





## ORIGINAL ARTICLE

# TEAMWORK CLIMATE SCALE (ECTE, in Portuguese): VALIDITY, RELIABILITY AND STANDARDIZATION STUDY\*

### HIGHLIGHTS

1. ECTE is an important research and management tool.
2. ECTE requires data analysis by teams in the study sample.
3. Robust instrument with evidence of validity and internal consistency.
4. Contributes to the nurse's analysis and intervention with the team.

Cibele Correia Semeão Binotto<sup>1</sup>   
Márcia Niituma Ogata<sup>1</sup>   
Everson Meireles<sup>2</sup>   
Jaqueline Alcântara Marcelino da Silva<sup>1</sup> 

### ABSTRACT

**Objective:** to present evidence of validity, reliability, and a standardization procedure for interpreting the Teamwork Climate Scale with family health teams. **Method:** a methodological study with an exploratory correlational design and a cross-sectional design. The participants were professionals from the Family Health teams of a municipality in the interior of São Paulo - BR. Data collection began in December 2020 and ended in April 2021. Data were analyzed using descriptive and inferential statistics. **Results:** The fit of the measurement model of four correlated latent factors (Confirmatory Factor Analysis) was acceptable and satisfactory. Composite reliability coefficients were higher than 0.95. It was possible to propose a valuable system of standards for interpreting the results. **Conclusion:** The study showed evidence of the validity and internal consistency of the Scale, which was confirmed as a powerful instrument whose findings can contribute to strengthening teamwork and interprofessional collaboration.

**KEYWORDS:** Interprofessional Relations; National Health Strategies; Personnel Management; Validation Study.

### HOW TO REFERENCE THIS ARTICLE:

Binotto CCS, Ogata MN, Meireles E, Silva JAM da. Teamwork climate scale (ECTE, in Portuguese): validity, reliability and standardization study. Cogitare Enferm. [Internet]. 2024 [cited "insert year, month and day"]; 29. Available from: <https://doi.org/10.1590/ce.v29i0.96176>.

<sup>1</sup>Universidade Federal de São Carlos, Departamento de Enfermagem, Programa de Pós-Graduação em Enfermagem, São Carlos, SP, Brasil.

<sup>2</sup>Universidade Federal do Recôncavo da Bahia, Departamento de Psicologia, Santo Antônio de Jesus, BA, Brasil.

## INTRODUCTION

Team climate has dynamic characteristics and can contribute to the strengthening and development of the work and individual aspects of the participants, such as the members' self-confidence and determination. Climate involves shared perceptions among the proximal work group<sup>1</sup>. Some studies indicate that well-articulated teamwork can contribute to the quality of care, from safe care to the personal satisfaction of members<sup>2-4</sup>.

The use of reflective processes by team members to analyze weaknesses, monitor colleagues' performance, and share experiences, with interdependence capable of developing an integrated approach with actions and attitudes based on cooperation, can contribute to a positive working climate<sup>2</sup>.

The teamwork climate can directly influence collaborative practices, both from an organizational perspective and in terms of work behavior. Interprofessional collaboration expresses an active partnership between professionals who work together to provide services and solutions, enhancing their strengths and skills and allowing them to perform better<sup>5</sup>.

To analyze the teamwork climate, an instrument called the Teamwork Climate Scale (ECTE) is used, which presents important conceptual aspects for collaborative work, such as interprofessional interaction and communication, co-responsibility for performance, support for work innovation, and the sharing of objectives<sup>2,6</sup>.

This instrument was developed by Anderson and West (1998)<sup>1</sup> who called it the Team Climate Inventory (TCI), whose adaptation and validation in Brazil as the Team Climate Scale was conducted by Silva and collaborators (2016)<sup>7</sup>, authors who also demonstrated initial evidence of validity based on internal structure and reliability.

The ECTE evaluates four factors of team climate, which covers the following constructs: participatory safety; support for innovation; objectives and shared vision; and orientation for tasks<sup>7</sup>.

The ECTE aims to analyze the context of teams, their members, routines, and competencies, as well as the relationships between the environment and work. The correlations between the four constructs can determine the profile and characteristics of teams. The Likert scale is used to evaluate 38 items distributed over the four dimensions mentioned<sup>1</sup>.

The Family Health Strategy (FHS), the setting for this study, is recognized as a model for organizing Primary Health Care (PHC) that contributes to the quality of care equitably, due to its proximity to the local needs of users and families and its commitment to improving access to and use of services by the population, access to social programs, equity, comprehensiveness, longitudinally and community orientation, with consequences for reducing infant and adult mortality and unnecessary hospitalizations<sup>8</sup>.

This research aims to present evidence of validity, reliability, and a standardization procedure for interpreting the ECTE with family health teams.

## METHOD

This is a methodological survey-type field study with an exploratory correlational design and a cross-sectional design. To develop the methodological analysis of the ECTE instrument, part of the data collected in the main author's thesis, entitled "Collaborative Interprofessional Practices for safe care in the Family Health Strategy," was used.

Health professionals from family health units in a municipality in the interior of the state of São Paulo - Brazil - were invited to take part. Nurses, nursing technicians, doctors, community health workers, dentists, and oral health assistants took part in the study.

The study participants were invited by the lead researcher on the day of the team meeting. The research was presented along with its main objectives: the data collection authorization form and the Informed Consent Form (ICF).

Data collection began in December 2020 and ended in April 2021 in a city in the interior of the state of São Paulo. The inclusion criterion was having been part of the same team for at least six months. Family health resident doctors were included because of the workload they carry out at the unit and the bond they build with the team and the population. Professionals who were on vacation or leave during the collection period were excluded.

The best teams for analyzing the work climate were selected based on the criteria of team composition. To identify the most favorable working environments, teams were chosen that had at least one senior member, one member with a technical background, and one middle-level member on the day the questionnaire was administered, following the study's eligibility criteria and a minimum of six months working together. The 202 participants made up 30 teams, of which 157 professionals from 23 teams were selected, as these teams met the criteria described above and showed good results in terms of team climate.

The data was analyzed using descriptive and inferential statistics. An exploratory analysis was carried out to describe the characteristics of the sample and assess the distribution of responses to the ECTE items. Missing values for the ECTE items were rare, ranging from 1 to 4 observations - on average, they represented 0.6%. Psychometric analyses were then carried out by a psychometrician.

Confirmatory Factor Analyses (CFA) were carried out to assess dimensionality, considering the individual level of responses as implemented by Anderson and West<sup>1</sup>. The factor model was specified according to the item-factor relationship reported in the ECTE validation study<sup>7</sup>; however, it maintained the original theoretical assumption that the four latent factors are correlated with each other<sup>1</sup> and not derived from causal effects of one on the other<sup>7</sup>.

The CFAs were carried out using Mplus 8<sup>9</sup> software, with the polychoric correlation matrix as the source of information, the weighted least squares means and variance adjusted (WLSMV) estimation method, and GEOMIN<sup>10</sup> oblique rotation.

The following indices/criteria were used to assess the goodness of fit of the factor model: Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) [values  $\geq 0.90$  indicate acceptable fit; values  $\geq 0.95$  are expected for fit]; and Root Mean Square Error Approximated (RMSEA) [values  $\leq 0.06$  indicate fit, with a maximum acceptable limit of 0.08]<sup>11-12</sup>.

The Average Variance Extracted (AVE) index was used as an indicator of the suitability of the set of items to represent the latent factor - values  $\geq 0.50$  are expected<sup>11</sup>. The

reliability/internal consistency of the factors was assessed using Cronbach's alpha and Composite Reliability coefficients - values equal to or greater than 0.70 indicate satisfactory consistency<sup>13</sup>.

Factor scores were created from the simple arithmetic average of each participant's answers to the items grouped into each of the four latent factors of the ECTE. These scores were aggregated at the level of the previously identified work teams. According to the theoretical orientation underlying the ECTE, scores should be interpreted at the work team level and not at the individual level<sup>11</sup>.

The scores at the team level were analyzed descriptively (average, standard deviation, quartiles, and percentiles). Differences between work teams were analyzed using non-parametric tests (Mann-Whitney and Kruskal-Wallis for independent samples) at  $p \leq 0.05$ . Intra-group rules for interpreting the ECTE results were drawn up.

The research was conducted according to the ethical precepts for research with human beings and approved by the Research Ethics Committee of the University of Araraquara, UNIARA, registered under opinion no. 4.280.360/2020.

## RESULTS

A total of 202 professionals took part, including community health workers (44.1%), nursing technicians or assistants (21.3%), nurses (10.4%), doctors (9.4%), oral health technicians or assistants (5.4%), dental surgeons (5.9%) and family health medical residents (3.5%).

The adjustment results of the measurement model, specified in four correlated latent factors to represent the internal structure of the Teamwork Climate assessed by the ECTE, returned acceptable and satisfactory indices: (CFI = 0.96; TLI = 0.96; RMSEA = 0.08 [95% CI, 0.076 to 0.086]).

Factor loadings indicating item saturation in the factor were estimated at  $p \leq 0.01$  and are shown in Table 1. All the items obtained robust saturation (greater than 0.70) in their respective factors, except for item 03 (We influence each other) whose factor loading was 0.67.

**Table 11** - Results of the Confirmatory Factor Analysis of the ECTE (N = 202). Araraquara, SP, Brazil, 2020.

TCI items	Factors and estimated factor loadings				$r_{it}$
	Participation in the team	Support for new ideas	Team goals	Task orientation	
I01	0.81				0.71
I02	0.84				0.76
I03	0.67				0.61

1 **Notes.** Factor model adjustment indices: CFI = 0,96; TLI = 0,96; RMSEA = 0,08 (IC=95%, 0,076 a 0,086). Internal consistency of the factors:  $\alpha$  = Cronbach's alpha; CR = Composite Reliability; AVE = Average Variance Extracted\* Item-total correlation coefficient ( $r_{it}$ ).

I04	0.81			0.74	
I05	0.77			0.63	
I06	0.74			0.68	
I07	0.85			0.74	
I08	0.89			0.77	
I09	0.90			0.80	
I10	0.88			0.74	
I11	0.89			0.77	
I12	0.70			0.57	
I13		0.93		0.83	
I14		0.93		0.83	
I15		0.87		0.79	
I16		0.85		0.79	
I17		0.88		0.80	
I18		0.91		0.83	
I19		0.86		0.81	
I20		0.89		0.82	
I21			0.84	0.78	
I22			0.92	0.85	
I23			0.89	0.82	
I24			0.90	0.76	
I25			0.90	0.78	
I26			0.83	0.80	
I27			0.83	0.79	
I28			0.86	0.85	
I29			0.73	0.72	
I30			0.74	0.74	
I31			0.94	0.74	
I32				0.90	0.84
I33				0.76	0.73
I34				0.85	0.82
I35				0.92	0.87
I36				0.93	0.86
I37				0.91	0.84
I38				0.92	0.87
$\alpha$ (CC)	0.93 (0.96)	0.95 (0.97)	0.95 (0.97)	0.95 (0.96)	
AVE	0.66	0.79	0.73	0.78	

Source: The authors (2023).

Item 03 showed saturation of less than 0.70 in previous studies<sup>7, 14-16</sup>, which attributed possible semantic ambiguities to the item, without excluding it from the instrument.

The internal consistency coefficients obtained for the four teamwork climate factors ranged from 0.93 to 0.97. Participation in the team - participation in decision-making, frequency of interactions, and sharing of information ( $\alpha = 0.93$ ;  $CC = 0.96$ );

Support for new ideas - approval and support for each team member's attempts to introduce new ideas ( $\alpha = 0.95$ ;  $CC = 0.97$ ); Team goals - clarity and individual and collective commitment to common goals ( $\alpha = 0.95$ ;  $CC = 0.97$ ); and task orientation - individual and team responsibility with monitoring for the best quality of care ( $\alpha = 0.95$ ;  $CC = 0.96$ ).

It was considered that keeping it in the instrument would not hurt the representation of the "Participation in the Team" construct because a factor load of 0.67 in the representation of a latent factor is not insignificant<sup>12</sup>.

The individual scores for each of the factors were aggregated at the level of their respective work teams, given the theoretical model underlying the ECTE<sup>1,17-18</sup>. The average of the individual responses of all team members for each of the four ECTE factors was calculated.

The number of participants in these teams ranged from 4 to 15 professionals (Mean = 7.74; standard deviation = 2.90). These teams were divided into three groups in terms of their size: G1 = up to 06 members (10 teams; 29.9% of the participants included); G2 = between 07 and 08 members (09 teams; 42.7% of the participants included); G3 = 09 members or more (04 teams; 27.4% of the participants included).

Non-parametric analyses (Kruskal-Wallis - K-W test for independent samples) were conducted to assess the extent to which team scores could be significantly affected by the number of members. Table 2 shows the comparison of teamwork climate scores according to the number of members.

**Table 2<sup>2</sup>** - Comparison of teamwork climate scores according to the number of team members (n = 23 teams). Araraquara, SP, Brazil, 2020

Teamwork climate factors (TCI) / groups by number of team members	M	SD	95% confidence interval for average		Amplitude observed		Sig. (p) of K-WA test	The possible amplitude of the TCI		
			Lim Lower	Lim. Upper	Min.	Max.		Min.	Max.	
<b>Participation in the Team</b>	G1	3.88	0.60	3.45	4.30	2.94	4.68	0.816	1.00	5.00
	G2	4.11	0.38	3.82	4.40	3.40	4.55			
	G3	3.90	0.65	2.87	4.93	2.96	4.41			
	Total	3.97	0.52	3.75	4.20	2.94	4.68			
<b>Support for new ideas</b>	G1	3.55	0.72	3.03	4.07	2.46	4.58	0.626	1.00	5.00
	G2	3.85	0.35	3.59	4.12	3.30	4.44			
	G3	3.79	0.68	2.71	4.86	2.84	4.31			
	Total	3.71	0.59	3.46	3.96	2.46	4.58			
<b>Team Objectives</b>	G1	4.89	0.79	4.32	5.45	3.64	6.14	0.327	1.00	7.00

2 **Note.** G1 = up to 6 members; G2 = between 7 and 8 members; G3 = 9 or more members.

	G2	5.30	0.44	4.96	5.63	4.49	6.02		
	G3	4.98	0.91	3.54	6.42	3.77	5.91		
	Total	5.06	0.69	4.76	5.36	3.64	6.14		
<b>Task Orientation</b>	G1	4.61	1.02	3.89	5.34	3.05	5.94	0.524	1.00 7.00
	G2	5.13	0.60	4.67	5.60	4.14	6.07		
	G3	4.44	1.36	2.27	6.61	2.50	5.57		
	Total	4.79	0.95	4.38	5.20	2.50	6.07		

Source: The authors (2023)

The teams' mean scores on each of the ECTE factors were used to form two groups. The median statistic was used to generate groups A and B: group A, called the lower stratum, obtained lower scores on the factor, while group B, called the upper stratum, obtained higher scores on the factor. An independent group comparison analysis was carried out using the Mann-Whitney non-parametric test at the  $p=0.05$  level to assess the effectiveness of the grouping criterion in significantly differentiating the teams into two groups. Table 3 shows the comparison of the teams.

**Table 3** - Comparison of the stratified teams in the ECTE factors (n= 23) Araraquara, SP, Brazil, 2020

ECTE factors	Extreme groups	Descriptive statistics			Mann-Whitney	
		N	Mean	Standard Deviation	U	P
Participation in the team	A. Stratum lower	13	3.62	0.41	4.032	0.001
	B. Stratum upper	10	4.43	0.14		
Support for new ideas	A. Stratum lower	12	3.27	0.44	4.063	0.001
	B. Stratum upper	11	4.19	0.24		
Team objectives	A. Stratum lower	12	4.57	0.55	4.063	0.001
	B. Stratum upper	11	5.60	0.33		
Task orientation for tasks	A. Stratum lower	12	4.10	0.79	4.062	0.001
	B. Stratum upper	11	5.53	0.33		

Source: The authors (2023)

Table 4 shows the classification of the work climate perceived by the teams.

**Table 4<sup>3</sup>** - Criteria for choosing the teams with the most favorable climate (n = 23) Araraquara, SP, Brazil, 2020.

ID	Team	No. of members	Mean on ECTE factors				Extreme groups*				SUM
			EF1	EF2	EF3	EF4	Cat1	Cat2	Cat3	Cat4	
2	2.0	5	3.15	2.6	3.76	3.05	0	0	0	0	0
3	3.1	6	3.50	3.38	4.48	4.13	0	0	0	0	0
7	7.0	4	4.06	3.50	3.64	4.36	0	0	0	0	0
9	9.0	4	3.93	3.61	4.82	4.41	0	0	0	0	0
14	13.2	4	3.47	2.98	5.03	4.62	0	0	0	0	0
15	15.0	15	2.96	2.84	3.77	2.50	0	0	0	0	0
18	18.0	10	3.99	3.75	4.90	4.51	0	0	0	0	0
20	8.2	4	2.94	2.46	4.74	3.10	0	0	0	0	0
22	21.2	7	3.40	3.30	4.49	4.14	0	0	0	0	0
16	16.0	8	3.86	3.59	5.19	4.61	0	0	1	0	1
6	6.0	6	4.06	3.82	5.08	5.31	0	1	0	1	2
8	4.2	7	4.29	3.88	5.09	5.00	1	1	0	0	2
12	12.0	8	3.88	3.58	5.13	5.02	0	0	1	1	2
19	8.1	7	3.90	3.70	5.61	5.27	0	0	1	1	2
21	21.1	8	4.25	3.98	5.08	4.79	1	1	0	0	2
1	1.0	7	4.55	4.04	5.51	5.86	1	1	1	1	4
4	3.2	8	4.46	4.44	6.02	6.07	1	1	1	1	4
5	5.0	9	4.41	4.24	5.34	5.17	1	1	1	1	4
10	10.0	7	4.42	4.18	5.56	5.43	1	1	1	1	4
11	11.0	5	4.68	4.58	6.14	5.94	1	1	1	1	4
13	13.1	5	4.49	4.18	5.41	5.68	1	1	1	1	4
17	17.0	4	4.50	4.41	5.75	5.54	1	1	1	1	4
23	22.2	9	4.23	4.31	5.91	5.57	1	1	1	1	4

Source: The authors (2023)

The classification of the teams was based on the ECTE factors, ranging from 0 to 4, whose classification system is standardized with interpretation parameters described in Table 5:

3 **Note:** \* 0 = team classified in the lower stratum of the factor in question; 1 = 0 = team classified in the upper stratum of the factor in question.



**Table 5** - Standards for interpreting the system / criteria for identifying teams with the most favorable climate. Araraquara, SP, Brazil, 2020.

SUM	Interpretation
0	Very unfavorable team climate, as it was classified in the lower stratum in all four ECTE factors;
1	Unfavorable team climate, as it was classified in the bottom stratum in three ECTE factors;
2	Unfavorable team climate, as it was classified in the lower stratum in two factors of the ECTE:
3	Favorable team climate, as it was classified in the top stratum in three ECTE factors;
4	Very favorable team climate, as it was classified in the top stratum in four ECTE factors.

Source: The authors (2023)

## DISCUSSION

This study shows acceptable and satisfactory ECTE rates in the FHS and therefore replicates findings from national studies using the same instrument in a variety of contexts, such as hospitals<sup>15-16</sup> and PHC with family health teams<sup>19</sup>.

The reliability/internal consistency coefficients were above those recommended ( $\geq 0.70$ ) and higher than those reported in other studies: Anderson and West (1998)<sup>1</sup>, range = 0.84 to 0.94; Ribeiro, (2019)<sup>16</sup>, range = 0.80 to 0.94; Santos, (2020)<sup>15</sup>, range = 0.90 to 0.93; Peduzzi et al. (2021)<sup>19</sup>, range = 0.90 to 0.95. The AVE indicator ranged from 0.66 to 0.79, higher than the criterion of 0.50, adding evidence to the suitability of the four-factor structure.

The four ECTE factors correlated positively and significantly with each other, with coefficients of strong magnitude (ranging from 0.65 to 0.87), as observed in previous studies<sup>7,20</sup>.

The results presented in the light of theoretical expectations<sup>1,7</sup>, psychometric parameters<sup>12,21</sup>, and findings from previous studies with the ECTE<sup>7,15-16,19</sup>, it is possible to argue about validity evidence based on the internal structure<sup>22</sup> and the robust internal consistency of the four-factor solution for this measuring instrument<sup>23</sup>.

The uniformity of the procedures for calculating the scores and interpreting the results is necessary for the comparability of studies<sup>23</sup>, but this has not always been observed in the reports of empirical studies using this measuring instrument. In Brazil, it is possible to find variability even in the description of the instrument's name: Team Climate Inventory - TCI<sup>2,20</sup>. Teamwork Climate Scale - ECTE<sup>7,24</sup>; Team Climate Scale - ECE<sup>17</sup>.

For standardization purposes, it is suggested that future studies use the name of the proposed instrument in its language of origin - Team Climate Inventory - TCI<sup>1</sup> or the equivalent adapted for use in Brazil - Teamwork Climate Scale - ECTE<sup>7</sup>.

It is possible to find conceptual and methodological misunderstandings in the use of the ECTE<sup>25</sup>. Peduzzi (2022)<sup>17</sup> warned that the concept of climate used in the development of the ECTE<sup>1</sup> refers to the shared perception among team members, the instrument measures the perception of "Teamwork Climate" and not the perception of "Organizational Climate", a different construct.

Furthermore, as the perceptions are shared at the team level, the results from the application of the TCI should be interpreted at the team level, not at the individual level<sup>1,19-20,24</sup>.

Differences were also found in the score calculation procedures. In some cases, the scores for the teamwork climate factors were calculated based on the sum of the answers to the items in each factor<sup>1,17,19,24</sup>, and in others, based on the mean<sup>15-16,26</sup>.

Each factor has a different number of items and different response scales: Factor 1 = Participation in the team - 12 items, five-point response scale; Factor 2 = Support for new ideas - 8 items, five-point scale; Factor 3 = Team goals - 11 items, seven-point response scale; Factor 4 = Task orientation - 7 items, seven-point scale.

If the sum is chosen, the researcher will be dealing with greater variability and amplitude in the scores for each factor. This option for summing can make interpretation more complex. With the mean, the interpretation of the factor scores is simpler, as they are circumscribed within the limits of the response scale so that the scores for factors 1 and 2 can vary from 1 to 5 points and for factors 3 and 4 from 1 to 7 points.

The scores for the four teamwork climate factors, regardless of whether they are meaned or summed, should be interpreted positively and always at the team level<sup>1,19</sup>.

In this study, we opted to use the mean, and calculated the means of the participants' responses to the items in each of the four factors, obtaining four results for each participant in the study.

During empirical tests of different factor configurations, Anderson and West<sup>1</sup> showed that the "Teamwork Climate" construct measured by the ECTE is multidimensional, consistent with the theoretical model proposed by West in 1990 about the four factors of teamwork climate.

The composition and use of a "total teamwork climate score" reported in some studies<sup>24,18-19</sup>, although it may be useful from a heuristic and pragmatic point of view, deserves to be better argued in terms of its validity in the context of a nomological network<sup>27</sup>.

The results indicated that there were no significant differences in the scores of the ECTE factors depending on the number of participants in the teams, corroborating a study carried out by Ribeiro<sup>16</sup>.

The stratification of the teams into lower and upper strata seems to have worked well since the mean results for these teams are significantly different in all factors at a level of  $p \leq 0.001$ . For the teams classified in the top stratum, the standard deviations are lower in all the ECTE factors, indicating that in these teams there is greater homogeneity in the perception of team climate in the dimensions assessed by the instrument.

Evidence of the validity, reliability, and standardization procedure for interpreting the ECTE can contribute to its use in the context of PHC and encourage the process of reflection and team improvement. One of the operational guidelines of the FHS is teamwork. The main objectives of these teams are to provide comprehensive care to users and their families, continuous care with resoluteness and quality, and to meet the health needs of the population<sup>28,15</sup>.

The team must make diagnoses of the local reality, as well as diagnoses of their situation as a working team. Understanding how the work climate can influence team performance is a way of contributing to planning and improving work<sup>28,15</sup>.

The teams with the best scores work in school units that receive undergraduate nursing and medical students. Of these, three receive medical residents. We can consider that the teaching-service link enables the team's relationship with students and teachers to trigger a process that contributes to improving health care and training.

Considering that this study aimed to present evidence of validity, reliability, and a standardization procedure for interpreting the ECTE with family health teams, it can be said that it was fully achieved. However, from a practical point of view, the use of a single instrument to assess the teamwork climate can be a limitation, given the complexity of this phenomenon.

It is therefore strongly recommended that the use of the ECTE be accompanied by the application of other data collection techniques, allowing for the triangulation of information. Qualitative techniques can be used, such as field observations, interviews, and focus groups, as well as other psychometric instruments that measure correlated constructs and/or external measures that can be correlated to the results obtained with the ECTE, such as supervisor evaluation, external service quality accreditation indicators, user and worker satisfaction.

## FINAL CONSIDERATIONS

The study showed evidence of validity and internal consistency of the ECTE, confirmed as a powerful instrument, whose findings can contribute to strengthening teamwork and interprofessional collaboration in a model of the organization of the health work process that favors the quality of care centered on the needs of users and families.

The findings elucidate the understanding of the application of the ECTE, data analysis, and interpretation of their respective scores anchored in the teamwork climate construct and its four factors: team participation, support for new ideas, team objectives, and task orientation.

The team climate assessment generates a diagnosis as a starting point for building improvements in the work performed. The instrument makes it possible to see the strengths and weaknesses in the organization of teams, specifically in family health, it encourages reflection on the work process and the construction of changes and reorganization of teams to improve care for people, families, and the community.

## ACKNOWLEDGMENTS

This work was carried out with the support of the Coordination for the Improvement of Higher Education Personnel - Brazil (CAPES) - Funding Code 001.

## REFERENCES

1. Anderson NR, West MA. Measuring climate for work group innovation: development and validation of team climate inventory. *J. Organ. Behav.* [Internet] 1998 [cited 2023 oct 19];19(3), 235–258. Available from: [https://doi.org/10.1002/\(SICI\)1099-1379\(199805\)19:3%3C235::AID-JOB837%3E3.0.CO;2-C](https://doi.org/10.1002/(SICI)1099-1379(199805)19:3%3C235::AID-JOB837%3E3.0.CO;2-C)
2. Agreli HF, Peduzzi M, Bailey C. The relationship between team climate and interprofessional Collaboration: Preliminary Results from a Mixed Methods Study. *J. Interprof. Care.* [Internet] 2017 [cited 2023 oct 19];31(2):184-186. Available from: <https://doi.org/10.1080/13561820.2016.1261098>
3. Lampman MA, Chandrasekaran A, Branda ME, Tumerman MD, Ward P, Staats B, et al. Optimizing Huddle Engagement Through Leadership and Problem Solving Within Primary Care: Results from a Cluster-Randomized Trial. *J Gen Intern Med.* [Internet] 2021 [cited 2023 oct 19];36(8):2292-2299. Available from: <https://doi.org/10.1007/s11606-020-06487-6>.
4. Bondevik GT, Hofoss D, Hansen EH, Deilkås ECT. Patient safety culture in Norwegian primary care: a study in out-of-hours casualty clinics and GP practices. *Scand. J. Prim. Health Care.* [Internet] 2014 [cited Oct 19];32(3):132-138. Available from: <https://doi.org/10.3109/02813432.2014.962791>
5. Reeves, S, Tassone M, Parker K, Wagner SJ, Simmons B. Interprofessional education: an overview of key developments in the past three decades. *Work.* [Internet] 2012 [cited 2023 Oct. 19];41(3): 233-245, 2012. Available from: <https://doi.org/10.3233/WOR-2012-1298>.
6. Cucolo DF, Souza PG, Miranda FM de, Mininel VA, Silva JAM da. Clima de trabalho em equipe e qualidade do cuidado na atenção primária à saúde/ Teamwork climate and quality in primary health care. *Braz. J. Hea. Rev.* [Internet]. 2021 Jun. 10 [cited 2023 Oct. 20];4(3):12587-61. Available from: <https://doi.org/10.34119/bjhrv4n3-231>
7. Silva MC, Peduzzi M, Sangaleti CT, Silva D da, Agreli HF, West MA, et al. Cross-cultural adaptation and validation of the teamwork climate scale. *Rev Saúde Pública* [Internet] 2016 [cited 2023 Oct. 19];50:52. Available from: <https://doi.org/10.1590/S1518-8787.2016050006484>
8. Macinko J, Mendonça CS. The family health strategy, a strong model of primary health care that delivers results. *Saúde Debate* [Internet] 2018 [cited Oct. 2023];42(1):18-37. Available from: DOI: <https://doi.org/10.1590/0103-11042018S102>
9. Muthén LK, Muthén BO. Mplus user's guide. [Internet]. Los Angeles, CA: Muthén & Muthén; 2017. [cited Oct. 2023] Available from: [https://www.statmodel.com/download/usersguide/MplusUserGuideVer\\_8.pdf](https://www.statmodel.com/download/usersguide/MplusUserGuideVer_8.pdf)
10. Aparuhov T, Muthen BO. Exploratory structural equation modeling. *Struct Equ Modeling* [Internet] 2009 [cited 2023 Oct. 19];16(3):397-438. Available from: <http://dx.doi.org/10.1080/10705510903008204>
11. Hair JF, Black WC, Babin BJ, Anderson RE, Tatham RL. *Multivariate data analysis*. 6th ed. Porto Alegre: Bookman; 2010.
12. Kline RB. *Principles and practice of structural equation modeling*. 3rd ed. New York: The Guilford Press; 2011.
13. Valentini F, Damásio BF. Average variance extracted and composite reliability: reliability coefficients. *Psic.: Teor. e Pesq.* [Internet] 2016 [cited 2023 Oct. 19];32(2):1-7. Available from: <http://dx.doi.org/10.15900102-3772e322225>
14. Cardoso CSG. *Team climate, innovation, and leadership: possible convergences in an agri-food sector organization* [Thesis]. Coimbra: College of Psychology and Education Sciences, University of Coimbra; 2009. Available from: <https://estudogeral.sib.uc.pt/bitstream/10316/12159/1/final.pdf>
15. Santos ACB. *Teamwork management with patient-centered care in the hospital context: a mixed method study* [Thesis]. São Paulo, School of Nursing, University of São Paulo; 2020. Available from: [https://www.teses.usp.br/teses/disponiveis/7/7140/tde-25022021-114516/publico/AnaClara\\_Barreiros.pdf](https://www.teses.usp.br/teses/disponiveis/7/7140/tde-25022021-114516/publico/AnaClara_Barreiros.pdf)

16. Ribeiro MBS. Validation of the team climate scale for the hospital context in Brazil [Dissertation]. São Carlos: Graduate Program in Nursing, Center for Biological and Health Sciences, Federal University of São Carlos, 2019. Available from: [https://repositorio.ufscar.br/bitstream/handle/ufscar/11600/RIBEIRO\\_Milena\\_2019.pdf?sequence=5&isAllowed=y](https://repositorio.ufscar.br/bitstream/handle/ufscar/11600/RIBEIRO_Milena_2019.pdf?sequence=5&isAllowed=y)
17. Peduzzi M, Agreli HLF, Silva JAM da, Souza HS de. Teamwork: Revisiting the Concept and its Developments in Inter-Professional Work. *Trab. educ. saúde* [Internet]. 2022 [cited 2023 oct 19];18(Supl.1). Available from: <https://doi.org/10.1590/1981-7746-sol00246>
18. Carmo H de O, Peduzzi M, Tronchin DMR. Team climate and job satisfaction in a mobile emergency care service. *Rev Esc Enferm USP*. [Internet] 2022 [cited 2023 Oct.19];56:e20220174. Available from: <https://doi.org/10.1590/1980-220X-REEUSP-2022-0174en>
19. Peduzzi M, Agreli HLF, Espinoza P, Koyama MAH, Meireles E, Baptista PCP, et al. Relationships between team climate and job satisfaction in the Family Health Strategy. *Rev Saude Publica*. [Internet] 2021 [cited 2023 Oct. 19];55:117. Available from: <https://doi.org/10.11606/s1518-8787.2021055003307>
20. Peduzzi, M., Agreli, H. F. Teamwork and collaborative practice in primary health care. *Interface* [Internet] 2018 [cited 2023 Oct. 19];22(2):1525-34. Available from: DOI: <https://doi.org/10.1590/1807-57622017.0827>
21. Pasquali L. *Psicometria: teoria dos testes na psicologia e na educação*. Rio de Janeiro: Vozes; 2013.
22. Rios J, Wells C. Validity evidence based on internal structure. *Psicothema*, [Internet] 2014 [cited 2023 Oct. 19];26(1):108-116. Available from: <https://doi.org/10.7334/psicothema2013.260>
23. American Educational Research Association (AERA). American Psychological Association (APA). National Council on Measurement in Education (NCM). *Standards for Educational and Psychological Testing*. New York: American Educational Research Association Behavioural Science; 2014. Available from: <https://www.testingstandards.net/uploads/7/6/6/4/76643089/9780935302356.pdf>
24. Agreli HF, Peduzzi M, Silva MC, Mascarelle RCV, Espinoza P. Effect of interprofessional education on teamwork and on knowledge of chronic conditions management. *Rev Latino-Am Enfermagem* [Internet]. 2019 [cited 2023 Oct. 19];27:e3203. Available from: <https://doi.org/10.1590/1518-8345.3095.3203>
25. Peduzzi M, Aguiar C, Lima AMV, Montanari PM, Leonello VM, Oliveira MR de. Expansion of the interprofessional clinical practice of Primary Care nurses. *Rev Bras Enferm* [Internet]. 2019 [cited 2023 Oct. 19];72:114–21. Available from: <https://doi.org/10.1590/0034-7167-2017-0759>
26. Binotto CCS. Collaborative interprofessional practices for safe care in the family health strategy. [Thesis] Federal University of São Carlos, São Carlos, 2023. Available from: <https://repositorio.ufscar.br/handle/ufscar/17901>
27. Markus KA, Borsboom D. *Frontiers of test validity theory: measurement, causation and Meaning*. New York: Routledge; 2013.
28. Ministério da Saúde. Portaria nº 4.279, de 30 de dezembro de 2010. Estabelece diretrizes para a organização da Rede de Atenção à Saúde no âmbito do Sistema Único de Saúde (SUS). *Diário Oficial da União*, Brasília, 2010 Dec. 31; Seção 1.p 88. Available from: <https://pesquisa.in.gov.br/imprensa/jsp/visualiza/index.jsp?jornal=1&pagina=88&data=31/12/2010>

\*Article extracted from the doctoral thesis: "PRÁTICAS INTERPROFISSIONAIS COLABORATIVAS PARA UM CUIDADO SEGURO NA ESTRATÉGIA SAÚDE DA FAMÍLIA", Universidade Federal de São Carlos, São Carlos, SP, Brasil, 2023.

Received: 25/10/2023

Approved: 30/04/2024

Associate editor: Dra. Luciana Nogueira

**Corresponding author:**

Cibele Correia Semeão Binotto

Universidade Federal de São Carlos

Rodovia Washington Luís, Km 235 - São Carlos - SP- Brasil

E-mail: [cibelecs@yahoo.com.br](mailto:cibelecs@yahoo.com.br)

**Role of Author:**

Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work - **Binotto CCS, Ogata MN, Meireles E, Silva JAM da**. Drafting the work or revising it critically for important intellectual content - **Binotto CCS, Ogata MN, Meireles E, Silva JAM da**. Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved - **Binotto CCS, Ogata MN, Meireles E, Silva JAM da**. All authors approved the final version of the text.

ISSN 2176-9133



This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).