>SE</i>	Boot LLCI	Boot ULCI	
Low supervisor sanctions	0.05	.03	−0.01	0.14	
Average supervisor sanctions	0.12	.03	0.06	0.19	
High supervisor sanctions	0.18	.05	0.09	0.28	

Note. *n* = 203 individuals. * *p* < .05, ** *p* < .01, *** *p* < .001. Unstandardized regression coefficients are reported. Bootstrap sample size = 5,000. LLCI = 95% bias-corrected lower limit confidence interval; ULCI = 95% bias-corrected upper limit confidence interval. Significant conditional indirect effects in bold.

Moderating role of supervisor support/sanctions on the indirect effects of safety professionals' reactions

The indirect effect of the co-workers' safety responses on the transfer of safety training through felt-responsibility for transfer was not significantly moderated by the supervisor support (*b* = −.07, [CI = −.16, .02], *t* = −1.63, *p* = .11; $F_{(7,195)} = 19.09$, *p* < .001, $R^2 = .41$). These results do not support hypothesis 7a. The indirect effect of the co-workers' safety responses on the transfer

of safety training through felt-responsibility for transfer was significantly moderated by the supervisor sanctions ($b = .14$, [CI = .06, .23], $t_{(195)} = 3.39$, $p < .001$; $F_{(7,195)} = 13.51$, $p < .001$, $R^2 = .33$). As the interaction was significant, we analyzed the conditional indirect effects for mean, low ($-1 SD$) and high ($+1 SD$) levels of the supervisor sanctions (Table 15).

Table 15. Regression results for conditional indirect effects of safety professionals' reactions on transfer of safety training at values of supervisor sanctions

	<i>b</i>	<i>SE</i>	<i>t</i>	LLCI	ULCI
Outcome: Felt-responsibility					
Constant	-2.87***	.25	-11.42	-3.37	-2.38
City council 2	0.71***	.13	5.53	0.45	0.96
City council 3	0.95***	0.16	5.79	0.63	1.28
City council 4	0.67***	0.17	3.94	0.34	1.01
Safety professionals' reactions	0.45***	.05	9.82	0.36	0.54
Outcome: Transfer of safety training					
Constant	4.84***	.41	11.82	4.04	5.65
City council 2	0.37*	0.18	2.08	0.02	0.72
City council 3	0.66**	0.23	2.84	0.20	1.12
City council 4	0.19	0.22	0.84	-0.25	0.63
Felt-responsibility	0.37***	.09	3.87	0.18	0.55
Safety professionals' reactions	0.05	.07	0.75	-0.09	0.19
Supervisor sanctions	-0.04	.04	-0.99	-0.13	0.04
Safety professionals' reactions x supervisor sanctions	0.14**	.04	3.30	0.06	0.22
Conditional indirect effects of safety professionals' reactions on transfer of safety training at values of supervisor sanctions ($\pm 1 SD$)					
	Supervisor sanction	Effect	<i>SE</i>	Boot LLCI	Boot ULCI
Low supervisor sanctions		0.06	.05	-0.03	0.18
Average supervisor sanctions		0.16	.04	0.09	0.27
High supervisor sanctions		0.26	.06	0.16	0.39

Note. $n = 203$ individuals. * $p < .05$, *** $p < .001$. Unstandardized regression coefficients are reported. Bootstrap sample size = 5,000. LLCI = 95% bias-corrected lower limit confidence interval; ULCI = 95% bias-corrected upper limit confidence interval. Significant conditional indirect effects in bold.

The indirect and positive effect of the safety professionals' reactions on the transfer of safety training through felt-responsibility for transfer was observed for mean and high levels of the supervisor sanctions ($b = .16$, [CI = .09, .27]; $b = .26$, [CI = .16, .39], respectively); however,

it was not observed for low levels of the supervisor sanctions ($b = .06$, [CI = $-.03$, $.18$]). These results partially support hypothesis 8b. Although we expected that felt-responsibility mediated the indirect effect when supervisor sanctions were low, the results show that the indirect effect occurs for high levels of supervisor sanctions.

5.8 Discussion

This study examined the predictor effect of co-workers and supervisors' safety climates and safety professionals' reactions on the TT, through the mediating role of the employees' felt-responsibility and under the moderator effect of the supervisor support/sanctions to transfer. The results bring major contributions to the existent knowledge on the transfer process for several reasons.

Firstly, the results establish a link between safety professionals' reactions to workers' safety-related behaviors/attitudes and the TT, through the workers' felt-responsibility towards transfer. This is, to the best of our knowledge, the first empirical evidence of what some studies have already suggested, that safety professionals may play an important role in the transfer of safety training due to their proximity to the workplace and their interactions with workers (Freitas & Silva, 2017).

Secondly, we also found support for a positive indirect effect of co-workers and supervisors' safety responses (e.g. Meliá et al., 2008) on the TT, mediated by workers' felt-responsibility for transfer. These results are consistent with the literature that points to co-workers and supervisors' safety responses as being strong sources of influence on the workers' safety-related behaviors and attitudes (e.g. Brondino et al., 2012; Meliá & Sesé, 2007; Zohar & Luria, 2003). The effects of safety climate on safety training effectiveness are known (Burke & Sockbeson, 2016) but only from an organizational perspective, centered on perceptions about managements' commitment to safety. Our study adopted a group analysis, centered on the employees' perceptions about their co-workers and supervisors' safety responses, two safety agents with a less episodic presence in the work environment than management.

To sum up, our findings suggest that safety-related behaviors and attitudes of safety professionals, co-workers and supervisors predict the TT by enhancing the workers' sense of obligation to use the learned safety knowledge/skills on the job. The rationale for such overall effect may be drawn from several theoretical frameworks such as the social learning theory (Bandura, 2001), social information processing (Salancik & Pfeffer, 1976) and social exchange and reciprocity (Blau, 1964; Gouldner, 1960). When workplace players' attitudes and behaviors are consistent with safety values, and when social interactions provide cues emphasizing the importance of safety, the learning is reinforced as well as the employees' personal responsibility

to act accordingly by applying what was learned in safety training. Additionally, positive safety climates and direct concerns with the workers' safety may encourage a sense of obligation to reciprocate through the transfer of safety training.

Thirdly, this study also innovates by empirically testing the role of felt-responsibility in the transfer process. The findings are consistent with the literature that establishes a relationship between social or relational aspects of jobs, including safety-related ones, and the individual's psychological response to his/her work (e.g. Oldham & Hackman, 2010; Hofmann et al, 2003; Turner et al, 2005). In our sample, the sense of personal responsibility towards the transfer seems to explain the employees' efforts regarding the transfer through a direct effect and by mediating the influence of the co-worker's/supervisors' safety responses and safety professionals' reactions on the TT.

The moderator effects on the TT for the interaction between felt-responsibility and the supervisor support and the supervisor sanctions were only significant for the latter, contrary to our expectations. In other words, perceptions of negative responses from the supervisors in the work environment appear to influence the TT by enhancing the individuals' sense of obligation to apply the safety training in the workplace. We consider this result to be most relevant particularly if the trainees have a low sense of felt-responsibility.

A positive relationship between supervisor support and the TT is commonly defended by the transfer literature on the basis of the social exchange theory and the associated notion of reciprocity (e.g. Lancaster et al., 2013; Tian et al, 2016). We were expecting to find the same pattern in our sample. However, our expectations were only partially confirmed. We found positive and significant main effects of supervisor support and the employees' sense of responsibility for transfer confirming the important role supervisors play in stimulating TT. But in our sample supervisor support for transfer did not moderate the the employees' sense of responsibility influence on the TT. Our results are consistent with the ones obtained by the Homklin et al. (2014) study which also involved blue-collar workers: perceptions of the supervisor support did not show moderating effects in the transfer process. The authors suggested that cultural organizational specificities may interfere with the impact of different types of supports on transfer outcomes.

We identified several theoretical frameworks that may provide some insights to the interpretation of the moderation effects, in particular, why the supervisor support appears not to influence the employees' decision to TT.

A first one, regards the type of approaches used by the organizations to foster the employees' adherence to safety regulations, a main goal of fundamental and recognition safety training interventions. Our findings suggest the presence of extrinsically oriented "command-and-control" organizational approaches (e.g. Kapp, 2012; Tyler & Blade, 2005) for promoting safety compliance, an approach supported by more passive transactional safety leadership practices. A second and related line of interpretation, involves the notion of power distance orientation (i.e. "the extent to which a society accepts the fact that power in institutions and organizations is distributed unequally", Holstede, 1980, p.45). Winkler et al. (2014) argued that unskilled and semiskilled workers in Western societies are considered to have more authoritarian values, when compared with more educated workgroups. Consequently, they expect supervisors to be authoritarian, and if a supervisor provides support, for example, through positive feedback, he/she might be viewed as untrustworthy. Overall, the power distance orientation perspective signals that cultural values and beliefs should also be consider in how we read the employees' perceptions of the supervisor's attitudes and behaviors toward safety TT.

Additionally, we may also consider the influence of the participants' characteristics. Blue-collar jobs are mainly routine and physical which facilitates the appreciation or measurement of the outputs' value (e.g. task completion time or according to specific criteria, output quality and quantity) that can be done upon completion of a task (Hopp, Iravani & Liu, 2009). The outputs of the white-collar jobs often have a latent value that complicates its appreciation/measurement, less fast and objective, when compared to blue-collars. Furthermore, supervisors are a frequent presence in blue-collars' daily professional life, for example, to check the tasks schedule, the product quality, and safety regulations. In sum, it is plausible to expect that blue-collar workers respond differently to the supervisor support, as a moderation effect, as a source of appreciation for the use of the newly acquired safety knowledge/skill. Some studies have also suggested that blue-collar workers are less sensitive to a positive safety-related interaction with their supervisors when compared with white-collar workers (Michael et al., 2006).

To explain the moderating effect of the supervisor sanctions on the transfer process we may also recall the transfer study by Bates and Holton (2004) and the fact that 'blue-collar' is a

monolithic term that can aggregate workers with different levels of skills and qualifications (Bochantin & Cowan, 2016). The individuals in our sample were low-qualified with lower-skill jobs. Bates and Holton (2004) found that employees with low levels of basic math/reading skills were more sensitive to supervisor sanctions concerning transfer than to supervisor support (compared to individuals with higher literacy skills). The authors suggested that low-skilled individuals are less able to transfer effectively what they have learned (perhaps because low literacy skills create learning and transfer difficulties) and, in consequence, are more likely to encounter negative responses from supervisors. The moderating effect of the supervisor sanctions on the TT found in our results is perhaps a reflection of the difficulties, and the consequent negative supervisor reactions, experienced by the workers during the transfer process.

Only empirical studies can confirm our reasoning, but we believe that it will be worth examining the moderating effects in the transfer process of supervisor support/sanctions on samples with low and highly qualified individuals further. Low-skilled/low-qualified employees are underrepresented in transfer research and our study contributes to the understanding of how the TT mechanisms function in this population. In a recent literature review on safety training, Burke and Sockbeson (2016) emphasized the need for research to understand the role of demographic variables in the conduct and transfer of safety training. In fact, most of the empirical evidence on the TT has been conducted with employees with higher education and very little has been done from the perspective of low-qualified employees, despite their being the larger segment of the workforce (Muse & Pichler, 2011; Taylor, Ayala, & Pinsent-Johnson, 2009). Some authors suggest that educational level, like other demographic variables, may underlie different responses to the characteristics of transfer systems (e.g. Chen, Holton, & Bates, 2006).

Limitations

A central limitation of the present study is the use of the trainees as a single source to evaluate the TT. It would be informative and perhaps more accurate to triangulate the measurement of the TT with other sources, for example, the supervisor, the co-workers and the safety professionals. A second methodological limitation regards the absence of a learning measure to confront the underlying assumption that low-qualified employees' may experience the transfer process differently due to difficulties in learning and transfer (Bates & Holton, 2004).

We cannot exclude the possibility of a nested effect reflected in the results. The four city councils were included in all the analysis as control variables and we did not find an influence, but we did not control whether the training groups included employees from the same work team. Therefore, this is another study limitation.

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General discussion

The present work intended to enlarge the existent knowledge on the processes that intervene in the transfer of training (TT) to the work context, mainly in one key way: It seek an understanding of the role played by OHS in-house trainers in the transfer process. For this purpose, we revised the literature to capture the existent research-based knowledge on the problematic of TT (Chapter 1), including in the specific field of occupational health and safety (Chapter 2), and to guide us into the design and development of three empirical studies (Chapters 3, 4 and 5), aimed at apprehending different and unknown dimensions of the phenomenon.

The literature review enhanced the importance of safety training enterprise in providing individuals and organizations with the knowledge, skills and attitudes relevant to a safer performance. Due to its' properties, safety training is a common tool in workplace hazard control programs, therefore it is critical to guarantee that it is properly transferred and maintained in the work environment. If not, the provision of safety training may create a false sense of security, exposing workers to unnecessary risks.

General research on TT has accumulated an important body of knowledge over the past thirty years on the factors that influence the process. However, organizations still find it difficult to assure that training is translated into employees' improved performance. Scholars continue to be challenged to reveal new dimensions of relationships to a deeper understanding of the "transfer problem".

Recent proposals for a new TT research agenda states that little is known about "the nature and motives of our trainers" and that their impact is more pronounced than existing transfer research conclusions might suggest (Baldwin, Ford & Blume, 2017, p.3-4). The understanding of how trainers influence training effectiveness is not a recent challenge for research (e.g. Anouli, 1994; Gilleard, 1889). The traditional approach has emphasized the competencies and attributes relevant to training design and delivery neglecting the trainers' direct support to the TT outside the 'transfer design' (Holton, et al, 1997, 2000; Bates, Holton & Hatala, 2012) boundaries. Less explored by research, is the relationship between the trainers' beliefs and the intensity/directions of their efforts toward TT, under the influence of contextual variables. The present thesis responds to these calls, by trying to unveil how a particular type of trainers, the in-house safety trainers, contribute to training effectiveness.

The delivery of safety training to workers is a direct responsibility of OHS professionals who usually perform activities as in-house trainers, and as part of their jobs in organizations (e.g. Hale, 2005, 2006). Despite being an indispensable group of social actors in an OHS systems, OHS professionals have been much excluded from social and organizational (safety) research (Provan & Rae, 2016). The prevailing studies, focused on their education and tasks (sections 2.3.3 and 3.4), confirm safety training as core technical activity that OHS professional develop in organizations, including as in-house safety trainers.

The study of the effects of contextual factors on the (safety) training effectiveness has gathered important evidences on the positive effects of social support on the application of the newly learned (safety) knowledge / skills (e.g. Bell et al, 2017; Blume et al., 2010). Co-workers and supervisors can determine the extent to which new acquired competencies are applied on the job (section 1.2.3). We departed from the theoretical assumption that, as internal resources, OHS professionals are in an organizational position that positively shapes their ability to influence decisions, the company policy, and to understand the organizational context (e.g. Hale, 1995). Such familiarity with the company functioning in the OHS field facilitates the design of contextually appropriate, transfer-friendly programs, based on well-identified safety needs, which are all important factors to the voluntary TT (section 1.2.). Moreover, internal OHS professionals are also able to act as 'transfer agents' (Wong & Lee, 2017) or 'managers of training transfer' (Kopp, 2006): the interactions and alliances they must establish (with supervisors, workers...) for safety purposes (Provan & Rae, 2016) provide opportunities to support the transfer of the training they deliver as in-house safety trainers.

To sum up, as a key player of the work social dimension, and due the nature of their overall role, OHS professionals may contribute to a supportive transfer climate, a strong predictor of TT, along with co-workers and supervisors (section 1.2.3). Our empirical studies gathered evidence that sustain the previous assumption: OHS professionals perceive themselves as a source of support for TT in the work environment (1st study, Chapter 3) and their reactions to workers' safety related behaviors/attitudes are linked to the safety training transference (3rd study, Chapter 5).

Safety literature describes a set of adversities that OHS professionals frequently face in organizations, for example: difficulty in influencing decisions (Olsen, 2012) because they are positioned in the sidelines of the organizations; low or no involvement with senior management

(Brun & Loisel, 2002; Pryor, Hale & Hudson, 2015); and/or with an ambivalent relationship with line-managers (Provan & Rae, 2016). Such circumstances make it less likely for in-house safety trainers to feel encouraged in defining their role in the transfer process outside training design and delivery (the trainers' traditional field) in order to include, for example, post training support in the work environment. Our results support this assertion. For one hand, we found that certain contextual factors (i.e. autonomy, organizational support, safety climate) shape the role OHS professionals are willing to perform in supporting the TT. For another hand, the findings also suggest that the managements' recognition of the importance of safety training have a positive influence in both the safety trainers' sense of responsibility and the amplitude of their efforts toward training success (2nd study, Chapter 4). Therefore, to optimize safety (training) interventions, companies should provide OHS professionals with the proper job resources and send clear messages valuing safety training interventions and its transference to workers' performance.

The lack of systems or mechanisms, as training evaluation, of training accountability (section 1.3.4) in the OHS professionals' organizations emerged in the results of the first empirical study (Chapter 3) and it was not completely unexpected. Authors have already diagnosed the inexistence or the superficiality of the approaches used to verify the real contribution of training to the development of individuals, team and organizations (e.g. Caetano, 2007). Some scholars have even suggested several reasons for this apparent inertia and/or resistance to training evaluation practices. For example, lack of planning or budget, because management is looking for increased performance and not necessarily the increased learning on which trainers usually judge the success of their training, or just because training is done for the wrong reasons (Berge, 2008). Baldwin, Ford and Blume (2017) add another explanation: trainees often manifest (in training evaluations of level 1) favourable attitudes toward the training experience itself but are likely to be less satisfied if attention is shifted to more difficult objectives of transfer. Therefore, if trainers are held accountable for conducting a well-received program, they will have little incentive to focus on or feel accountable for transfer outcomes.

As Frink and Klimosky (2004) enhanced, understanding accountability demands in human resources management strategies is critical to understand the behavioral patterns that are found in training stakeholders. Being held accountable for carrying out a particular task, such as transferring learning (or supporting it) to the workplace, increases the likelihood to engage in prescribed behaviors that enable the adherence to performance expectations (Grossman & Burke-Smalley,

2017). Therefore, in the absence of rules, procedures or goals related to TT, it would be less likely to find trainers or trainees feeling a high sense of obligation and commitment (felt-responsibility) toward training results and to act accordingly.

The concept of felt-responsibility (Hackman & Oldman, 1975, 1976; Oldman & Hackman, 2010) is associated with the process of holding others accountable for work results (Schlenker et al. 1994, 2001), including in the training field, and have never been studied as a source of influence over TT (as far as our knowledge goes) despite some calls for research (Burke & Saks, 2009) (sections 1.3.4, 3.3, 4.3 and 5.4). We found that this internal psychological state acts as a mediator in the relationship between perceptions of contextual variables and the safety trainers' role orientation toward TT, and also between perceptions of contextual variables and the extent trainees use the training in the job. Even in the absence of organizational accountability systems for safety training, some work environmental variables may induce motivational states favourable to the transfer process. In sum, these results highlight the importance of considering interventions that can influence contextual factors that can, in turn, positively influence the TT.

Limitations

Each of the three empirical studies has its one specific limitations, described at the end of the chapters 3, 4 and 5. It is also important, though, to take the overall work and reflect on those aspects that can be considered shared or global limitations.

The “dual safety role” of the participants of the first (Chapter 3) and the second (Chapter 4) studies may be seen as a project limitation. One may question how OHS professionals can respond as in-house safety trainers, as if their central roles in organizations could be compartmentalized away from the latter. However, this is simultaneously a sample characteristic and a study limitation since OHS professionals are inherently in-house safety trainers, especially positioned in organizations to prepare, monitor and reinforce the transfer of the safety training they deliver to workers. The first two studies included methodological procedures, previous to data collection, that intended to identify eventual difficulties or misunderstandings in the interpretation of questions aimed at measuring the trainers' role definition. We could not detect any signs suggesting that separating and interpreting their role as in-house safety trainers was a difficult task for the OHS professionals. However, we must consider as a potential source of bias the influence

of their main role as OHS professionals when reporting their perspectives as in-house safety trainers.

A contextual variable, that may influence the way in-house safety trainers define their role and their feelings of responsibility toward transfer, was not measured: the supervisors' support. It is plausible that supervisors more or less collaborative or sensitive to safety-related issues may influence the trainers' sense of responsibility regarding training results and how they define their role in the transfer process. Additionally, one may also argue that trainers' actions in assisting TT in the work context duplicate the efforts of first-line manager or supervisors, especially in the post training. Supervisors are a recognized transfer predictor (section 1.3.3), that affect the transfer process in ways already identified and well described in literature (e.g. Govaerts & Dochy, 2014; Chauhan et al., 2017). The role of in-house safety trainers in supporting the TT in the work context does not overlap or substitute the support provided by supervisors (or even coworkers), rather, it is complementary.

We explored the safety trainers' role in the TT by putting a special emphasis in the pre and, mostly, in the post training and such focus may be pointed as a study limitation. In fact, research already acknowledged the influence of design and delivery decisions in the TT (sections 1.3.3). Most of the existent knowledge about the factors that affect safety training effectiveness was produced by studies that have given a special attention to training methods and techniques (section 2.3.1), and its level of engagement, as a source of predictive effects over TT. The influence of contextual variables has been much less explored or it is approached as a source of moderating effects (section 2.3.2). In this thesis, we addressed the work context as another potential area of influence of the (in-house safety) trainer, but without underestimating the value and importance of their actions within the 'transfer design' (Holton et al., 1997, 2000).

None of our empirical studies confronted the trainers' actions toward TT with the extent of the use in the job of what trainees have learned in safety training. Such combination was foreseen in the initial version of the overall research project. However, feasibility issues led us to re-evaluate and redesign the studies in order to respond the main research purpose. Further studies should try to pursue the initial idea and gathered more evidence of how and under what conditions OHS professionals/in-house safety trainers promote the transfer of the safety training.

Implications for research and practice

The present thesis presents several implications both for research and practice. OHS professionals' presence in work environments is not a constant variable but a fluctuating one, yet it seems to function as a critical element in the workers' performance and post-training behaviors. We believe that the results of the first empirical study point to a wide avenue of research aimed at understanding how and under what circumstances OHS professionals, who develop safety training activities as part of their activities in organizations, can exert their influence on the effectiveness of safety training. The results describe their monitoring visits to the workplace as not being guided by objectives of transfer support, although having a positive effect on workers' behaviors. This information strongly suggests that the OHS professional exert a "trigger effect" in the TT that can be optimized if developed in an oriented and structured way. Further research should explore under what conditions these professionals' reactions to workers' behaviors are more successful in terms of training effectiveness, using experimental or quasi-experimental designs.

Another potential field for further empirical studies regards the influence of felt-responsibility on TT. The results of the second and third studies (Chapter 4 and Chapter 5) suggest that felt-responsibility for transfer may influence the transfer process, at least, in two ways: By interfering in the trainers' role orientation toward the support of TT; by acting as a full mediator in the transfer process, between the employees' perceptions of the work environment and the TT. In addition to understand more deeply these last effects, it may be worthwhile to examine the influence of felt-responsibility in a third stakeholder actions and attitudes toward TT, the supervisors.

Recent proposals for a future transfer research agenda (Ford, Baldwin, & Prasad, 2017) already signaled as a topic of interest the multidimensionality of the workplace support, including the supervisor support. Our third empirical study (Chapter 5) suggest that the complexity of the supervisor support is probably much larger when it comes to low-qualified trainees. Based on literature, we assumed that when returning to the workplace the trainees would feel compelled to display more behavior changes if they received stronger support and lower sanctions from the supervisors. However, the effects from the supervisors' attitudes and behaviors toward TT were not as clear cut as we expected (i.e. the moderating properties of supervisor support were not

confirmed, only its' direct influence on the TT; and the supervisor sanctions influenced as a moderator the effect of the employees' sense of obligation in the TT).

Despite being the major part of the workforce, low-qualified employees are much underrepresented in the transfer studies which have privileged so far samples with higher educated individuals. We propose that future research should closer examine how the transfer of (safety) training happens with low-qualified employees since some few studies, including ours, point to differences in the process that may impact in the effectiveness of the (safety) training intervention.

The OHS professionals involved in first empirical study were not familiarized with the problematic of TT and interpreted their role as trainers as limited to training design and deliver activities. Since almost all the participants are certified safety trainers, the results suggest that certification programs underestimate or neglect the results of research on TT and need to be updated. Educational undertakings (vocational and higher educational OHS courses) should inform and prepare practitioners/professionals to foster the transfer of the safety training they organize and delivery to employees as part of their overall activity in organizations. Trainers' role should be expanded, in a theoretical and in a practical sense, so they will be able to foster training success outside the boundaries of training design and delivery.

The results, in particularly those from the third study (Chapter 5), have also implications for the design and evaluation of safety training programs, especially if delivered by safety professionals. The findings highlight the importance of these players in the transfer of safety training by revealing the indirect influence of safety professionals' responses through the trainees' sense of responsibility for using the learned safety knowledge and safety skills in the job. In their interactions with the employees for safety purposes, safety professionals can encourage the willingness and sense of responsibility to (properly) use the safety knowledge/skills acquired in training. It is a role coherent with the formal mandate that safety professionals have, to promote a safe environment in organizations (e.g. Hale and colleagues, 1995, 2005).

Although, companies must empower safety trainers so to enhance their control over the transference process. Our work also indicates that it is important for companies to have the knowledge of the factors that influence the way trainers construct their role in the TT because it

may help to predict their efforts concerning the success of safety training interventions. Additionally, if management sends clear messages recognizing the importance of safety training it will stimulate the trainers' sense of responsibility and the kind of effort they are willing to make to foster training effectiveness. The occurrence of the desirable safety agents' behaviors will be more likely if in a presence of a positive organizational safety climate. Therefore, it is essential that management (top and middle) communicate in a clear way their strong support to safety and reveal their commitment with the organizational safety policy and practices.

As internal resources, safety professionals are in a pivotal position to promote a favorable transfer climate. Their efforts toward a safe work environment should include the awareness of supervisors for their influence in the safety training success (as in the overall employees' safety performance) including as role models. By contributing to a supportive transfer climate, supervisors will also help in the internalization of safety values and in the development of self-regulated forms of safety compliance behaviors. Our findings showed the various relevant roles supervisors may play in the different moments of the transfer process. Before training (T1), their attitudes and actions toward safety showed to influence both directly and indirectly the safety TT. After training (T2), we detected a main effect of the supervisors' encouraging attitudes/behaviors toward TT suggesting another positive influence in the training success. Additionally, supervisors' negative attitudes/actions (i.e. sanctions) toward TT in the workplace (T2) were found to influence the effect of the employee's sense of responsibility in the transfer process.

In sum, as key players in the organizational safety system, supervisors are natural partners in the activities aimed to promote safety in the workplace. As such, given their strong influence in the transfer of safety training, efforts should be made to assure that (1) they feel committed and engaged in supporting safety (2) and they know how to properly perform such role. One way to improve supervisors' approach to safety (training transfer) could be, for example, through training interventions that could also be aimed to improve safety leadership behaviors. There are evidences that an active transactional leadership (with positive and constructive safety monitoring and corrective actions) is most effective in promoting the employees' safety compliance (Clarke, 2013), one of the main goals of safety training. Naturally, supervisors and employees will benefit from a diversified range of leadership behaviors able to foster more proactive safety behaviors. Supervisors will likely be more stimulated to adopt positive attitudes and behaviors toward the safety TT, if involved in the decisions concerning the transfer design. For example, they can

participate in the tailoring of the training interventions, and in the identification of opportunities to foster the desirable safety-related behaviors.

Felt-responsibility was found to play both a direct and a mediating role in the transfer process. These findings suggest that TT may be positively enhanced through interventions aimed to foster the individuals' sense of responsibility for applying safety training in their work. For example, pre-training meetings between supervisors, safety professionals and trainees: to establish specific measurable goals for transfer the safety training; and to clarify the link between transfer expectations and how trainees perceive their jobs' obligations.

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Conclusions

Over the last three decades an impressive amount of knowledge about the transfer of training (TT) has been gathered by research. However, organizations still find difficult to assure a direct link between training efforts and the organizations, teams and individuals' performance, suggesting that the process has not yet been fully understood. Scholars seem to agree that there is still much more to learn about the TT (e.g. Baldwin et al, 2017; Saks, Salas & Lewis, 2014). This thesis contributes to the existing knowledge by revealing the role played by OHS professionals in the transfer of the safety training they prepare and deliver to workers as in-house safety trainers and as part of their jobs in organizations. For that purpose, we built a theoretical framework described in two chapters that emphasize the complexity of the TT concept and the relevance of its investigation, and focus the practices and factors that determine the training translation to the workers' performance, especially in the field of occupational health and safety. The literature review guided us into the formulation of research questions and the development of three empirical studies.

The study "Exploring OHS trainers' role in the transfer of safety training" (Chapter 3) examines OHS professionals' practices and influence, as in-house trainers, on safety training success, a common undertaking to protect workers from hazards in the workplace. Through a qualitative methodological approach, the study intended to identify the perspectives of in-house safety trainers on both best practices in fostering the TT and their role in the process. This first study allowed us to understand how trainers experience the transference process, their views about what role should they have in the process as well as their opinions of the organizational factors that facilitate or inhibit the support they give to TT. The study results, regarding the best practices on supporting TT, emphasized: The trainers' qualities and training frequency-length as factors related to training design and delivery and yet unexplored in the general literature on transfer; the OHS' professionals' support in the workplace, helping trainees apply the learned safety knowledge and skills. Most participants established a clear division between their roles as trainers and OHS professionals, regarding training issues. The trainer's' role is perceived to include only design and development activities, and none related to the level of the work environment.

Though unaware of safety TT issues, at least from a theoretical point of view, the perceptions of our OHS professionals were very close to the literature models and guidelines. This suggests

that the effectiveness of the safety training they prepare and deliver would be much enhanced if sustained by a technical domain of the transfer predictors, based on research results. The trainers also expressed a perceived restricted sense of control (suggesting low self-efficacy) over transfer, centred only on decisions relating to design and delivery.

Most of our participants reported the absence of mechanisms of training accountability (e.g. training evaluation) in their work organizations leading us to expect that in such contexts support for TT is lower as well as the in-house safety trainers' feelings of responsibility for transfer. However, a feeling of personal responsibility concerning training results was stated. This apparent contradiction was explained in the light of the participants' role as OHS professionals: training is used to obtain gains in safety, a mission that defines these practitioners' global performance in organizations. If safety training fails its purpose, it jeopardizes the main objective.

The correlational study "Predictors of safety training transfer support as in-role behaviours of OHS professionals" (Chapter 4), intended to understand to what extent in-house safety trainers consider the support of TT to be in-role. Departing from the role theory framework, we considered that in-house safety trainers, although with similar jobs, define their role in supporting the transfer process differently, which in turn will influence their efforts and actions toward safety training success. We examined if their perspectives were affected by both contextual (i.e. job autonomy, job resources, organizational support, safety climate) and individual influences (i.e. felt-responsibility for transfer).

The results highlight the importance of the effect of job resources on individuals' definition of their role in the TT, through the mediating influence of felt-responsibility. This is consistent with what JCT and JD-R models anticipates, respectively, that job characteristics and job resources initiate a motivational process that increases the likelihood of personal outcomes and work engagement (Oldham & Hackman, 2010; Schaufeli & Taris, 2014). Our findings also suggest that in-house safety trainers who perceive more discretion and support in their occupation will be more motivated, both intrinsically and extrinsically, to assure training effectiveness and, therefore, perceive their role in supporting the transfer process more extensively. We also found that, in our sample, the perceived importance of the company's safety training moderates the influence of job resources over both felt-responsibility and role orientation toward the TT. This means that when in-house trainers perceived safety training as adequate and a priority for the organization, the

negative effects of adverse job characteristics, such as lack of autonomy and organizational support, seem to be attenuated.

The third empirical study, entitled “The roles of coworkers, supervisors, OHS professionals and felt-responsibility in safety training transfer” (Chapter 5), investigated the influence of in-house safety trainers in the TT as an element of the work environment, along with the influence of other safety players, the coworkers and the supervisors. We examined, in a sample of low-qualified city council employees, to what extent safety professionals’ (all in-house safety trainers) reactions to workers’ safety-related behaviors and attitudes in the work context affects TT, through the trainees’ felt-responsibility for transfer and under the moderating influence of supervisors’ support and sanctions. Our results suggest that by the end of the training intervention, employees’ felt-responsibility was stimulated by the safety players’ behaviours and attitudes toward safety. Three months later, we verified that the transfer process was moderated by supervisor sanctions but not by perceptions of the supervisor support. These last results were unexpected since supervisors are a confirmed and important source of support in the TT (section 1.3.3), also accountable for the subordinates’ safety behavior (e.g. Zohar & Luria, 2013) which may represent an additional source of motivation for supporting the transfer of the learned safety knowledge/skills to job.

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Annex A. Interview Schedule - “Exploring OHS trainers’ role in the transfer of training
(1st empirical study)

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Temas	Objetivos	Exemplos de perguntas	Observações
Legitimação da entrevista e motivação do entrevistado	Reforçar explicação sobre objetivos da entrevista; Motivar o entrevistado. Agradecer colaboração. Informar sobre anonimato da entrevista e confidencialidade das informações.		<ul style="list-style-type: none"> Solicitar o preenchimento da ficha de caracterização geral do entrevistado
A) Papéis e atividades na área da Formação	Identificar: <ul style="list-style-type: none"> Papéis que desempenha na área da formação Atividades desenvolvidas no âmbito de cada papel, em particular, como formador 	<ul style="list-style-type: none"> Como é que chegou até esta organização? Gostaria que me falasse um pouco sobre o seu percurso, só para ficar a conhecê-lo(a) um pouco melhor... E na área da formação que atividades tem desenvolvido no decurso da sua experiência como profissional de SST? Como é ser formador de SST numa [tipo de organização]? Quer descrever-me o seu trabalho, as suas tarefas/ atividades? Não estou muito familiarizado com a formação em SST numa organização deste tipo... 	<ul style="list-style-type: none"> Pedir para concretizar, exemplos
B) Boas práticas de apoio à transferência	Inquirir sobre: <ul style="list-style-type: none"> Fatores que influenciem a transferência e eficácia da formação; Estratégias a desenvolver para promover a transferência da formação, antes, durante e após as iniciativas; Outros atores envolvidos nas boas práticas de apoio à transferência. 	<ul style="list-style-type: none"> Na prática, como vê a transferência da formação para o local de trabalho pelos formandos? Acontece, não acontece, depende e, nesse caso, de quê e porquê? Com base na sua experiência como formador em SST, que aspetos lhe parecem influenciar mais a transferência da formação? Em geral e aqui na sua organização? Porquê? Ainda com base na sua experiência, se lhe pedissem conselhos sobre como estimular a transferência da formação em SST o que diria? Há outros intervenientes no processo que contribuem para o maior ou menor sucesso da formação? Quem? E porquê? 	<ul style="list-style-type: none"> Pedir para concretizar, exemplos Situar sugestões no tempo: <i>antes, durante e após</i> a formação
C) Responsabilidades	Indagar:	<ul style="list-style-type: none"> Como vê a responsabilidade do formador para ajudar os formandos a aplicar o que aprenderam no local de trabalho? 	

no apoio à transferência	<ul style="list-style-type: none"> - Perceção sobre responsabilidades no sucesso da formação; - Enquadramento formal da formação 	<p>Porquê? Acha que os outros (chefias, colegas, formandos) têm o mesmo entendimento?</p> <ul style="list-style-type: none"> • Qual a política desta organização no que toca à formação? • Há regulamentos, procedimentos ...? Se sim, incluem procedimentos específicos sobre transferência/avaliação eficácia da formação? • Sente que a organização (ex: a gestão, os trabalhadores, as chefias) o responsabiliza, de alguma maneira, pela eficácia da formação que dá? Porquê? 	<ul style="list-style-type: none"> • Se existirem, pedir para consultar documentos
D) Auto-eficácia sobre a transferência	<ul style="list-style-type: none"> - Averiguar perceção quanto ao seu grau de controlo face ao sucesso da formação 	<ul style="list-style-type: none"> • Na prática, consegue influenciar a utilização efetiva que os formandos fazem daquilo que aprenderam na formação? Explique. 	<ul style="list-style-type: none"> • Pedir para ilustrar com situações concretas
E) Afirmações sobre o papel do formador no processo de transferência	<ul style="list-style-type: none"> - Obter um resumo das perspetivas dos participantes sobre diferentes afirmações (baseadas nos 3 itens propostos por Burke and Saks (2009) para medir os sentidos de responsabilidade e auto-eficácia) relativamente à transferência. 	<p>Os itens que se seguem vão ser usados num inquérito a profissionais de SST. Vou pedir-lhe que responda a cada um e que vá explicitando em voz alta o seu raciocínio:</p> <ul style="list-style-type: none"> - “Esta organização espera que os formadores ajudem os formandos a aplicar no trabalho o que aprenderam na formação”; - “Como formador, é minha responsabilidade assegurar que os formandos aplicam no trabalho o que aprenderam na formação”; - “Tenho algum grau de controlo sobre a aplicação pelos formandos no local de trabalho do que aprenderam na formação” (Escala: 1- Discordo totalmente; 5 – Concordo totalmente) 	<ul style="list-style-type: none"> • Entregar ao entrevistado folha com itens
F) Encerramento da entrevista	<p>Agradecer disponibilidade. Proporcionar oportunidade para completar o que disse atrás. Disponibilizar resultados do estudo, uma vez terminado; também a gravação, se solicitado.</p>	<ul style="list-style-type: none"> • Falamos de muitos assuntos, há algum aspeto importante que não tenha sido abordado ou que queira aprofundar mais? 	

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Annex B. Questionnaire 1 - “Predictors of safety training transfer support as in-role behavior of OHS trainers (2nd empirical study)

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Inquérito

O questionário seguinte enquadra-se num estudo de investigação de um programa doutoral sobre as **dinâmicas da formação em saúde e segurança no trabalho nas organizações portuguesas**.

O inquérito é dirigido a **profissionais de Saúde e Segurança no Trabalho (SST)** que, no âmbito das suas funções, exercem atividades como formadores internos. Visa conhecer as suas opiniões sobre o papel e a atuação dos profissionais de SST na formação dos trabalhadores.

O preenchimento demora cerca de **5 minutos**. **Não existem respostas certas ou erradas**. Responda, por favor, com o máximo de **sinceridade** e **espontaneidade** possível, descrevendo **aquilo que geralmente acontece** e não aquilo que gostaria que acontecesse. O questionário é **anónimo** e confidencial.

Antecipadamente agradecida,

A equipa de investigação,

Lisboa, 2016

Seção 1

Nesta primeira seção, pretendemos compreender a **sua intervenção formativa**, no âmbito das suas funções como profissional de Saúde e Segurança no Trabalho (SST). **Não existem respostas certas ou erradas**. Responda, por favor, descrevendo **aquilo que geralmente acontece** e não aquilo que gostaria que acontecesse.

Para cada afirmação, indique a sua opinião de acordo com a seguinte escala:

Nunca acontece	Quase nunca	Acontece pouco	Às vezes acontece	Acontece muito	Quase sempre	Acontece sempre
1	2	3	4	5	6	7

e tenha em conta que Correto ● Incorreto ✓ ✗ /.

1. Sinto que devo ser pessoalmente responsabilizado(a) pelos resultados da formação que dou meu trabalho. 1 2 3 4 5 6 7

2. Sinto um elevado grau de responsabilidade pela formação que dou, no âmbito do meu trabalho. 1 2 3 4 5 6 7

“Como **formador interno**, faz parte das minhas funções:

3. Preparar a formação de modo a facilitar a aplicação das aprendizagens no posto de trabalho. 1 2 3 4 5 6 7

4. Assegurar um compromisso entre os intervenientes (formandos, formador e chefias) para a aplicação da formação no posto de trabalho. 1 2 3 4 5 6 7

5. Acompanhar os formandos após a formação, ajudando-os a aplicar o que aprenderam no trabalho 1 2 3 4 5 6 7

6. Avaliar a aplicação da formação nos postos de trabalho em diferentes períodos de tempo a seguir à formação e apresentar os resultados às chefias, incluindo de topo. 1 2 3 4 5 6 7

Seção 2

Aqui inquirimos a sua opinião quanto às **condições de que dispõe** na sua organização para fazer o seu trabalho. **Não existem respostas certas ou erradas.** Responda, por favor, descrevendo **aquilo que geralmente acontece** e não aquilo que gostaria que acontecesse.

Para cada afirmação, indique a sua opinião de acordo com a escala seguinte:

Nunca acontece	Quase nunca	Acontece pouco	Às vezes acontece	Acontece muito	Quase sempre	Acontece sempre
①	②	③	④	⑤	⑥	⑦

e tenha em conta que Correto ● Incorreto ✓ ✗ ①.

-
1. Tenho a possibilidade de decidir como organizar o meu trabalho. ① ② ③ ④ ⑤ ⑥ ⑦
 2. Tenho acesso à informação de que necessito para fazer bem o meu trabalho. ① ② ③ ④ ⑤ ⑥ ⑦
 3. Tenho acesso aos recursos de que necessito para fazer bem o meu trabalho. ① ② ③ ④ ⑤ ⑥ ⑦
 4. O meu trabalho permite-me tomar decisões por mim próprio(a). ① ② ③ ④ ⑤ ⑥ ⑦
 5. A minha organização preocupa-se com o meu bem-estar. ① ② ③ ④ ⑤ ⑥ ⑦
 6. Na minha organização existe uma adequada formação em segurança. ① ② ③ ④ ⑤ ⑥ ⑦
 7. Conheço as estratégias e os objetivos da minha organização ① ② ③ ④ ⑤ ⑥ ⑦
 8. A minha organização tem em conta as minhas opiniões. ① ② ③ ④ ⑤ ⑥ ⑦
 9. Geralmente, obtenho os recursos adicionais de que necessito. ① ② ③ ④ ⑤ ⑥ ⑦
 10. Na minha organização, a formação em segurança é feita regularmente. ① ② ③ ④ ⑤ ⑥ ⑦
-

Seção 3

Por último, as respostas às seguintes questões irão ajudar-nos a **caracterizar os sujeitos do estudo**. Assinale, por favor, no item que corresponde à sua situação.

1. Sexo:

- Feminino
- Masculino

2. Idade:

- de 21 anos
- 22 - 35 anos
- 36 - 49 anos
- 50 - 63 anos
- + de 64 anos

3. Tempo de experiência profissional como Técnico (Superior) de SST

- até 5 anos
- 06 - 15
- 16 - 25
- 26 - 35
- + de 36 anos

4. Formação em Saúde e Segurança no Trabalho (indique a última):

- Curso Técnico-Profissional
- Pós-graduação
- Licenciatura
- Mestrado
- Doutoramento
- Outra. Qual?

4. Funções atuais:

- Técnico(a) superior
 - Administração
 - Direção
 -
- Chefia intermédia
 - Outra. Qual?
-

Termina aqui o seu questionário.

Muito obrigado pela sua colaboração!

Caso pretenda contactar-nos, utilize o seguinte endereço: accfs1@iscte-iul.pt

Annex C. Questionnaire 2 - “The roles of coworkers, supervisors, safety professionals, and felt-responsibility for safety training transfer (3rd empirical study – Time 1)

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Inquérito

O ISCTE-IUL está a realizar um estudo sobre Formação **em Saúde e Segurança no Trabalho (SST)** em organizações portuguesas. A sua opinião é muito importante para o sucesso deste estudo.

Responda, por favor, com o máximo de **sinceridade** possível. **Não existem respostas certas ou erradas**. Descreva **aquilo que geralmente acontece** e não aquilo que gostaria que acontecesse. O questionário é **anónimo**.

Antecipadamente agradecida,

A Equipa de Investigação,

Lisboa, 2017

Seção 1

Seguem-se várias afirmações. Indique a sua opinião sobre cada uma de acordo com a seguinte escala:

Discordo totalmente	Discordo	Discordo em parte	Não discordo nem concordo	Concordo em parte	Concordo	Concordo totalmente
①	②	③	④	⑤	⑥	⑦

Atenção! **Não existem respostas certas ou erradas.** Diga **aquilo que geralmente acontece e não o que gostaria que acontecesse.**

-
- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| 1. A minha chefia preocupa-se em fornecer aos trabalhadores o equipamento de segurança necessário. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 2. A maioria dos meus colegas sente-se muito responsável por aplicar no trabalho o que aprendeu na formação. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 3. O técnico de segurança fala com os trabalhadores sobre como melhorar a segurança. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 4. Sinto um elevado grau de responsabilidade por aplicar no meu trabalho aquilo que aprendi na formação. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 5. Os meus colegas ajudam-se uns aos outros a trabalhar com segurança. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 6. O técnico de segurança ajuda-nos sempre a trabalhar com segurança. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 7. A minha chefia controla se todos os trabalhadores cumprem as regras de segurança. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 8. O técnico de segurança preocupa-se com a segurança dos trabalhadores. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 9. Os meus colegas ajudam na segurança uns dos outros, mesmo quando têm muito trabalho. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 10. A minha chefia preocupa-se com todas as regras de segurança. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 11. Sinto que devo ser pessoalmente responsabilizado por aplicar no meu trabalho o que aprendi na formação. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 12. Os meus colegas preocupam-se com a segurança uns dos outros. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
-

Seção 2

As questões seguintes irão ajudar-nos a descrever quem participou no estudo. Em cada pergunta, assinale a resposta que corresponde à sua situação

1. **Género?**

- Feminino
 Masculino
Outro

2. **Idade?**

_____ anos

3. **Tempo de serviço na atual organização?**

_____ anos

4. **Vínculo profissional?**

- Trabalhador independente (recibo verde)
 Contrato sem termo (efetivo)
 Contrato a termo incerto
 Contrato a termo certo
 Outro. Qual? _____

5. **Escolaridade?**

- até ao 4º ano
 6º ano
 9º ano
 12º ano
 Licenciatura
 Outro. Qual? _____

6. **As duas primeiras letras da cidade/vila onde nasceu?**

1ª letra: _____

2ª letra: _____

7. **Os dois primeiros números do código-postal da sua atual morada?**

1º número: _____

2º número: _____

Termina aqui o seu questionário.
Muito obrigado pela sua colaboração

Caso pretenda contactar-nos, utilize o seguinte endereço: accfs1@iscte-iul.pt

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Annex D. Questionnaire 3 - “The roles of coworkers, supervisors, safety professionals, and felt-responsibility for safety training transfer (3rd empirical study – Time 2)

Inquérito

Estamos na segunda fase do projeto “**Dinâmicas da Formação em Saúde e Segurança no Trabalho nas Organizações Portuguesas**” e vimos perguntar novamente a sua opinião.

Responda, por favor, com o máximo de **sinceridade** possível. **Não existem respostas certas ou erradas**. Descreva **aquilo que geralmente acontece** e não aquilo que gostaria que acontecesse. O questionário é **anónimo**.

Antecipadamente agradecida,

A Equipa de Investigação,

Lisboa, 2017

Seção 1

Seguem-se várias afirmações. Indique a sua opinião sobre cada uma, de acordo com a seguinte escala:

Discordo totalmente	Discordo	Discordo em parte	Não discordo nem concordo	Concordo em parte	Concordo	Concordo totalmente
①	②	③	④	⑤	⑥	⑦

Atenção! **Não existem respostas certas ou erradas.** Diga **aquilo que geralmente acontece e não o que gostaria que acontecesse.**

-
1. A minha chefia ajuda-me a aplicar o que aprendi na formação. ① ② ③ ④ ⑤ ⑥ ⑦
2. Aquilo que aprendi na formação tem-me ajudado no meu trabalho. ① ② ③ ④ ⑤ ⑥ ⑦
3. A minha chefia não gostará se eu fizer as coisas como aprendi na formação. ① ② ③ ④ ⑤ ⑥ ⑦
4. A minha chefia mostra interesse sobre o que eu aprendi na formação. ① ② ③ ④ ⑤ ⑥ ⑦
5. A minha chefia não gostará se eu fizer as coisas como aprendi na formação. ① ② ③ ④ ⑤ ⑥ ⑦
6. Tenho aplicado aquilo que aprendi na formação para melhorar o meu trabalho. ① ② ③ ④ ⑤ ⑥ ⑦
7. A minha chefia diz-me que estou a fazer um bom trabalho quando utilizo o que aprendi na formação. ① ② ③ ④ ⑤ ⑥ ⑦
8. A minha chefia pensa que sou pouco eficaz quando uso no meu trabalho o que aprendi na formação. ① ② ③ ④ ⑤ ⑥ ⑦
-

Seção 2

As questões seguintes irão ajudar-nos a **descrever** quem participou na 2ª fase deste estudo.

9. **As duas primeiras letras da cidade/vila onde nasceu?**

1ª letra: _____

2ª letra: _____

10. **Os dois primeiros números do código-postal da sua atual morada?**

1º número: _____

2º número: _____

Termina aqui o seu questionário. Muito obrigado pela sua colaboração!