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Evidências de validade da escala de clima para aprendizagem


Validity evidence of the learning climate scale

Evidencia de validez de la escala de clima de aprendizaje

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PALAVRAS-CHAVE

Comportamento
Organizacional.
Clima Organizacional.
Aprendizagem

Resumo: Clima para aprendizagem em um contexto organizacional é a percepção compartilhada entre os empregados sobre políticas e práticas organizacionais que têm o objetivo de facilitar, recompensar e apoiar os comportamentos de aprendizagem. O presente estudo teve como objetivo traduzir e adaptar uma medida tridimensional de clima para aprendizagem, bem como avaliar indicadores de validade deste instrumento por meio de Análise Fatorial Exploratória. Após tradução da escala e validação por juízes, o instrumento, em formato eletrônico, foi divulgado em redes sociais e obteve 293 respostas válidas. A análise fatorial demonstrou uma estrutura satisfatória de três fatores, com bons índices de fidedignidade: facilitação da aprendizagem (alpha de Cronbach=0,83); valorização da aprendizagem (alpha de Cronbach=0,90); e evitação de erros (alpha de Cronbach=0,85). As cargas fatoriais variaram entre 0,60 e 0,97. Esses resultados indicam que a escala de Clima para Aprendizagem possui características psicométricas adequadas para seu uso em diagnósticos organizacionais e pesquisas acadêmicas sobre aprendizagem no trabalho. Assim, no campo prático, o uso dessa escala pode contribuir ao fornecer insumos para intervenções que visem a propiciar ambientes organizacionais favoráveis à aprendizagem. Já no âmbito acadêmico, a escala pode ajudar a compreender o fenômeno da aprendizagem dentro de organizações de trabalho por meio de estudos empíricos quantitativos.

KEYWORDS

Organizational Behavior.
Organizational Climate.
Learning.

Abstract: Learning climate in an organizational context is the shared perception among employees about organizational policies and practices that facilitate, reward, and support learning behaviors. The present study aimed to translate and adapt a three-dimensional measure for learning climate and evaluate this instrument's validity criteria through Exploratory Factor Analysis. After translating the scale and validating it by judges, the instrument, in electronic format, was published on social networks and obtained 293 valid responses. Factor analysis demonstrated a satisfactory three-factor structure with good reliability indices: facilitation (Cronbach's alpha=0.83), appreciation (Cronbach's alpha=0.90), and error avoidance (Cronbach's alpha=0.85). The factor loadings varied between 0.60 and 0.97. These results indicate that the learning climate scale has adequate psychometric characteristics for use in organizational diagnoses and academic research on learning at work. Thus, in the practical field, using this scale can contribute by providing inputs for interventions to provide organizational environments favorable to learning. In the academic field, the scale can help to understand the phenomenon of learning in work organizations through quantitative empirical studies.

PALABRAS CLAVE

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Resumen: Clima para aprendizaje en un contexto organizacional es la percepción compartida entre los empleados sobre las políticas y prácticas organizacionales que tienen por objetivo facilitar, recompensar y apoyar los comportamientos de aprendizaje. El presente estudio tuvo como objetivo traducir y adaptar una medida tridimensional de clima para aprendizaje, como también evaluar los indicadores de fiabilidad de ese instrumento mediante un Análisis Factorial Exploratorio. Después de la traducción de la escala y de la evaluación hecha por jueces, el instrumento, en formato electrónico fue divulgado en las redes sociales y se obtuvo un total de 293 respuestas útiles. El análisis factorial mostró una estructura satisfactoria de tres factores, con índices adecuados de fiabilidad: facilitación del aprendizaje (alpha de Cronbach=0,83); valoración del aprendizaje (alpha de Cronbach=0,90); y evitación de errores (alpha de Cronbach=0,85). Las cargas factoriales oscilaron entre 0,60 y 0,97. Esos resultados indican que la escala de Clima para Aprendizaje posee características psicométricas adecuadas para su uso en diagnósticos organizacionales y estudios académicos sobre aprendizaje en el trabajo. En términos prácticos, el uso de esa escala puede contribuir al ofrecer subsidios para realizar intervenciones que objetiven fomentar ambientes organizacionales propicios al aprendizaje. En términos académicos, la escala puede ayudar a comprender el fenómeno del aprendizaje dentro de las organizaciones de trabajo mediante la realización de estudios empíricos cuantitativos.

Introduction

Learning at work, at its different levels (individuals, teams, and organizations), constitutes a relevant field of research. That is because the current scenario demands agility in acquiring new knowledge to keep organizations competitive. In this context, conducting studies focused on understanding contextual work variables that influence learning is essential.

Speaking about learning in organizations is not new. However, as Marsick and Watkins (2003) emphasize, the actions adopted in organizations focused on constantly acquiring new knowledge are elusive and not always based on research into what constitutes a learning culture. Furthermore, many instruments used in this field have the purpose of diagnosing and proposing interventions and are developed in the market and not through research, which means that these instruments can even promote changes but hardly identify standards for achieving defined objectives. Although these authors made this criticism more than 20 years ago, a recent review developed by Neves and Steil (2019) pointed out that measurement is still a gap in organizational learning since the empirical measures found have methodological weaknesses and conceptual convergence problems. Therefore, higher care is required when constructing instruments, from appropriate conceptualization to the search for reliable validity evidence.

As a counterpoint to this scenario, there are fields of research, such as Organizational Psychology, which have developed theories and measures on variables related to learning in organizations - e.g., Support to informal learning at work, Coelho-Junior and Borges-Andrade (2015) - which contributes to advancing understanding of this phenomenon and, consequently, to greater effectiveness of interventions.

Learning in the workplace is closely linked to employees' perception of an environment conducive to learning. To address this issue, it is relevant to mention organizational climate, a traditional field of research within Organizational Psychology. The organizational climate refers to the set of perceptions shared by employees regarding the work environment, and its elements contribute to creating an environment that can stimulate or inhibit individuals' learning. Therefore, understanding the organizational climate is fundamental to understanding and promoting effective learning in the workplace.

It is noteworthy, within the characteristics of climate, that it is a multidimensional construct. Once multiple climates (dimensions) exist simultaneously within the same organization, studying it is more appropriate when the climate is specified and with a referent (Carrasco et al., 2011), such as innovation, service, safety, and or learning. Hence, given this multidimensional characteristic of the climate and given the fact that the organization's ability to stimulate learning in its employees is essential for their survival in a dynamic context such as the current one (Nikolova et al., 2014), a measure that focuses on a climate favorable to learning is relevant.

Therefore, this study aims to translate and adapt a three-dimensional measure of learning climate and present its validity evidence in Portuguese. To this end, we conducted an empirical research of a quantitative nature.

Theoretical elements of the research

Learning climate

The definition of climate is often confused with other constructs. For this study, it is relevant to emphasize that climate is not associated with an evaluative judgment considering affective aspects but rather with

perception and description of the context, differentiating itself from variables such as satisfaction.

Onça, Bido, and Carvalho (2018) define learning climate as team perceptions about the work environment being a facilitator or inhibitor of learning. Nikolova et al. (2014) argue that learning climate is the perception of organizational policies and practices adopted to facilitate, reward, and support employees' learning behaviors. This second definition is more specific in delimiting the perception of organizational policies and practices and, therefore, is the basis for the definition used in this study. Considering the differentiation of psychological climate (individual perception), it is added to this definition that perceptions must be shared to be a construct at a higher level (not individual). Therefore, learning climate is defined here as a shared perception of organizational policies and practices implemented to facilitate, reward, and support employees' learning behaviors. This definition aligns with the theoretical nature of the organizational climate, defined by Koys and Decottis (1991, p. 266) as "an experiential-based, multi-dimensional, and enduring perceptual phenomenon which is widely shared by the members of a given organizational unit. Its primary function is to cue and shape individual behavior toward the modes of behavior dictated by organizational demands".

We can justify the relevance of studying climate by the role of informal learning in employee performance. Marsick and Watkins (2003) argue that, although formal training plays an important role, the most significant individual learning in the work context occurs mainly in less structured actions supported by a favorable climate.

The climate favorable to learning is a predictor of learning intentions, positive attitudes about learning and participation in learning activities, innovation behavior,

performance, decreased turnover, reduced stress at work, and increased satisfaction (Nikolova et al., 2014). Cortini et al. (2016) demonstrate that it is vital for the development of performance (in motivational and instrumental terms) that organizations, on the one hand, support training and learning actions and, on the other, value the learning activities and efforts made by workers.

The learning climate favors producing innovative ideas in employees and encourages an empowering work environment by facilitating employees to collaborate to face and overcome the organization's challenges (Eldor, 2017). Thus, perceptions about a learning climate can offer a competitive advantage, reflected, among others, in employee innovation behavior. Studies in this field, carried out focusing on the individual level, demonstrated that the perception of the learning climate moderates the relationship between knowledge sharing within the team and innovative practices (Song, Ma, & Sun, 2023). The authors explained this result as an indication that a positive learning climate can increase the frequency of communication between team members, increasing mutual trust and encouraging them to propose new ideas without worrying about judgment from co-workers. In this sense, Nikolova et al. (2016) also point out that a learning climate can be particularly influential in maintaining employees' competence levels in organizational changes that require new skills. Thus, a learning climate will offer the necessary environmental conditions to promote individuals' resources concerning new knowledge, skills, attitudes, and other characteristics (KSAOs) needed for change.

Still in the context of change, Nikolova et al. (2016) highlight that, in addition to favoring the acquisition of knowledge that is important for new processes, investing in employee professional development in times of restructuring can be perceived as a sign that

the company values its workforce and intends to retain employees, providing them with greater security. In this sense, Govaerts et al. (2011) also identified that a learning climate predicts talent retention, positively influences the intention to stay in the company, and negatively influences the intention to seek new opportunities. This result is justified once employees are less inclined to leave work when they realize they are growing and learning.

Even though scholars have widely defended the importance of learning climate, there is less agreement on what comprises the construct and how we should measure it (Nikolova et al., 2014). The variety of concepts and operationalizations can bring inconsistencies in empirical findings, leading to the need to define better the construct and its dimensions. As an example, Onça, Bido, and Carvalho (2018) use the following dimensions to define a learning climate: management style and relationship, time, autonomy and responsibility, team style, development opportunity, guidance on how to carry out the work, and satisfaction with the workplace. We can observe some conceptual confusion with these dimensions regarding the difference between climate, its predictors, consequences, and other related variables. For instance, on this scale, there is a dimension on satisfaction, even though there is consensus in the literature on the differentiation between climate and satisfaction that, despite being related, are different constructs, as the first is more related to cognitive aspects while the second has an affective nature.

Some studies in the international literature assess the learning climate through the questionnaire developed by Marsick and Watkins (2003), comprised of 52 items that aim to measure relevant variables concerning the organizational climate, culture, systems, and structures that influence individuals' learning. It covers seven dimensions that

characterize an organization in which learning is encouraged: create continuous learning opportunities, promote inquiry and dialogue, encourage collaboration and team learning, create systems to capture and share learning, empower people toward a collective vision, connect the organization to its environment, and provide strategic leadership for learning. Even though this instrument presents an advance, especially for measuring learning at different levels (individual, group, and organization), it goes beyond the learning climate, measuring consequences, such as changes in organizational performance. Therefore, the instruments by Marsick and Watkins (2003) and that by Onça, Bido, and Carvalho (2018) are not faithful to the theoretical nature of the organizational climate and are not suitable for studying this construct.

There is also the definition by Higuira and Agudelo (2014) adopted to construct their instrument. They understand learning climate as a set of perceived psychological, social, and physical variables decisive for increasing people's learning. They theorized the instrument as one-dimensional but divided into two factors, entitled: 1) conducive environment, which refers to the team's perception of existing cooperation and communication that favor learning, and 2) receptivity, which refers to the team's confidence in sharing ideas, opportunities to apply them, and how much opinions are valued. The definition presented is broad, which made item construction generic. The theorization used to explain the structure divided into two factors, which occurred after empirical findings, also demonstrates the fragility of item construction and the association with the concept of learning climate.

In a literature review, Nikolova et al. (2014) report extensive scales to measure the learning climate covering different constructs. These authors, when focusing on the

theoretical nature of the learning climate, defend the presence of three main dimensions, which would represent the environmental aspects relevant to learning and that are related to the theoretical nature of organizational climate:

- 1) Facilitation refers to support for learning and opportunities offered by the organization, including formal learning.
- 2) Appreciation refers to material and non-material rewards for valued behaviors (learning behaviors in this case).
- 3) Error avoidance refers to the tolerance for errors regarding learning. The importance of this dimension is highlighted, given that in “learning by doing” (the most common way of learning), there must be certainty about how errors resulting from this type of learning will be managed.

The third dimension (error avoidance) is similar to part of psychological safety since, according to Edmondson (1999), one of the aspects that favors exchange between team members is psychological safety, defined as the perception of free expression in an environment, without fear of retaliation, especially in error situations. Error avoidance would be a restrictive factor in psychological safety (Nikolova et al., 2014) and is, therefore, a dimension of the learning climate with a negative meaning: the higher the error avoidance, the less favorable the learning climate.

The present study relies on these three dimensions of learning climate. We argue that the articulation between facilitating and valuing learning in the organizational environment and understanding error as part of the learning process (not avoiding it) constitutes a favorable climate for learning in companies.

We highlight that the learning climate as a construct that refers to an environment conducive to learning presents interfaces with other contextual variables that address the subject. In addition to psychological safety, which, as discussed in the previous paragraph, interfaces with the error avoidance dimension, support for informal learning at work also presents some similarities in its definition. This variable is the individual’s perception of the psychosocial support provided by their peers, colleagues, and managers for learning new knowledge and skills related to work tasks (Coelho Junior & Mourão, 2011). The difference between learning support and learning climate is that the first refers to perceived support coming from peers and managers and directed to a specific individual/group, and climate consists of the perception of the organization’s general policies and practices that stimulate or inhibit engagement in learning actions, formal or informal.

In initial studies on learning climate, the focus was on direct relationships with other variables, without paying attention to possible mediators of the relationship between perceptions of learning climate and employee performance variables (Eldor, 2017). Recently, however, complex relationships involving this variable have been studied. Eldor (2017) explored how the learning climate relates to innovation behavior, presenting evidence that commitment to work would mediate the relationship. This study also finds a mediation relationship when the criterion variable is proficiency in performing work activities. Cortini et al. (2016) identified that psychological tension mediates the relationship between the learning appreciation dimension and work performance. Nikolova et al. (2016) demonstrate the moderating role of the restructuring context variable in the influence of the facilitation climate on the acquisition of new skills. Considering extra-

role behaviors as a criterion variable, we observe that employee engagement mediates their relationship with the learning climate (Eldor & Harpaz, 2016).

When analyzing the role of the different dimensions separately, learning facilitation and learning appreciation are predictors of new skills acquisition (Nikolova et al., 2016). Cortini, Pivetti, and Cervai (2016) highlight that offering support for learning and training and appreciating the worker's effort to engage in learning is crucial for improving performance. These authors found evidence that the dimensions of facilitation and appreciation influence job satisfaction. These two dimensions are also associated with resilience behaviors. The study by Caniëls et al. (2022) demonstrated the mediating role of the learning climate (for the dimensions of learning appreciation and learning facilitation) in the relationship between resilience, personality traits and behaviors. Thus, the learning climate in these two dimensions is the mechanism that contributes to the expression of resilient behaviors at work.

Osagie et al. (2018) found evidence that a climate that appreciates learning increases leaders' social responsibility skills when this climate facilitates learning, demonstrating that the interaction between the two dimensions of the learning climate can better explain some organizational results than each dimension separately.

In the literature, there are also (in higher quantities) studies on the learning climate focusing on schools (e.g., Gwayi-Chore et al., 2021; Maksum & Khory, 2020) that are not addressed in this article, as the focus is a climate favorable to learning in an organizational environment. Even in the organizational environment, a trend focuses on the learning climate in medical residencies, including scales that bring specificities of this environment (e.g., Jansen, Silkens, Stalmeijer,

& Lombarts, 2019). The organizational scenario studied in this article is broader and considers continuous learning, not just in the early stages of a career. Therefore, the concept of climate used in this article is applicable in different work contexts.

Given the above, it is relevant to have an instrument that measures the shared perceptions of team members regarding the incentive given by the organization for learning. In this study, we understand that the learning climate comprises three dimensions, as Nikolova et al. (2014) theorized: learning facilitation, learning appreciation, and error avoidance. When constructing the scale, these authors highlight that other measures address aspects beyond the learning climate besides being very extensive. Their instrument focuses on the most salient facets of work settings inherent to the organizational climate that promote employee learning. That means the scale has well-defined conceptual limits aligned with the phenomenon to be studied, thus respecting its theoretical nature. Its stable factorial structure and adequate psychometric characteristics in different versions, such as the Italian (Cortini et al., 2016) and the Dutch (Osagie et al., 2018), reinforce the quality of the measure. Thus, this study aims to translate and adapt a three-dimensional measure of learning climate and present its validity in Portuguese. Given the proximity of the concepts of dimension error avoidance and the construct of psychological safety, we considered the power of discrimination between these two variables and possible overlaps. Therefore, we also investigated the interrelationship between the two constructs.

Methodological elements of the research

Participants

We carried out the study with a convenience sample comprised of employees who work in teams at Brazilian companies. In

total, 299 responded to the survey, with six participants excluded due to missing data on the climate scale. Of the total participants, 55 are from two micro (less than ten employees) and medium-sized (between 50 and 100 employees) companies, in which access to employees was made possible through the people management area. The remaining participants (244) are individuals who accessed the questionnaire link available via social networks. These individuals come from different organizations, most from public departments or companies/mixed capital companies (171).

Instruments

For this study, we used the Learning Climate Instrument, translated and adapted from Nikolova et al. (2014). The original instrument consists of nine items, divided into three factors with three items each: a learning facilitation climate, a learning appreciation climate, and an error avoidance climate. Participants responded to a 5-point Likert scale.

To measure psychological safety and identify evidence of discriminant validation, we used a single-factor scale from Ramalho (2019), adapted by Vieira, Camilo, Puente-Palacios, and Castro (2020), consisting of seven items and $\alpha=0.90$.

Procedures of translation and adaptation of the instrument

The scale by Nikolova et al. (2014) was translated into Portuguese by a person fluent in English and Portuguese. It was then retranslated into English by an individual who did not know the original scale. The results were compared and adjusted for greater clarity. After this stage, the scale was submitted for evaluation by a group of judges comprised of doctorate researchers with knowledge in constructing measurement instruments in the organizational behavior

field. These judges were responsible for evaluating item discrimination between factors and the clarity of item wording. We observed that the judges appropriately allocated items to the factor to which they theoretically belonged 100% of the time. Then, we made the suggested changes regarding the clarity of the item.

Following this stage, we submitted the instrument to a research group specialized in team performance to evaluate the clarity and relevance of the items. This group raised the need for a new item related to the availability of time for learning. This item is relevant to the dimension of learning facilitation. With this change, the adapted instrument used in the research consisted of 10 items.

Data collection

Data collection took place through an electronic questionnaire. Initially, we applied the questionnaire to two companies, one micro-company and the other medium-sized. We obtained 55 responses this way. Afterward, we made the questionnaire available and disseminated it on social networks, focusing on people who work in teams. The first page of the questionnaire asked the respondent to confirm if he was a work team member. On that same page, we presented the free and informed consent form, in which the participant agreed to answer the questionnaire, being aware that their participation was voluntary and that they could withdraw at any time. By adopting these procedures, we respected the ethical principles that govern research with human beings.

Data analysis

We carried out an Exploratory Factor Analysis (EFA) using the Factor software to evaluate the factorial structure of the learning climate scale. Considering that the data presented multivariate kurtosis, demonstrated by the Mardia test, we decided to use the

polychoric matrix and the Robust Diagonally Weighted Least Squares (RDWLS) extraction method (Asparouhov & Muthen, 2010), which correct the non-normal data. To decide on the number of factors to retain, we analyzed the results of the Parallel Analysis with random permutation of the observed data (Timmerman & Lorenzo-Seva, 2011), the Kaiser-Guttman criterion, which establishes the eigenvalue greater than 1, and theoretical relevance. The rotation used was Robust Promin. This rotation is recommended because it is an oblique method (appropriate for factors that are not independent of each other) and because its characteristics include simplicity in the rotated solution and stability between samples (Lorenzo-Seva & Ferrando, 2019).

We assessed the model adequacy with the Comparative Fit Index (CFI) and the Root Mean Square Error of Approximation (RMSEA) residual index. Although there is discussion about the cutoff limits of these indicators, the literature points out that the RMSEA is good below 0.06 and acceptable below 0.10. The CFI is good when higher than 0.95 and adequate when higher than 0.90 (Lai & Green, 2016).

We assessed factor stability with the H index, which measures how well a set of items represents a common factor (Ferrando & Lorenzo-Seva, 2018). H values range from 0 to 1. High H values (> 0.80) suggest a well-defined latent variable more likely to be stable across different studies. To assess the reliability of the factors, we evaluated Cronbach's alpha index (most used) and the composite reliability index, which considers the importance of each item to calculate the reliability of the factor.

To carry out the discriminant analysis, we applied factor analysis along the main axis, inserting the items from the climate scale and those from psychological safety, with varimax rotation, to focus more on the differences between the constructs and forcing the

extraction of two factors (two scales).

Result presentation and discussion

Before beginning the analysis of the structure underlying the scale items, we observed the assumptions for factor analysis. The sphericity tests Bartlett (2098.2, $df = 45$, $p < 0.001$) and KMO (0.85) demonstrated the factorability of the items. We observed that the distribution of responses showed multivariate kurtosis using the Mardia test. However, the analysis performed is robust for this assumption because we used the polychoric matrix and the RDWLS method once we considered the scale data ordinal.

The Kaiser-Guttman criterion was the most consistent with the theory to define the number of factors, suggesting three factors. Despite being a non-recommended method as it tends to overestimate the number of factors (Damásio, 2012), its association with theoretical relevance makes the suggested 3-factor solution more suitable for this scale.

It is relevant to highlight that the indicators Unidimensional Congruence (UniCo = 0.88), Explained Common Variance (ECV=0.75), and Mean of Item Residual Absolute Loadings (MIREAL=0.35) (Ferrando & Lorenzo-Seva, 2018) did not support the possibility of unidimensionality of the scale, a fact that offers additional support for the search for a multifactorial solution, in this case, three factors, instead of a single factor. We divided the items according to the expected theoretical structure with the Robust Promin rotation (Lorenzo-Seva & Ferrando, 2019). Table 1 describes the factor loadings of the items.

Table 1
Factor structure of the Learning Climate Scale

| Items | 1 | 2 | 3 |
|---|------|---|---|
| <i>Learning facilitation</i> | | | |
| 2. My organization provides educational facilities and resources that stimulate learning. | 0.92 | | |

| | | | |
|---|------|------|------|
| 3. In my organization, people receive the training they need to perform their roles. | 0.87 | | |
| 1. My organization offers the resources necessary to develop my skills. | 0.77 | | |
| 4. In my organization, time is given for people to engage in learning actions. | 0.60 | | |
| Learning appreciation | | | |
| 5. Employees are promoted if they commit to their professional development. | 0.95 | | |
| 7. In my organization, people who make an effort to learn new skills are valued and recognized. | 0.92 | | |
| 6. In my organization, employees who continually develop are rewarded. | 0.91 | | |
| Error avoidance | | | |
| 10. In my organization, employees feel uncomfortable discussing errors. | 0.97 | | |
| 9. In my organization, people get apprehensive when they need to discuss work-related problems. | 0.91 | | |
| 8. In my organization, people are afraid to admit errors. | 0.79 | | |
| Orion | 0.91 | 0.95 | 0.97 |
| FDI | 0.96 | 0.98 | 0.98 |
| H-latent | 0.91 | 0.95 | 0.97 |
| H-observed | 0.92 | 0.98 | 0.94 |
| Reliability (Cronbach's alpha) | 0.83 | 0.90 | 0.85 |
| Composite reliability | 0.87 | 0.95 | 0.92 |

Source: research data (2023).

Note 1: loadings lower than 0.30 were omitted.

Note 2: free translation of the items used in the questionnaire

Also reported are the indices of factor reliability (Cronbach's alpha and composite reliability), factor determinacy index (FDI), Orion, as well as replicability estimates of the factor scores (H-index, Ferrando & Lorenzo-Seva, 2018).

The items presented high loadings in their respective factors. In the factor learning facilitation, the loadings varied between 0.60 and 0.92. In the factor learning appreciation, the variation was between 0.91 and 0.95. In the factor error avoidance, the loadings were between 0.79 and 0.97. We observed no cross-loading pattern, that is, items with factor loadings above 0.30 on more than one factor.

The measure of replicability of the factorial structure (H-index), proposed by Ferrando and Lorenzo-Seva (2018), suggested that all factors tend to be replicable in future studies since the H-index was higher than 0.80 in all factors.

The reliability indices were also adequate, with Cronbach's alpha varying between 0.83 and 0.90 and the composite reliability varying between 0.87 and 0.95. The factor learning appreciation obtained the best reliability ratings.

The adjustment indices were CFI=0.94, considered adequate, and in the residual analysis, we observed that the RMSEA index was higher than expected (0.28). However, the relevance analysis of the proposed model, comprised of three factors, cannot be carried out by analyzing each index separately. Thus, considering the set of indicators (factor loadings and reliability indices), it is pertinent to defend the structuring of the scale into three factors.

Regarding correlations between factors, Table 2 shows that the highest was 0.72. Thus, two factors in the measure show more intense associations with each other (facilitation and appreciation). On the other hand, this value also reveals that these factors share 52% of the variance. Therefore, they still have 48% uniqueness or specificity, which supports the adequacy of the defended structure with three factors.

Table 2

Correlation between factors

| | Error avoidance | Learning facilitation |
|-----------------------|------------------------|------------------------------|
| Learning facilitation | -0,45 | |
| Learning appreciation | -0,53 | 0,72 |

Source: research data (2023)

Given the pattern of correlations between factors, we carried out second-order

factor analysis, considering the factor scores. We aggregated the three factors into a second-order one, with loadings above 0.30: learning appreciation climate=0.82, learning facilitation climate=0.69, and error avoidance climate=-0.43. We observed that the error avoidance factor has the lowest factor loading, demonstrating that it is the least central dimension in the learning climate construct.

After checking the validity evidence and considering the theoretical framework mentioned in the introduction of this manuscript, we tested the discrimination power of the learning climate instrument and the psychological safety instrument to identify evidence that they are two theoretically and empirically distinct phenomena, although related. We carried out this analysis using an exploratory factor analysis with forced separation of two factors. We observed that the first two factors of the climate scale (learning facilitation and learning appreciation) were grouped, and the error avoidance factor was grouped with psychological safety, demonstrating that the two concepts are perceived similarly. Table 3 describes the results of the analysis.

Table 3
Discrimination of the learning climate scale and the psychological safety scale

| Items | Factor 1 | Factor 2 |
|-------|----------|----------|
| AC2 | 0.86 | 0.32 |
| AC1 | 0.85 | |
| AC3 | 0.83 | |
| FC1 | 0.80 | |
| FC2 | 0.76 | |
| FC3 | 0.73 | |
| FC4 | 0.65 | |
| EAC2 | | -0.82 |
| EAC3 | | -0.82 |
| PS2 | | 0.81 |
| PS5 | 0.31 | 0.79 |
| PS4 | | 0.74 |
| PS1 | | 0.69 |

| | | |
|------|------|-------|
| PS3 | | 0.65 |
| EAC1 | | -0.63 |
| PS6 | | 0.57 |
| PS7 | 0.36 | 0.54 |

Note: AC – Appreciation Climate; FC – Facilitation Climate; EAC- Error Avoidance Climate; PS – Psychological Safety.

Source: research data (2023).

Added to these data is the information that the correlation between the Error Avoidance Climate and Psychological Safety was $r=-0.52$, indicating that each presents specific characteristics despite being similar and sharing part of the variance. Hence, respondents perceive error avoidance climate and psychological safety similarly in the same category. However, the correlation between these two constructs indicates that they are not interchangeable.

The results presented in this section demonstrate initial evidence of how the dimensions of the learning climate, translated by the scale factors analyzed here, are organized. Therefore, it is pertinent to argue that the dimensions of learning appreciation and learning facilitation are central to structuring the concept of learning climate. Moreover, the dimension error avoidance seems less central, even though it is a constituent part of the construct. Thus, the data obtained in this analysis reveal that these three factors represent the set of organizational practices and policies that can describe a learning climate.

Final Remarks

Organizations are increasingly concerned with promoting learning among their employees to remain competitive in a dynamic market. Therefore, measuring whether the organizational environment is favorable to learning is relevant to diagnosing and proposing actions that favor acquiring new

knowledge. According to Marsick and Watkins (2003), this topic is already explored within organizations and, often, with instruments elaborated without scientific rigor, lacking reliability and trustworthiness. Therefore, proposing measures that assess the organizational environment's favorableness to employee learning becomes relevant. In this sense, and considering that the already developed learning climate measures covered several phenomena, Nikolova et al. (2014) proposed their scale to be faithful to the theoretical nature of the organizational climate aimed at promoting learning, focusing on the most salient factors that favor it, thus valuing parsimony.

The Portuguese version of the scale, proposed and analyzed in this study, presented consistent evidence of a good factor structure once the structure of three factors separated the items as theorized, showing adequate factor loadings. The indices indicating the replicability of the factors (H-index) were also high, demonstrating that the factor structure will tend to remain stable in other samples. Regarding the reliability indices (Cronbach's alpha and composite reliability), it is worth highlighting that they were all above 0.8, demonstrating internal consistency in the factors.

Regarding the findings obtained in this study, it is also worth mentioning that the three-factor structure seems to be adequate, due to the theoretical aspect that cannot be neglected in an EFA (Damásio, 2012), and considering indicators such as factor loadings (high and with the absence of complex loads), reliability and factor determinacy indices (FDI). The existence of a strong correlation ($r=0.72$), identified between learning appreciation and learning facilitation, shows that they are associated, but also constitute specific dimensions. While the first refers to the perception of return obtained by employees when engaging in learning actions,

the second focuses on the means that favor engagement in these actions. Thus, they constitute correlated dimensions, but with theoretical specificity, considering the content regarding the practices and policies accessed as well as the percentage of non-shared variance (48%).

The factor regarding error avoidance proved less central in the learning climate. Even with its smaller salience, demonstrated by second-order factor analysis, its maintenance on the scale is defended because this factor represents the opposite of openness to learning, considering that errors can occur during the learning process. This factor is a psychological safety restrictor, opposite to an environment favorable to learning. In this regard, it is still important to highlight that, given the specificity of each factor, it is pertinent to expect that each one presents different relationships with other variables, whether as an antecedent or consequent. In the study by Cortini et al. (2016), for instance, both the facilitation and appreciation climates were predictors of team performance. The same did not occur for the error avoidance climate. Osagie et al. (2018) found that facilitation and appreciation climates jointly impact skill development. However, the authors did not find a similar relationship with the error avoidance climate. It is worth highlighting that this dimension of the learning climate is related to experimentation and learning in this context, which reflects an environment where there is space for learning during application that can lead to innovation. Therefore, it is a relevant dimension for the concept of learning climate.

Still regarding the error avoidance dimension, the similarity of its definition to that of psychological safety stands out since, for Nikolova et al. (2014), the error avoidance climate would be a restrictive factor in psychological safety. We investigated the relationship between these two variables in

this study, and the result contributes to broadening the reflection on the similarity and partial overlap of the two concepts. We can see psychological safety as the deepening of a learning climate dimension. Based on these findings, and given the evidence of the validity of the scales when evaluated separately, both are appropriate for use in research. However, we would not recommend models that contain both variables. Therefore, we recommend choosing the variable learning climate in studies that aim to understand the broad context of an environment favorable to learning and the variable psychological safety in studies that aim to explore employees' perceptions regarding an open environment for free expression. In any case, the relationship between these two concepts inspires care when developing predictive models.

Regarding the three-factor model adjustment, the RMSEA residual index was higher than expected despite the adequate CFI. Discrepancies between adjustment indices are common, and one of the indices without the cutoff established in the literature should not be a reason to reject the model, in this case, the factor structure, as defended by Lai and Green (2016). These authors also warn that, although studies widely use these indices, researchers assume that data follows a normal distribution. As mentioned, the data presented multivariate kurtosis, which may have biased the indicators. Furthermore, the sample size may have been insufficient to find the expected effect (Lai & Green, 2016). The correlation between factors (especially appreciation and facilitation) may also have influenced. Therefore, we propose a confirmatory factor analysis in a different sample because of the correlation between these factors.

Given the results found and considering the theoretical basis used in constructing the scale, we argue that the learning climate within organizations comprises three theorized dimensions.

Therefore, an organization that intends to stimulate learning among its work teams must pay attention to appreciating efforts in this regard, providing an environment that facilitates learning and minimizing error avoidance. These three dimensions were adequately represented, with good empirical evidence, by the three factors of the instrument.

Therefore, we recommend using the scale for organizational diagnoses and academic research that works with predictors of learning in organizations. The scale presented also has the advantage of having few items that adequately capture the phenomenon in question. Short scales favor their application in diagnosis and research since they are generally not applied alone. Long questionnaires are tiring for the respondent and can harm the quality of the answers.

The study has the limitation of using a convenience sample since most of the responses obtained result from a link published on a social network. Therefore, there is sampling bias in the participants. So, we recommend future studies with diverse samples.

As an agenda, we propose that future studies confirm the psychometric quality of the scale and use it in Brazilian organizations to investigate predictors and consequences of an environment conducive to learning, thus favoring the understanding of the learning process in the organizational context and its impacts on the company's results.

We conclude that the instrument presented herein has adequate psychometric quality. Therefore, this article contributes to academics and practitioners, providing an instrument with validity evidence for use in organizational diagnoses and research that analyzes antecedents and consequences of the perceived context of stimulating learning.

However, we recommend application in other contexts and confirmatory factor

analysis to verify the stability of the factorial structure and generalize findings across different audiences.

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