



Revista de Psicología del Trabajo y de las Organizaciones

ISSN: 1576-5962

ISSN: 2174-0534

Colegio Oficial de Psicólogos de Madrid

Martins, L. B.; Zerbini, Thaís; Medina, Francisco J.  
Impact of Online Training on Behavioral Transfer and Job Performance in a Large Organization  
Revista de Psicología del Trabajo y de las Organizaciones, vol. 35, no. 1, 2019, pp. 27-37  
Colegio Oficial de Psicólogos de Madrid

DOI: <https://doi.org/10.5093/jwop2019a4>

Available in: <http://www.redalyc.org/articulo.oa?id=231360290004>

- How to cite
- Complete issue
- More information about this article
- Journal's webpage in redalyc.org

redalyc.org

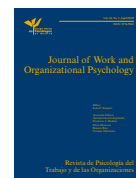
Scientific Information System Redalyc  
Network of Scientific Journals from Latin America and the Caribbean, Spain and  
Portugal

Project academic non-profit, developed under the open access initiative



# Journal of Work and Organizational Psychology

<https://journals.copmadrid.org/jwop>



## Impact of Online Training on Behavioral Transfer and Job Performance in a Large Organization

L. B. Martins<sup>a</sup>, Thaís Zerbini<sup>b</sup>, and Francisco J. Medina<sup>c</sup>

<sup>a</sup>IMED, Vila Rodrigues, Passo Fundo, RS, Brazil; <sup>b</sup>University of Sao Paulo, Brazil; <sup>c</sup>University of Seville, Spain

### ARTICLE INFO

#### Article history:

Received 21 November 2018

Accepted 23 January 2019

#### Keywords:

Effectiveness  
Training transfer  
Learning strategies  
Reactions  
Support of transfer  
Barriers

### ABSTRACT

This study analyzes the effectiveness of online training in a large organization. We tested the influence of different training processes, such as learning strategies, reactions, support of transfer, and barriers, on behavioral transfer and job performance. The participants were 3,600 employees of a Brazilian public bank after taking part in online training at work. Six months later, their supervisors evaluated the influences of the training on their subordinates' work behaviors. Findings indicated that in self-evaluation behavioral transfer was predicted by elaboration/practical application learning strategies, trainees' reactions to training, organizational, and peer support; motivation control, cognitive/help-seeking, and elaboration/practical application learning strategies, along with trainees' reactions to training, were significantly related to job performance. In hetero-evaluation, supervisor support contributed to explaining behavioral transfer, and cognitive/help-seeking strategies explained job performance. The mediating role of reactions to training was identified, and support of transfer showed marginal moderating effects.

### El impacto de la formación en línea en la transferencia de comportamiento y en el desempeño laboral en una gran organización

### RESUMEN

Este estudio analiza la efectividad de la formación en línea en una gran organización. Se ha probado la influencia de diferentes procesos de la formación, como las estrategias de aprendizaje, las reacciones, el apoyo a la transferencia y las barreras, en la transferencia del comportamiento y el desempeño laboral. Los participantes fueron 3,600 empleados de un banco público brasileño que participaron en una formación en línea en el trabajo. Seis meses después, sus supervisores evaluaron las influencias de la formación en el comportamiento laboral de sus subordinados. Los hallazgos indicaron que en la autoevaluación la transferencia del comportamiento se predijo mediante estrategias de aprendizaje de elaboración/aplicación práctica, reacciones a la formación, apoyo organizacional y de pares; las estrategias de control de la motivación, cognitivas/búsqueda de ayuda y elaboración/aplicación práctica, junto con las reacciones a la formación, se relacionaron significativamente con el desempeño laboral. En la heteroevaluación, el apoyo del supervisor contribuyó a explicar la transferencia del comportamiento y las estrategias cognitivas/búsqueda de ayuda explicaron el desempeño laboral. Se identificó el papel mediador de las reacciones a la formación y el apoyo a la transferencia mostró efectos moderadores marginales.

Training and development programs are strategic in organizations, as they offer the opportunity to promote and consolidate technical and behavioral skills of employees, improving their performance at work (Grossman & Salas, 2011; Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2012). Regarding these benefits, allied with the widespread technologies and cost reduction, organizations more often consider distance learning to be a viable alternative for offering their training to employees (Bedwell & Salas, 2010).

Since online training has become generalized in both organizational and training fields, using platforms such as Coursera or Edx, specific

studies that contribute to the investigation of the acquisition and transfer of skills in this type of training should be conducted (Salas et al., 2012). This paper contributes to training literature by analyzing online training in a large corporate context and its impact on workers' performance, considering mediation and moderation mechanisms.

Although e-learning become a dominant method of delivering training in work environments (DeRouin, Fritzsche, & Salas, 2005), virtual instructional resources do not guarantee learning itself. Online learning environments present particularities that must be identified to allow proposals for more effective interventions. Some of these

Cite this article as: Martins, L. B., Zerbini, T., & Medina, F. J. (2019). Impact of online training on behavioral transfer and job performance in a large organization. *Journal of Work and Organizational Psychology*, 35, 27-37. <https://doi.org/10.5093/jwop2019a4>

Funding: The research was partially funded by "Coordenação de Aperfeiçoamento de Pessoal de Nível Superior" (CAPES/Brazil) and the Spanish Ministry of Economy and Competitiveness (MINECO/FEDER), grant reference n. PSI2015-64894-P. Correspondence: [lara\\_bmartins@hotmail.com](mailto:lara_bmartins@hotmail.com) (L. Barros-Martins).

ISSN: 1576-5962/© 2019 Colegio Oficial de Psicólogos de Madrid. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

particularities may be more flexible methods that require better control of time, space, and rhythm from trainees (Döös & Wilhelmson, 2011). Furthermore, these characteristics might require from them greater motivation to persist in the course and different learning skills from what are required in face-to-face training, in order to adjust and reconcile studies with other activities, either professional or personal, which will help trainees to transfer successfully when they return to the workplace.

Compared to traditional forms of educational events, online training permits many employees, dispersed by geographical or occupational conditions, to take part in a training program simultaneously (Abbad, Côrrea, & Meneses, 2010; Bell, Tannenbaum, Ford, Noe, & Kraiger, 2017; Noe, Clarke, & Klein, 2014). It provides more independent, flexible, and collaborative learning (Badia & Monereo, 2010), and can be undertaken in the workplace (video conferencing, Internet, or Intranet). Moreover, it fulfills the motivations, expectations, and approaches to learning of a new generation that is active in the job market, widely familiarized with the web (Garrison & Vaughan, 2008).

Throughout the following pages, we will analyze the different processes and mechanisms that predict the effectiveness of training, focusing essentially on the context of distance training.

### E-Learning in Organizations

Online courses for training purposes in organizations have been largely spread with accompanying cybernetic innovations, available interaction tools, and digital media (Raymond, Clarke, & Klein, 2014). These instructional events are suitable for adults to attend in the work environment (Abbad et al., 2010), provide continuous learning and professional qualification, and can reduce financial costs, cheapening training programs (Iglesias & Salgado, 2012).

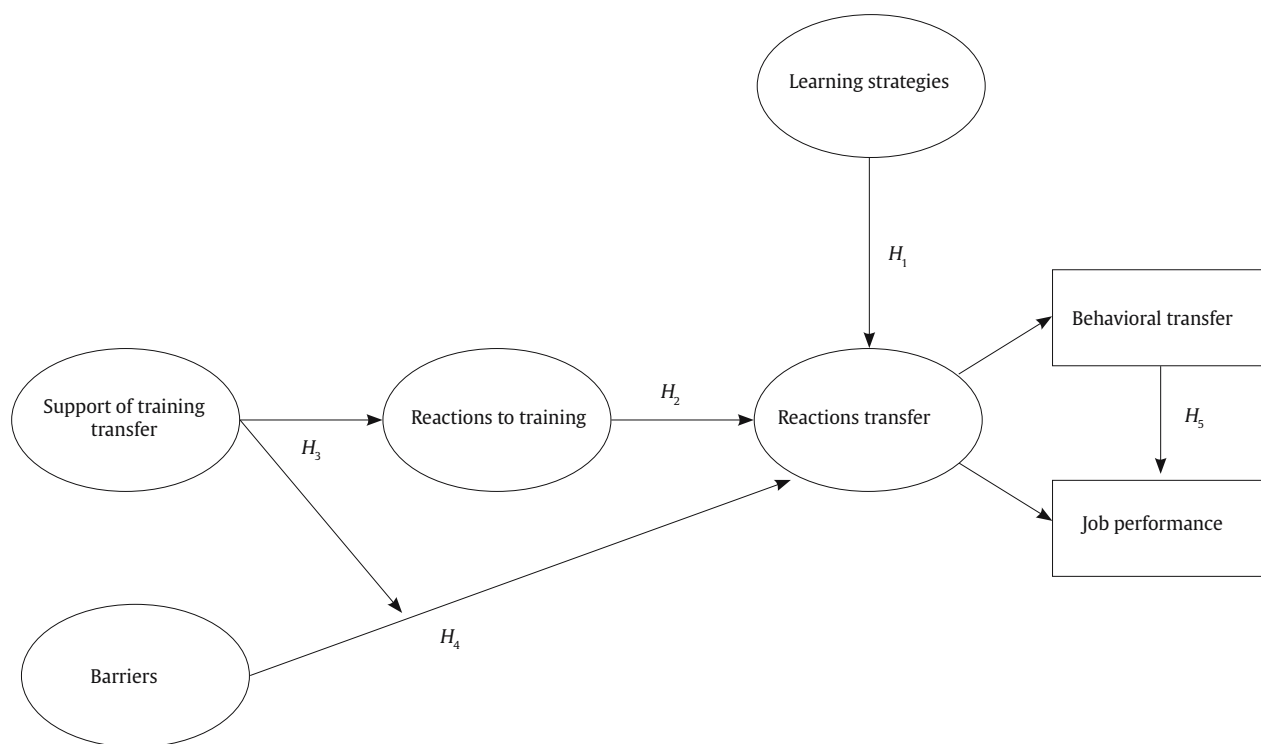
The science of training attempts to keep up with the advanced development, design, and delivery of online training programs in order to discover how to improve human performance through the definition of principles, guidelines, and criteria in monitoring e-learning in organizations (Garavan, Carbery, O'Malley, & O'Donnell, 2010).

It is widely accepted that trainees' characteristics have a powerful role in the transfer of training and training outputs (Burke & Hutchins, 2007): their personal features, life habits, expectations, strategies used to achieve learning, motivations, interests, and goals can influence the acquisition of skills during training and, subsequently, its application in work situations (Meneses, Abbad, Zerbini, & Lacerda, 2006).

The skills and resources that a worker needs in an online training process are different from those needed for a face-to-face training, mainly because online training increases the demanded level of regulatory resources and motivation to persist in it, requiring the worker to plan and organize him/herself in a more relevant way (Zijlstra, Roe, Leonora, & Krediet, 1999). For example, when employees are frequently interrupted while completing an online course (Sitzmann & Elly, 2010), they must recover the pace of work and decide whether to continue in the training process, which, in turn, demands additional motivation.

In this sense, some research findings in e-learning point to the greater importance of cognitive and self-regulatory learning strategies to obtain better learning outcomes (Johnson, Gueutal, & Falbe, 2009; Martins & Zerbini, 2016). In distance corporate environments, these learning strategies may meet the development of skills and performance of tasks that are mainly cognitive, apart from the adequacy of using self-regulatory processes to combine work activities (performance goals, excess workload) with studying (learning needs, development of new skills) during work-hours training.

When training sessions are effective, trainees develop new skills and intend to apply them at work, but limitations in work environment may interfere in the transfer process (Salas et al., 2012). In that case, not only do the forms of interpersonal interaction during instruction and trainees' competencies change, but also the instructional design itself and the social support provided. Trainees must be accustomed to the technologies and, for the most part, do without help or feedback from a supervisor/instructor, which can be a challenge for some employees. Situational constraints might



**Figure 1.** Conceptual Model Underlying the Hypothesized Relationships.

frustrate the trainees, by reducing their motivation to learn and their belief that additional effort will lead to better performance, hindering training results.

Despite the differences between web-based and classroom instruction, the evaluation of training effectiveness requires measuring its effects on the individual employees' performance (Aguinis & Kraiger, 2009; Burke & Hutchins, 2007). Thus, this paper includes a range of individual characteristics and work environment variables to explain the training outputs.

This study tests an effectiveness model (Figure 1) in a corporate online context to identify factors relating to learning strategies, reactions, barriers, and support of training transfer that can influence the transfer of training. The transfer of training was measured in terms of behavioral transfer (do trainees use their acquired knowledge and skills on the job?) and job performance (does training have an impact on the effectiveness of behavior?). Definitions and specific hypotheses for each of the relationships between variables that were tested are presented and supported below.

## Learning Strategies

Learning strategies refer to cognitive, behavioral, and self-regulatory procedures; trainees use them to aid learning during a training program and achieve specific learning goals (Badia & Monereo, 2010; Warr & Allan, 1998). E-learning programs require a range of different skills—knowing how to use a variety of web-based instructional procedures and resources, virtual tools, technological and pedagogical interactivity—tending to offer trainees increasingly larger amounts of control over their own learning process (DeRouin et al., 2005), once content can be accessed anywhere and anytime. Because of that, those who have been trained in the most effective strategies can achieve better performance results (Bjork, Dunlosky, & Kornell, 2013).

According to Warr and Allan's (1998) classification of learning strategies, they can be divided into three components: cognitive (rehearsal, organization, elaboration), behavioral (interpersonal and written help-seeking, practical application), and self-regulatory (emotion and motivation control, comprehension monitoring).

Empirical studies have found that mainly cognitive and behavioral strategies during training are positively correlated with learning and transfer (Brandão & Borges-Andrade, 2011; Crouse, Doyle, & Young, 2011; Pantoja & Borges-Andrade, 2009). Such strategies might be of great importance for achieving the best transfer results because trainees that are also workers mostly search the training content for utility and applicability: they look for connections between course material and their previous knowledge, and its implications at work, apart from the practical application of newly learned skills or behaviors.

However, self-regulatory strategies have shown positive and strong relationships with good academic results in e-learning environments (Aguinis & Kraiger, 2009; Johnson et al., 2009; Vovides, Sanchez-Alonso, Mitropoulou, & Nickmans, 2007). In short, self-regulatory strategies express the learner's control of anxiety, concentration, attention, motivation, and the learning process itself. It appears to be more important in distance training than in face-to-face training, because trainees must more often force themselves to pay attention, maintain their interest in and concentration on the learning lesson, once online training is undertaken at the workplace, so that learning must compete with work activities and performance goals.

Although self-regulatory learning strategies seem relevant to explaining the transfer of training, providing trainees with skills that help them transfer successfully back to the workplace, most of the research outcomes have been limited to learning or have only indirectly tested relationships to transfer (Burke & Hutchins, 2007). As the use of self-regulatory processes seems to be quite adequate

in an online context, while studying in the workplace may require more effort, focused attention, and self-monitoring of learning, we predict self-regulatory learning strategies will influence the training outcomes and trainees' performance more than cognitive and behavioral strategies.

Hypothesis 1: Self-regulatory learning strategies will predict training transfer indicators.

## Reactions to Training

Trainees' reactions to training reflect their satisfaction with the instructional characteristics in terms of pace, format, organization, content relevance, delivery quality, and amount learned (Alvarez, Salas, & Garofano, 2004; Klein, Noe, & Wang, 2006). Reactions are an important emotional outcome in the area of training and development (Aguinis & Kraiger, 2009) that influence the training transfer process (Mathieu, Tannenbaum, & Salas, 1992), affecting subsequent performance.

Apart from learning and transferring skills, reactions are also effective training criteria. These favorable opinions about training are expected effects: first, because the more satisfied the participants with training, the more willing to transfer, increasing chances to achieve performance results at work; second, trainee reactions seem to play an important role along with other prior work experiences, and should be viewed as part of a larger training system (Bell et al., 2017). Positive previous training experiences may contribute to participation in and motivation for future developmental programs, which can affect learning outcomes and job behavior.

Beyond testing effects of reactions as predictors, research might also test them as moderating (Gunawardena, Linder-VanBerschoot, LaPointe, & Rao, 2010) and mediating variables (Mathieu et al., 1992). A supportive environment, pre-training motivation, and other trainee characteristics can influence reactions to training experiences, increasing employee participation and leading them to be more likely to demonstrate trained skills.

The instructional procedures matter to training success (Salas et al., 2012) and should be chosen according to previous results that displayed positive relationships with the transfer process (Burke & Hutchins, 2007). Reactions have been consistently demonstrated in studies to be related to training outcomes (Giangreco, Carugati, Sebastiano, & Della Bella, 2010), as increases in the satisfaction of the participants (liking a training program and perceiving its utility) are concomitant with increases in willingness to transfer the new skills acquired when they return to the workplace.

Based on this, we suppose trainees' reactions to training will positively predict training transfer indicators.

Hypothesis 2: Trainees' reactions to training will be a positive predictor of training transfer indicators.

## Support of Training Transfer

Support of training transfer is a contextual variable that evaluates the support trainees receive to use their new skills and knowledge (Abbad et al., 2012; Burke & Hutchins, 2007). Organizational and social (supervisor and peer) support are very consistent factors explaining the relationship between work environment characteristics (variables such as climate, job design, quality management, etc.) and transfer (Bell et al., 2017; Chiaburu, van Dam, & Hutchins, 2010; Grossman & Salas, 2011; Joo, Lim, & Park, 2011).

Once new skills have been acquired, the work environment might facilitate their application. In this sense, organizational, peer, and supervisor support are of special relevance to training being applied at work (Chiaburu, 2010; Gunawardena et al., 2010), or the person's own skills to transfer the knowledge.

We will distinguish social and organizational support (Abbad et al., 2012; Burke & Hutchins, 2007). Social support means that the supervisors, coworkers, or peers set goals, give assistance (to discuss and to encourage the application of the new skills at work), and provide feedback. Organizational support refers to the available material and financial resources at the workplace and the workplace's physical conditions that could facilitate (or hinder) the skills transfer process.

Many studies show social support to be more important than organizational support for the transfer process (Bhatti, Battour, Sundram, & Othman, 2013; Dermol & Čater, 2013; Homklin, Takahashi, & Techakanont, 2014; Pham, Segers, & Gijssels, 2012). One explanation is that the former is a closer and more concrete type of support, so learners are more likely to be engaged deeply in applying what they have learned in the presence of support from supervisors and peers, compared to the latter, which is more distal and diffuse, possibly leading to weaker influence on transfer (Chiaburu, 2010). In some cases, support from peers and colleagues has proven to yield more consistent influence on trainee transfer than supervisory support (Chiaburu, 2010; Homklin et al., 2014).

We predict that social support, that is, peer and supervisor support, will be more important than organizational support in an online context, especially when the training occurs during work hours. This type of support might present stronger relationships to transfer when the focus of training is on open skills (Blume, Ford, Baldwin, & Huang, 2010) because managers can support their subordinates through "showing," i.e., modeling appropriate behaviors (Bell et al., 2017).

Considering the attitudinal nature of the training evaluated—its objectives consist of the employee's decision to turn off the light when s/he leaves work or a room that is not being used at the time, deciding not to print an e-mail, or to use only a single disposable cup during the whole day—the human aspect (role model) seems to play an important part.

When supervisors are fully aware of the training, they will be better prepared to encourage the trainees to transfer, influencing post-training behaviors; in addition, when a leader behaves in a manner that supports what was taught in training, trainees are more likely to apply what they learned (Bell et al., 2017). For this reason, we predict that:

Hypothesis 3a: Social support will have a greater influence on training transfer indicators than organizational support.

Lastly, as an additional test of reaction relevance, its influence on training transfer should also be observed indirectly, since positive trainee reactions to a training program might influence the perception of support of transfer when they return to the workplace and, consequently, transfer. Trainees are more likely to respond positively to training when they perceive that learning or transfer is supported. When estimating the levels of support of transfer existing in their organizational environment, trainees might take into account their own reaction to training. The reported higher levels of reaction to training might lead to a positive perception of the support offered, influencing them to apply their knowledge and skills in the work setting.

Hypothesis 3b: Trainees' reactions to training will mediate the support of training transfer and training transfer indicators.

## Barriers

Barriers can be defined as factors related to the learner, instructional, and contextual (social or organizational) characteristics that prevent, disrupt, or prematurely interrupt a learning process; likewise, they can hinder performance during training programs, impacting related results (Crouse et al., 2011; Hicks, Bagg, Doyle, & Young, 2007).

In distance learning, new and specific aspects are present, for example, quality of the instructor's teaching performance, virtual

instructional design, technical and social support provided by peers and organization to trainees (when and how it is provided to them), availability, and utility and ease of use of technology (Garavan et al., 2010).

Previous studies have found that barriers were mainly related to resource constraints like lack of time and access to technology (Internet, computers, etc.) or to personal features: a learner's lack of interest in the course content, misperceptions about its nature and complexity, conflict with work schedules and activities, self-regulatory learning processes (Hicks et al., 2007; Klein et al., 2006). These difficulties may interfere in the choice to persist in training or even cause course evasion (Abbad et al., 2010).

Environmental conditions or events can be perceived as facilitators or obstacles by learners, depending on their individual characteristics and the instruction itself (Klein et al., 2006): whether they are able to combine work activities with studying and master the required technologies, whether the course meets their personal and professional expectations, the amount of resources in terms of time, finances, or knowledge available for study.

When perceived as facilitators, those factors are called enablers and might express possibilities for trainees during training programs, because they are able to motivate, support, and enhance learning, helping them acquire new knowledge and skills. Findings suggest that the enablers would be related to organizational support, job or task, and/or family, and access to technology and personal attributes (motivation to learn, learner's own needs and interest).

Therefore, we expect the extent to which personal and environmental features as a whole are perceived to be barriers will influence the transfer of training. If trainees perceive features as barriers, these obstacles might hinder their performance, leading to lower levels of transfer.

Hypothesis 4a: Barriers will be negatively related to training transfer indicators.

Furthermore, we examine the moderating role of support in transferring, buffering the negative influence of perceived barriers over training transfer indicators, i.e., the effects of barriers on transfer will decrease when trainees perceive support for transfer.

Hypothesis 4b: The more trainees perceive support for transfer, the less negative the influence of barriers to training effectiveness.

## Training Transfer

Training transfer refers to the effective application at the workplace of new knowledge, skills, and abilities (KSAs) acquired during a training program, and has been the main indicator of the effectiveness of training at an individual level (Bell et al., 2017; Burke & Hutchins, 2007; Grossman & Salas, 2011). In this paper, we measure training transfer as both behavioral transfer and job performance. Behavioral transfer encompasses the direct and specific effects of training, related to learning goals, on the trainees' subsequent performance in their job positions (Zerbini et al., 2012). Job performance refers to the indirect influence of training on broader trainee performance, attitudes, and motivation (Abbad, Pilati, Borges-Andrade, & Sallorenzo, 2012). This definition extends the performance concept provided by Campbell (1990) by examining the effects of training on broader job performance, specifically performance that was not directly related to the training itself (Bell et al., 2017).

Obviously, the second measure has been more frequently used in empirical studies, once it standardizes evaluation indicators, making them generic and objectives, becoming very useful in comparing the effects of different training regimes on trainees' performance (Pilati & Abbad, 2005). The former requires the analysis of learning goals, which are not always available and vary from one course to another, requiring the elaboration and validation of a specific instrument for each training program evaluated (Zerbini et al., 2012). Consequently,



the use of two different measures has some clear advantages, allowing the evaluation of the training outcomes on job positions and, additionally, their effects on the trainees' broader performance, including their motivation, self-confidence, and openness to changes in work processes.

We assumed that the direct effects of training on the specific developed skills would influence the participants' broader performance since work behavior occurs in a combined way. In other words, a specific and effective change caused by training (i.e., trainees apply the new KSAs directly to their job positions) would lead to a change in the way they perform indirectly at work in other activities, not necessarily related to the learning goals of training.

Hypothesis 5: Training effectiveness related to the job (behavioral transfer) will be positively related to the worker's broader performance (job performance).

## Method

### Participants

Participants were employees of a large public Brazilian bank that, in 2016 and at the workplace, participated in the Operational Efficiency online training, with the objective of identifying ways to promote operational efficiency in work activities at the company. It is a 2-hour self-instructional course that approached, in six units, the differences between efficiency and effectiveness, exposed some trends in the banking scenario, taught how to measure operational efficiency, and proposed ways to improve and promote it at work.

This training is strategic training available to all bank employees and not specific to a single functional category. It was developed more to enhance the individual performance than group or unit performance; so, even if the employees were in different work units (support, business, tactics, or strategic), there would hardly be differences between those units. Nevertheless, due to training characteristics and the individual analysis of performance by the organization, we could not analyze data using multi-level analysis.

Additionally, managers have evaluated the influences of that course on their subordinates' work behaviors. Managers can easily observe the trained behaviors (e.g., put into practice actions that can reduce administrative expenses, decrease the consumption of the bank's resources, and increase its results) on a daily basis at the workplace. In addition, the bank commonly performs this type of evaluation, including both workers' and supervisors' reports.

The answers obtained as to the demographic and professional characterization of 1,639 employees (participants in training) and 2,261 managers (raters of the employees who participated in training), respectively, show that the majority are males (56.8%/67.7%), aged between 46 and 55 years (26.1%/41.7%), have 1 to 3 years of experience on the job (20.3%/27.5%), work in the Business and Management Support Unit (37.8%/59.1%), and hold an undergraduate degree or higher (63.3%/86.3%).

### Instruments

We used an adapted version of the following instruments:

**Learning strategies.** An 18-item questionnaire, using a 5-point rating scale from 1 (*never*) to 5 (*always*), that measures the frequency with which the participants employed learning strategies (Martins, Zerbini, & Medina, 2018a). It was represented by items from its 4-factor structure, for instance: "I increased my effort when I began to lose interest" (motivation control); "I identified daily situations in which I could try the material out in practice" (elaboration/practical application); "I tried to persuade myself not to worry about mistakes I made" (emotion control); and "I asked other course members for help when I did not fully understand the material" (cognitive/help-

seeking). The internal consistency reliability estimate of this scale in this study was .89.

**Reactions to training.** Participants' reactions to training were assessed using a 9-item scale (sample items included "language used in course material" and "contents available in each unit"), with response alternatives scored from 1 (*very bad*) to 5 (*excellent*) (Martins, Zerbini, & Medina, 2018b). The internal consistency reliability estimate of this scale in this study was .92.

**Support of training transfer.** Supervisor, peer, and organizational support were assessed using a 14-item scale (e.g., "the necessary information for the effective use of new skills learned in training is provided", "difficulties in the effective use of new skills learned in training are removed", and "the necessary material resources are provided for the effective use of the new skills learned in training"), with response alternatives scored from 1 (*never*) to 5 (*always*) (Abbad & Sallorenzo, 2001). The internal consistency reliability estimate of this scale in this study was .94.

**Barriers.** To measure perceived barriers, a list of 13 items were presented to the participants, reflecting different personal and environmental features that could be viewed as hindering their course performance (sample items included: "time available to study", "Internet connection", and "reconciliation of the course with professional activities"), with response alternatives scored from 1 (*did not hinder my performance*) to 5 (*definitely hindered my performance*) (Umekawa & Zerbini, 2015). The internal consistency reliability estimate of this scale in this study was .98.

**Training transfer.** To measure training transfer, two instruments were used (Pilati & Abbad, 2005), one for self-evaluation ( $\alpha = .89$ ) and another for hetero-evaluation ( $\alpha = .94$ ), both with 7 items that evaluate the indirect influence on the broader performance, attitudes, and motivation of trainees (job performance—see Appendix). Participants rated their agreement with each item using a 5-point Likert scale, from 1 (*do not agree*) to 5 (*totally agree*).

Additionally, an 8-item instrument, with alternative answers scored from 1 (*never*) to 5 (*always*), was developed to measure the direct and specific effects of training Operational Efficiency on job position (behavioral transfer) related to its learning goals (e.g., minimize resource consumption, reduce administrative expenses, contain costs, apply resources, and share actions with colleagues to promote operational efficiency in daily activities at work). The internal consistency reliability estimated for the scale was .85 and .89, respectively, in self-evaluation and hetero-evaluation.

### Procedure

This paper uses multi-source data collected from workers that had participated in the online training and from their supervisors, who had evaluated course influence on their subordinates' work behaviors. An online application of the instruments to a potential population of 3,600 employees was carried out; their supervisors responded to the training transfer measures (behavioral transfer and job performance) related to subordinates who were enrolled in the course. Due to the high number of employees in the bank (about 110,000) and the number of bank offices (about 15,000), each subordinate was evaluated by one supervisor, with some exceptions.

The evaluation was completed after approximately 6 months from the end of training, so its effect could be observed at an individual level. The self- and hetero-evaluation obtained, respectively, an overall response rate of 61.1% ( $n = 2,201$ ) and 66.9% ( $n = 2,411$ ). To link managers' performance ratings to workers' reports of training transfer, we analyzed the relationships between overall average levels of training transfer reported by workers and their supervisors.

## Data Analysis

To run the analyses, the SPSS/AMOS 22.0 was used. Preliminary analyses were done to check the existence of missing values, univariate, and multivariate outliers. Normality was assessed by the skewness and kurtosis of item values, which should range from -2.0 to 2.0, although the larger the sample size, the less concern about normality.

To test the proposed research model and identify different relationships between variables, a structural equation modeling (SEM) was conducted. The estimation method used was maximum likelihood, which is very reliable in cases where distributions of the variables are normal. To judge model fit, the following goodness-of-fit indices were considered acceptable: when  $CMIN/DF(\chi^2/df)$  is less than 5, incremental indexes (CFI and TLI) are higher than .90 (ideally, above .95), and error rate (RMSEA) is less than .08 (ideally, below .05). To estimate mediators and moderators of training effectiveness at work, PROCESS/SPSS procedure (bootstrap confidence interval [CI] method) was used.

To take into account unavoidable clustering effects that occur when managers rate multiple workers, we determined intra-rater reliability by calculating intraclass correlation coefficient (ICC), using a two-way fixed model (alpha) and absolute agreement type,  $(\sigma_{\text{error}})^2 = (\sigma_o)^2 + (\sigma_{\text{residual}})^2$ . In this way, we could establish the reliability or consistency of repeated measures (for example, two individual raters testing the same characteristic or measure), and determine how consistent those measures are.

## Results

### Initial Analyses

Means, standard deviations, correlations, and alpha reliabilities are presented in Table 1.

Descriptive statistics indicated that workers transferred the new competencies learned to their job positions (behavioral transfer:  $M = 4.16$ ,  $SD = .84$ ) and training affected their broader performance as well (job performance:  $M = 4.31$ ,  $SD = .70$ ). Supervisors confirmed those reports (behavioral transfer:  $M = 4.04$ ,  $SD = .89$ ; job performance:  $M = 4.07$ ,  $SD = .83$ ), showing a high convergence between the evaluations of both sources and their agreement on training contributions. Among supervisors, regarding ratings of behavioral transfer and job performance, results present very good reliability, corroborated by  $ICC = .85$  (95% CI [.832, .865],  $F = 6.722$ ). Raters are consistent, i.e., supervisors agree absolutely on the measurement they are getting, so that we have consistent results and reliable data.

## Hypotheses Testing

With respect to distributional assumptions, the absolute values of skewness (range from .08 to 1.60) and kurtosis (range from .002 to 1.94), with only a few exceptions (6 out of 69 items: 2.34 to 3.94), which is still within the recommended bounds by Hancock and Mueller (2010), did not exceed the reference interval, indicating the normal distribution of data.

In order to test hypotheses, direct effects of learning strategies (cognitive/help-seeking, emotion control, elaboration/practical application, and motivation control), reactions to training, support (supervisor, peer, and organizational support), and barriers to training transfer (behavioral transfer and job performance) were examined by reviewing the standardized regression coefficient ( $\beta$ ) weights at alpha level of  $p < .0001$  and  $p < .05$ .

**Self-evaluation.** The structural model provided a good fit to the data ( $CMIN/DF = 4.87$ ,  $CFI = .91$ ,  $TLI = .90$ ,  $RMSEA = .04$ ). First, the effects of elaboration/practical application learning strategies ( $\beta = .477$ ,  $p < .0001$ ), trainees' reactions to training ( $\beta = .204$ ,  $p < .0001$ ), organizational support ( $\beta = .159$ ,  $p < .0001$ ), and peer support ( $\beta = .081$ ,  $p < .05$ ) of the behavioral transfer were statistically significant. Second, the effects of motivation control ( $\beta = .129$ ,  $p < .0001$ ), cognitive/help-seeking ( $\beta = .110$ ,  $p < .05$ ), and elaboration/practical application learning strategies ( $\beta = .093$ ,  $p < .05$ ), besides trainees' reactions to training ( $\beta = .247$ ,  $p < .0001$ ) on job performance were statistically significant. The direct effect of the behavioral transfer on job performance was of  $\beta = .334$  ( $p < .0001$ ).

**Hetero-evaluation.** The fit statistics indicated that the measurement model exhibits a good fit ( $CMIN/DF = 4.67$ ,  $CFI = .92$ ,  $TLI = .91$ ,  $RMSEA = .03$ ). For behavioral transfer, supervisor support ( $\beta = .074$ ,  $p < .05$ ), and job performance, cognitive/help-seeking learning strategies ( $\beta = .052$ ,  $p < .05$ ) were statistically significant. The direct effect of behavioral transfer on job performance presented a very high value ( $\beta = .878$ ,  $p < .0001$ ).

In sum, the results have completely supported Hypotheses 2 and 5, which predicted that trainees' reactions to training would be a positive predictor of training transfer indicators, and that behavioral transfer would be positively related to job performance. On the other hand, since the effects of barriers on the effectiveness of training indicators were not statistically significant, Hypothesis 4a was not confirmed.

Regarding Hypothesis 1, which predicted that self-regulatory learning strategies (motivation and emotion control) would explain training transfer indicators, findings showed that it was partially confirmed. Emotion control did not significantly predict performance results; however, motivation control not only predicted job performance, but also exhibited a greater  $\beta$  weight than the other strategies of cognitive/help-seeking and elaboration/practical application. Nevertheless, the combination of cognitive

**Table 1.** Means, Standard Deviations, Correlations, and Reliabilities

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Cognitive/help-seeking	3.49	.80	(.85)												
2. Emotion control	4.33	.65	.14*	(.80)											
3. Elaboration/practical application	4.20	.64	.51*	.38*	(.84)										
4. Motivation control	4.33	.66	.42*	.40*	.51*	(.81)									
5. Reactions to training	4.12	.67	.40*	.35*	.56*	.43*	(.92)								
6. Barriers	2.01	1.33	.13*	-.00	.00	-.03	-.03	(.98)							
7. Supervisor support	3.81	.90	.25*	.14*	.24*	.17*	.32*	-.00	(.95)						
8. Peer support	3.64	.87	.25*	.15*	.21*	.19*	.28*	.04	.70*	(.93)					
9. Organizational support	3.75	.87	.29*	.22*	.33*	.22*	.44*	.01	.48*	.42*	(.85)				
10. Behavioral transfer (SELF)	4.16	.84	.33*	.27*	.53*	.37*	.48*	.06	.31*	.30*	.36*	(.85)			
11. Job performance (SELF)	4.20	.74	.38*	.25*	.49*	.39*	.52*	.02	.33*	.31*	.37*	.59*	(.89)		
12. Behavioral transfer (HETERO)	4.04	.89	.07**	-.00	.02	.05	.03	-.02	.07**	.02	.03	.02	.03	(.89)	
13. Job performance (HETERO)	4.02	.87	.03	-.01	-.01	.00	-.00	-.00	.02	-.00	-.01	.00	.01	.74*	(.94)

Note. Parenthetical numbers on the diagonal are coefficient alpha reliability estimates.

\* $p < .01$ , \*\* $p < .05$ .

and behavioral strategies (elaboration/practical application) also predicted both behavioral transfer and job performance.

Concerning the different types of support (organizational, peer, and supervisor), all revealed a significant relationship with training transfer indicators. Although, contrary to what Hypothesis 3a stated, which predicted that social support (supervisor and peer) would have a greater influence on training transfer indicators than organizational support, organizational support exhibited a greater  $\beta$  weight than peer or supervisor support.

These findings elucidate the significant contribution of individual and contextual variables in predicting training transfer, which means that there are some learning strategies that are more important than others and, consequently, should be chosen while studying. Then, after training is ended, trainees' levels of satisfaction with instructional proceedings and their perceived support when they return to work also matter. Moreover, job-related training effectiveness (behavioral transfer) is positively associated to a worker's broader performance (job performance).

**Reactions to training as mediators.** Trainees' reactions to training were specified as a mediating variable between support of training transfer and training transfer indicators in Hypothesis 3b. Mediation analysis corroborated this hypothesis, according to the results shown in Table 2.

"Support of training transfer" (supervisor, peer, and organizational support) had a positive indirect effect on training transfer indicators (behavioral transfer and job performance) through increasing "reactions to training", confirming its mediator role—the  $ab$  effect was statistically significant (value 0 is not within the 95% confidence interval, which can be observed by positive signals of  $LL$  and  $UL$ ). "Support of training transfer" had a positive effect on "reactions to training," and "reactions to training" had a positive effect on "training transfer," leading to an overall positive indirect effect of "support of training transfer" on "training transfer."

**Support of training transfer as moderators.** Results indicate (Model 1, bootstrap CI method, bias corrected, number of samples bootstrap = 5,000) that "organizational support" marginally moderates the effect of perceived "barriers" on "behavioral transfer" ( $\beta_{\text{interaction}} = .03, p < .10$ ), such that for participants who judged the support offered by the organization to be sufficient "barriers" effects on "behavioral transfer" were attenuated.

For trainees with high scores for "organizational support" ( $M = 4.64$ , 5-point scale), "barriers" had a positive effect on "behavioral transfer" (95% CI = [.0120, .0874]). However, for those with low ( $M = 3.00$ , 95% CI = [-.0558, .0466]) to moderate averages ( $M = 3.82$ , 95% CI = [-.0090, .0541]) on perceived "organizational support", the effect became insignificant. Thus, the "behavioral transfer" prediction of "barriers" through levels of "organizational support" is almost inexpressive, according to its small magnitude, marginally supporting Hypothesis 4b.

## Discussion

We analyzed the impact of online training for performance using two sources: employees and their superiors. Findings indicated that

based on employees' perceptions, behavioral transfer was predicted by elaboration/practical application learning strategies, trainees' reactions to training, organizational and peer support; on the other hand, motivation control, cognitive/help-seeking, and elaboration/practical application learning strategies, along with trainees' reactions to training, were significantly related to job performance. Based on perceptions of superiors, supervisor support contributed to explaining behavioral transfer, as well as cognitive/help-seeking strategies and job performance. In addition, results pointed to the mediating role of reactions to training between support of transfer and training transfer indicators (behavioral transfer and job performance), and organizational support marginally moderated the effect of barriers on behavioral transfer. We will explain these outcomes more deeply in the following pages.

Learning strategies were related to training effectiveness, corroborating their relevance to providing trainees with skills that help them transfer successfully to the workplace. Results indicate the most effective learning strategies for the process of applying the new skills at work, which refer to a combination of self-regulatory strategies with cognitive and behavioral strategies. Participants that achieved the best transfer results were those who: thought about new material and its implications, looked for connections between course material and their previous knowledge and identified daily situations where they could try the material out in practice (elaboration/practical application), forced themselves to pay attention and to concentrate on the learning lesson even when there was little interest in it (motivation control), read, repeated, and copied out material, looked for coworkers' help, and sought other sources of information to help them learn (cognitive/help-seeking). On the other hand, emotion control is a self-regulatory strategy that did not significantly predict performance results. This may be because training did not require the use of strategies that prevent dispersion of concentration caused by feelings of anxiety, while learning goals were very simple.

In order to achieve positive results in online training, trainees should be advised about the most appropriate learning strategies to use during the learning process and those strategies that produce better performance results in the workplace. Furthermore, the training design itself should take into account successful strategies and facilitate their use through training planning, exercises, assignments, simulations, etc. More studies centered on this matter are required, as only a few research outcomes have tested relationships of learning strategies to transfer and, when they did, they have not included the self-regulatory items from the scale, assuming a limited influence of this kind of strategy on the explanation of work behaviors, which seems untrue in an e-learning context.

Trainees' reactions to training showed a positive influence on training results, producing good effects on a trainee's performance at work. According to prior research (e.g., Gunawardena et al., 2010; Joo et al., 2011), this variable is important for both face-to-face and online training, indicating the practical relevance of continuing to measure the levels of post-training reaction. Data suggest that availability and motivation to transfer increase when a trainee's satisfaction is high: when trainees reaction to training is positive, they will be willing to transfer the new skills. Therefore, this affective outcome might

**Table 2.** Simple Mediation of Reactions to Training between Support and Training Transfer

X	Y	n	Direct effects ( $\beta$ )			Indirect effects ( $ab$ )	95% CI		$\kappa^2$
			a	b	c'		LL	UL	
Supervisor	Behavioral transfer	905	.17*	.52*	.11*	.09	.0707	.1181	.14
	Job performance	1,147	.17*	.56*	.12*	.09	.0739	.1202	.14
Peer	Behavioral transfer	874	.17*	.51*	.11*	.09	.0694	.1187	.13
	Job performance	1,112	.14*	.55*	.13*	.08	.0601	.1046	.12
Organizational	Behavioral transfer	918	.26*	.51*	.10*	.13	.1091	.1698	.19
	Job performance	1,156	.24*	.54*	.12*	.13	.1102	.1651	.19

Note. M = RP; XM = a; MY = b; XY = c'; Model 4, bootstrap CI method (bias corrected), number of samples bootstrap = 5,000; Boot LL CI = lower limit; Boot UL CI = upper limit;  $\kappa^2$  = kappa-squared (Preacher & Kelly, 2011).

\* $p < .0001$ .



continue to be a result worth seeking for training designers or Human Resources Development managers in charge of planning, offering and evaluating training programs.

The perception of support to transfer yields good training outcomes concerning behavioral transfer in self-evaluation (organizational and peer support) and in hetero-evaluation (supervisor support). As predicted, social support was very important in this context: peers and supervisors may have supported graduates by showing right or expected behaviors at work, leading them to training transfer. Changes in the former groups' behaviors are copied by the latter, who are willing to put the new skills learned into practice; thus, the more the graduates perceive that their coworkers are doing it well, according to training goals and expectations of the organization, the more they will try to imitate their attitudes, taking them as role models. In addition, behavioral transfer also requires managers to support the effective application of the developed skills, by providing feedback or once again through "showing" which are the positive results when performing tasks relating to the Operational Efficiency training learning goals.

On the other hand, organizational support also exhibited good transfer results. Despite the attitudinal nature of the training evaluated, which can explain the great relevance of social support, as mentioned, to achieve the main training goals consisting of promoting operational efficiency in work activities at the company, the organization might as well provide conditions and resources so their employees can change behaviors at work. This can occur by offering alternatives, including to their clients, not to receive print material, such as bank statements, but preferring the use of Internet Banking or Automated Teller Machines (ATMs), rather than human resources, for example.

Briefly, both variables, reactions and support, have practical implications: the training will be transferred to the workplace, whether these conditions have been met or not. In other words, training must be planned in a way so that it achieves positive reactions from its participants and guarantees satisfactory support, as these factors have great influence on the transfer process.

In this study, we analyzed some mechanisms as mediators and moderators of distance learning courses outcomes, namely reaction to training and support of transfer, respectively. Regarding the mediating role of reactions to training between support of transfer and training transfer indicators, results confirmed that trainees were more likely to respond positively to training (liking it, perceiving its utility, and applying the new skills) when they perceived a supportive environment (organizational and social support). Self-reported high levels of reaction to training led to a positive perception of the support offered, influencing, in turn, transfer outcomes.

When considering the moderating role of support in training transfer, organizational support in particular marginally moderated the effect of barriers on behavioral transfer. The more trainees perceived support from the organization, the less negative was the influence of barriers on training effectiveness (trainees could use the new knowledge and skills in their job), although barriers were not significant predictors of training transfer indicators in this study.

Descriptive data indicated that more than 50% of participants did not perceive situational or individual conditions as barriers to transfer ( $M = 2.01$ ,  $SD = 1.33$ ). Perhaps, in the online context considered, in which trainees took the course at the workplace, most of the conditions were satisfactorily met and did not affect their performance during training nor after it. Alternatively, the result could be due to an inconsistency in the measure employed, which was not sufficiently sensitive to this context.

Low correlations among managers' ratings and the rest of the variables (see Table 1) are an unexpected finding, and it could be due to different reasons. The training transfer measure analyses of the effects of training on broader job performance, not only directly related to the training itself. In this sense, we understand that the

incidence of the training program on the explained variance in job performance is necessarily low, since the course has a short duration and only affects a part of the work performed by the employees. It is also possible that the correlations between the main constructs of the study and the self-reported measure of job performance are higher because these variables were collected at the same time.

Data collection provided from one large organization is positive because it helps control other variables' effects, such as transfer climate or the quality, design, delivery, and complexity of the course, which could influence results (Mourão, Abbad, & Zerbini, 2014). Furthermore, a unique training program, with the participation of thousands of people, in a single organization, prevents any cultural or organizational influences that may be present in multi-organizational studies.

However, there are some difficulties generalizing the results obtained, and evaluating more complex training programs in different organizations would help to generalize the findings of this study. In this respect, more complex learning goals and ways of assessing them through exercises, exams, etc., would allow the inclusion of the learning variable and measures in research models. In contrast, low complexity courses, predominantly cognitive in nature, offer few research opportunities to investigate higher learning and transfer processes.

This study did not evaluate training at the organizational level; that is, it has not used direct and objective measures of work performance. Yet, due to the short duration of the training, the effects of it on the objective indicators of productivity of the organization could appear quite late. In the same line, training characteristics related to the operational efficiency may be more appropriately evaluated by superiors than by some organizational measures.

The multi-source nature of the data, large sample, online nature of the training, and interesting constructs are some of the strengths of this study. From a theoretical perspective, this study offers a research model of training effectiveness by including both contextual and individual factors that are important for improving training effectiveness. Moreover, it provides interesting insights into the antecedents and outcomes of training transfer, advancing our understanding of these relationships, including mediators and moderators, while attending to recommendations regarding the importance of investigating them in transfer of training research (Aguinis & Kraiger, 2009; Bell et al., 2017; Ford, Baldwin, & Prasad, 2018), and variables not explored by the large body of existing literature on training transfer (e.g., learning strategies).

The findings are valuable for researchers and practitioners, as they contribute to a better understanding of trainees' reactions to training, learning strategies, organizational and social support as predictors of transfer, and clarify some important mechanisms (the mediating role of reactions to training), which were significantly related to transfer of training. Regarding the high practical workplace relevance of this study, practitioners can use these results as ideas to design corresponding training and training transfer interventions. Future research should continue investigating psychological variables that can increase the research model's explanatory power, and extend the model to long-term courses in different organizational settings.

## Conflict of Interest

The authors of this article declare no conflict of interest.

## References

- Abbad, G., Côrrea, V. P., & Meneses, P. P. M. (2010). Avaliação de treinamentos a distância: Relações entre estratégias de aprendizagem e satisfação com o treinamento. *RAM - Revista de Administração Mackenzie*, 11(2), 43-67. <https://doi.org/10.1590/S1678-69712010000200003>

- Abbad, G., Pilati, R., Borges-Andrade, J. E., & Sallorenzo, L. H. (2012). Impacto do treinamento no trabalho – medida em amplitude. In G. Abbad, L. Mourão, P. P. M. Meneses, T. Zerbini, J. E. Borges-Andrade, & R. Vilas-Boas (Orgs.), *Medidas de avaliação em treinamento, desenvolvimento e educação* (pp. 145-162). Porto Alegre, Brazil: Artmed.
- Abbad, G., & Sallorenzo, L. H. (2001). Desenvolvimento e validação de escalas de suporte à transferência de treinamento. *Revista de Administração da USP*, 36(2), 33-45.
- Abbad, G., Sallorenzo, L. H., Coelho, F. A., Zerbini, T., Vasconcelos, L., & Todeschini, K. (2012). Suporte à transferência de treinamento e suporte à aprendizagem. In G. Abbad, L. Mourão, P. P. M. Meneses, T. Zerbini, J. E. Borges-Andrade, & R. Vilas-Boas (Orgs.), *Medidas de avaliação em treinamento, desenvolvimento e educação* (pp. 127-146). Porto Alegre, Brazil: Artmed.
- Aguinis, H., & Kraiger, K. (2009). Benefits of training and development for individuals and teams, organizations, and society. *Annual Review of Psychology*, 60, 451-474. <https://doi.org/10.1146/annurev.psych.60.110707.163505>
- Alvarez, K., Salas, E., & Garofano, C. M. (2004). An integrated model of training evaluation and effectiveness. *Human Resource Development Review*, 3, 385-416. <https://doi.org/10.1177/1534484304270820>
- Badia, A., & Monereo, C. (2010). Ensino e aprendizagem de estratégias de aprendizagem em ambientes virtuais. In C. Coll & C. Monereo (Orgs.), *Psicologia da educação virtual – Aprender e ensinar com as tecnologias da informação e da comunicação*. (pp. 311-328). Porto Alegre, Brazil: Artmed.
- Bell, B. S., Tannenbaum, S. I., Ford, J. K., Noe, R. A., & Kraiger, K. (2017). 100 Years of training and development research: What we know and where we should go. *Journal of Applied Psychology*, 102, 1-19. <https://doi.org/10.1037/apl0000142>
- Bhatti, M. A., Battour, M. M., Sundram, V. P. K., & Othman, A. A. (2013). Transfer of training: Does it truly happen? An examination of support, instrumentality, retention and learner readiness on the transfer motivation and transfer of training. *European Journal of Training and Development*, 37, 273-297. <https://doi.org/10.1108/03090591311312741>
- Bedwell, W. L., & Salas, E. (2010). Computer-based training: Capitalizing on lessons learned. *International Journal of Training and Development*, 14, 239-249. <https://doi.org/10.1111/j.1468-2419.2010.00355.x>
- Bjork, R. A., Dunlosky, J., & Kornell, N. (2013). Self-Regulated learning: Beliefs, techniques, and illusions. *Annual Review of Psychology*, 64, 417-444. <https://doi.org/10.1146/annurev-psych-113011-143823>
- Blume, B. D., Ford, J. K., Baldwin, T. T., & Huang, J. L. (2010). Transfer of training: A meta-analytic review. *Journal of Management*, 36, 1065-1105. <https://doi.org/10.1177/0149206309352880>
- Brandão, H. P., & Borges-Andrade, J. E. (2011). Desenvolvimento e validação de uma escala de estratégias de aprendizagem no trabalho. *Psicologia: Reflexão e Crítica*, 24, 448-457. <https://doi.org/10.1590/S0102-797220110000300005>
- Burke, L. A., & Hutchins, H. M. (2007). Training transfer: An integrative literature review. *Human Resource Development Review*, 6, 263-297. <https://doi.org/10.1177/1534484307303035>
- Campbell, J. (1990). Modeling the performance prediction problem in industrial and organizational psychology. In M. Dunnette & L. Hough (Eds.), *Handbook of industrial and organizational psychology* (pp. 686-707). Palo Alto, CA: Consulting Psychologists Press.
- Chiaburu, D. S. (2010). The social context of training: Coworker, supervisor, or organizational support? *Industrial and Commercial Training*, 42, 53-56. <https://doi.org/10.1108/00197851011013724>
- Chiaburu, D. S., van Dam, K., & Hutchins, H. M. (2010). Social support in the workplace and training transfer: A longitudinal analysis. *International Journal of Selection and Assessment*, 18, 187-200. <https://doi.org/10.1111/j.1468-2389.2010.00500.x>
- Crouse, P., Doyle, W., & Young, J. D. (2011). Workplace learning strategies, barriers, facilitators and outcomes: A qualitative study among human resource management practitioners. *Human Resource Development International*, 14, 39-55. <https://doi.org/10.1080/13678868.2011.542897>
- Dermol, V., & Čater, T. (2013). The influence of training and training transfer factors on organizational learning and performance. *Personnel Review*, 42, 324-348. <https://doi.org/10.1108/00483481311320435>
- DeRouin, R. E., Fritzsche, B. A., & Salas, E. (2005). E-learning in organizations. *Journal of Management*, 31, 920-940. <https://doi.org/10.1177/0149206305279815>
- Döös, M., & Wilhelmson, L. (2011). Collective learning: Interaction and a shared action arena. *Journal of Workplace Learning*, 23, 487-500. <https://doi.org/10.1108/13665621111174852>
- Ford, J. K., Baldwin, T., & Prasad, J. (2018). Transfer of training: The known and the unknown. *Annual Review of Organizational Psychology and Organizational Behavior*, 5, 201-225. <https://doi.org/10.1146/annurev-orgpsych-032117-104443>
- Garavan, T. N., Carbery, R., O'Malley, G., & O'Donnell, D. (2010). Understanding participation in e-learning in organizations: A largescale empirical study of employees. *International Journal of Training and Development*, 14, 155-168. <https://doi.org/10.1111/j.1468-2419.2010.00349.x>
- Garrison, D. R., & Vaughan, N. D. (2008). *Blended learning in higher education: Framework, principles, and guidelines*. San Francisco, CA: Jossey-Bass.
- Giangreco, A., Carugati, A., Sebastiano, A., & Della Bella, D. (2010). Trainees' reactions to training: Shaping groups and courses for happier trainees. *The International Journal of Human Resource Management*, 21, 2468-2487. <https://doi.org/10.1080/09585192.2010.516598>
- Grossman, R., & Salas, E. (2011). The transfer of training: What really matters. *International Journal of Training and Development*, 15, 103-120. <https://doi.org/10.1111/j.1468-2419.2011.00373.x>
- Gunawardena, C. N., Linder-VanBerschoot, J. A., LaPointe, D. K., & Rao, L. (2010). Predictors of learner satisfaction and transfer of learning in a corporate online education program. *American Journal of Distance Education*, 24, 207-226. <https://doi.org/10.1080/08923647.2010.522919>
- Hancock, G., & Mueller, R. (2010). *The reviewer's guide to quantitative methods in the social sciences*. New York, NY: Routledge.
- Hicks, E., Bagg, R., Doyle, W., & Young, J. D. (2007). Canadian accountants: Examining workplace learning. *Journal of Workplace Learning*, 19, 61-77. <https://doi.org/10.1108/13665620710728457>
- Homklin, T., Takahashi, Y., & Techakanont, K. (2014). The influence of social and organizational support on transfer of training: Evidence from Thailand. *International Journal of Training and Development*, 18, 116-131. <https://doi.org/10.1111/ijtd.12031>
- Iglesias, M., & Salgado, J. F. (2012). Effectiveness of occupational training through videoconferencing: Comparison with classroom training and individual differences. *Revista de Psicología del Trabajo y de las Organizaciones*, 28, 183-188. <https://doi.org/10.5093/tr2012a15>
- Johnson, R. D., Gueutal, H., & Falbe, C. M. (2009). Technology, trainees, metacognitive activity and e-learning effectiveness. *Journal of Managerial Psychology*, 24, 545-566. <https://doi.org/10.1108/02683940910974125>
- Joo, Y. J., Lim, K. Y., & Park, S. Y. (2011). Investigating the structural relationships among organizational support, learning flow, learners' satisfaction and learning transfer in corporate e-learning. *British Journal of Educational Technology*, 42, 973-984. <https://doi.org/10.1111/j.1467-8535.2010.01116.x>
- Klein, H. J., Noe, R. A., & Wang, C. (2006). Motivation to learn and course outcomes: The impact of delivery mode, learning goal orientation, and perceived barriers and enablers. *Personnel Psychology*, 59, 665-702. <https://doi.org/10.1111/j.1744-6570.2006.00050.x>
- Martins, L. B., & Zerbini, T. (2016). Fatores influentes no desempenho acadêmico de universitários em ações educacionais a distância. *Estudos de Psicologia (Natal)*, 21, 317-327.
- Martins, L. B., Zerbini, T., & Medina, F. J. (2018a). Learning Strategies Scale: Adaptation to Portuguese and factor structure. *Psicologia: Reflexão e Crítica*, 31(12), 1-9. <https://doi.org/10.1186/s41155-018-0092-1>
- Martins, L. B., Zerbini, T., & Medina, F. J. (2018b). Course reaction scale in E-Learning: Adaptation and factor structure. *Revista Psicologia: Teoria e Prática – Mackenzie*, 20, 223-224.
- Mathieu, J. E., Tannenbaum, S. I., & Salas, E. (1992). Influences of individual and situational characteristics on measures of training effectiveness. *Academy of Management Journal*, 35, 828-847. <https://doi.org/10.2307/256317>
- Meneses, P. P. M., Abbad, G., Zerbini, T., & Lacerda, E. (2006). Medidas de características da clientela em avaliação de TD&E. In J. E. Borges-Andrade, G. Abbad, & L. Mourão (Orgs.), *Treinamento, desenvolvimento e educação em organizações e trabalho: fundamentos para a gestão de pessoas* (pp. 422-442). Porto Alegre, Brazil: Artmed.
- Mourão, L., Abbad, G., & Zerbini, T. (2014). Avaliação da efetividade e dos preditores de um treinamento a distância em uma instituição bancária de grande porte. *RAUSP-Revista de Administração*, 49, 534-548. <https://doi.org/10.5700/rausp1166>
- Noe, R. A., Clarke, A. D. M., & Klein, H. J. (2014). Learning in the twenty-first-century workplace. *Annual Review of Organizational Psychology and Organizational Behavior*, 1, 245-275. <https://doi.org/10.1146/annurev-orgpsych-031413-091321>
- Pantoja, M. J., & Borges-Andrade, J. E. (2009). Estratégias de aprendizagem no trabalho em diferentes ocupações profissionais. *RAC-Eletrônica*, 3(1), 41-62.
- Pham, N. T. P., Segers, M. S. R., & Gijssels, W. H. (2012). Effects of work environment on transfer of training: Empirical evidence from master of business administration programs in Vietnam. *International Journal of Training and Development*, 17, 1-19. <https://doi.org/10.1111/j.1468-2419.2012.00417.x>
- Pilati, R., & Abbad, G. S. (2005). Análise fatorial confirmatória da escala de impacto no treinamento no trabalho. *Psicologia: Teoria e Pesquisa*, 21(1), 43-51. <https://doi.org/10.1590/S0102-37722005000100007>
- Preacher, K., & Kelley, K. (2011). Effect size measures for mediation models: Quantitative strategies for communicating indirect effects. *Psychological Methods*, 16, 93-115. <https://doi.org/10.1037/a0022658>
- Raymond, A. N., Clarke, A. D. M., & Klein, H. J. (2014). Learning in the twenty-first-century workplace. *Annual Review of Organizational Psychology and Organizational Behavior*, 1, 245-275. <https://doi.org/10.1146/annurev-orgpsych-031413-091321>
- Salas, E., Tannenbaum, S. I., Kraiger, K., & Smith-Jentsch, K. A. (2012). The science of training and development in organizations: What matters in practice. *Psychological Science in the Public Interest*, 13, 74-101. <https://doi.org/10.1177/1529100612436661>

- Sitzmann, T., & Elly, K. (2010). Sometimes you need a reminder: The effects of prompting self-regulation on regulatory processes, learning, and attrition. *Journal of Applied Psychology*, 95, 132-144. <https://doi.org/10.1037/a0018080>
- Umekawa, E. E. R., & Zerbini, T. (2015). Evasão e persistência em ações educacionais a distância: Análise do perfil discente. *Revista Psicologia: Organizações e Trabalho*, 15, 188-200. <https://doi.org/10.17652/rpot/2015.2.517>
- Vovides, Y., Sanchez-Alonso, S., Mitropoulou, V., & Nickmans, G. (2007). The use of e-learning course management system to support learning strategies and to improve self-regulated learning. *Educational Research Review*, 2, 64-74. <https://doi.org/10.1016/j.edurev.2007.02.004>
- Warr, P., & Allan, C. (1998). Learning strategies and occupational training. *International Review of Industrial and Organizational Psychology*, 13, 83-121.
- Zerbini, T., Coelho, F. A., Abbad, G. S., Mourão, L., Alvim, S., & Loiola, E. (2012). Transferência de treinamento e impacto do treinamento em profundidade. In G. S. Abbad, L. Mourão, P. P. M. Meneses, T. Zerbini, J. E. Borges-Andrade, & R. Vilas-Boas (Orgs.), *Medidas de avaliação em treinamento, desenvolvimento e educação: ferramentas para gestão de pessoas* (pp. 127-144). Porto Alegre, Brazil: Artmed.
- Zijlstra, F. R. H., Roe, R. A., Leonora, A. B., & Krediet, I. (1999). Temporal factors in mental work: Effects of interrupted activities. *Journal of Occupational and Organizational Psychology*, 72, 163-185. <https://doi.org/10.1348/096317999166581>

**Appendix**

## Items of the Job Performance Measures

## Self-evaluation

1. I take the opportunities I have to practice the new skills.
2. I make fewer mistakes at work.
3. I can do my work faster.
4. It improved the quality of my work.
5. It increased my motivation to work.
6. I suggest changes in work routines more often.
7. I clarify doubts of my colleagues.

## Hetero-evaluation

1. The employee takes the opportunities she/he has to practice the new skills.
2. The employee makes fewer mistakes at work.
3. The employee can do her/his work faster.
4. The training improved the quality of her/his work.
5. The training increased her/his motivation to work.
6. The employee suggests changes in work routines more often.
7. The employee clarifies doubts of her/his colleagues.