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Entropic organizational climate (EOC): Development and validation of new scale

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Abstract. Entropy, which is an element of the system approach evaluating organizations as a system, refers to the deterioration tendency. *Purpose*. This study aimed to develop a new scale in order to evaluate the negative climate in organizations. *Method*. The study was carried out in two stages. In the first study, the construct validity of the scale (*N* = 412) was revealed by exploratory factor analysis and, also convergent and discriminant analysis in the banking sector. The second study was carried out in the teacher sample (*N* = 224) and analysed for confirmatory factor analysis and predictive validity of the scale. *Findings*. The Entropic Organizational Climate (EOC) Scale emerged as a two-dimensional structure. Considering the relevant opinions in the literature, the EFA and also convergent and discriminant validity analysis results show that the entropic organizational climate scale has a strong construct validity. Processual entropy makes a negative contribution to predicting job engagement and relational entropy makes a positive contribution to predicting intention for leaving the job. These findings indicate that the entropic organizational climate scale has a predictive validity. The reliability analyses both study 1 and study 2 indicate that the inter-item consistency of the entropic organizational climate scale is reliable as Cronbach's alpha coefficients provide a threshold equal to α ≥ .70, and the composite reliability coefficients provide a threshold equal to CR ≥ .70. All these findings indicate that the EOC scale can be used for similar psychometric measurements. The dimensions of the scale were named as "Relational entropy" and "Processual entropy". *Implications for practice*. This scale is a valid and reliable instrument to measure entropic climate in organizations.

Keywords: entropic climate, relational entropy, processual entropy scale development.

Introduction

The concept of climate has been transferred to the social sciences from natural sciences and has been included in social sciences since the 1950s with K. Lewin's Field Theory in Social Sciences study. He defined the organizational climate as a product of the interaction with the individual and his organizational environment (Lewin, 1951). On the other hand, C. Argyris considered the organizational climate as a function depending on the needs, values, personalities of the employee and on organizational policies (Argyris, 1958).

Organizational climate is an employee's perception of the working environment and emphasized concept in social, industrial, and organizational psychology (Griffith, 2006). S. W. Gellerman used the concept within the framework of industrial psychology and compared it with human personality

(Gellerman, 1960; 1973). Similarly, A. W. Halpin and D. B. Croft considered the personality of individual and the organizational climate as equal (Halpin, Croft, 1963). It is a set of measurable characteristics of the work environment that are perceived directly or indirectly by the employees and accepted to affect their motivation and behaviour (Litwin, Stringer, 1968). R. Tagiuri defines the organizational climate as a permanent and durable inner environment character (i) experienced by the employees, (ii) effects the behaviours of employees (iii) and which differentiates the organization from other organizations in terms of its characteristics (Tagiuri, 1968).

Studies show that organizational climate is a concept with different dimensions (Waters, Roach, Batlis, 1974; Mok, Au-Yeung, 2002). The largest dimensioning was done by H. G. Litwin and R. Stringer. These dimensions are organizational structure and restrictions, individual responsibility, sincerity, support, rewarding and punishment, conflict, success standards, organizational commitment and risks taking (Litwin, Stringer, 1974).

The organizational climate, which is one of the basic concepts for business and organization (Peña-Suárez, Muñiz, Campillo-Álvarez, Fonseca-Pedrero, García-Cueto, 2013), is felt by the employees and the employees are affected positively or negatively by this climate (Wang, Zang, Jackson, 2013). Positive influence increases the level of motivation and success of the employee while increasing job satisfaction (Salgado, Remeseiro, Iglesias, 1996). Besides, the organization climate is a concept associated with creativity (Hassan Jafri, M., Dem, C., Choden, 2016), performance (Woznyj, Yap, Heggestad, Kennerly, 2019; Denison, Mishra, 1995; Byles, Aupperle, Arogyaswamy, 1991), and organizational activity (Zhang, Liu, 2010).

Entropy, another concept that passes from the natural sciences to social sciences, expresses the tendency to deteriorate. It was first formulated by Clausius in 1867 as the second law of thermodynamics (Entropy Law). According to this law, the total amount of energy in the universe is constant, but its quality decreases continuously (Perrot, 1998; Guillen, 2001). The second law states that, as a result of all activities, some amount of available energy in the universe becomes unusable, meaning that the available energy is continuously decreasing. In short, entropy can be defined as the amount of energy that has lost its quality as a result of energy transformations and cannot produce work (Alpan, Efil, 2011).

The concept of entropy has been included in social sciences as an element of the General Systems Theory of Austrian biologist L. von Bertalanffy (1971). The system is an intact structure composed of consistently organized, interrelated, collaborative and interactive pieces to achieve a goal (Meadows, 2008). In general systems theory, organizations are considered to be open and closed entities, and it is stated that open systems have a continuous input-output relationship with the environment and thus keeping up with change and development (Cole, 1993), whereas in closed systems that interaction is not present, and they are not sensitive to environmental changes (Owens, 1981).

When handled from the perspective of an organization, entropy refers to the deterioration of the organizational balance, in other words, the stable state. The high level of entropy in organizations leads to uncertainty, error, confusion, irregularity, and unpredictability for the system. In time, all systems are exposed to entropy and any inside or outside factor that prevents the system from working in harmony and efficiently causes entropy in the system. Organizations that are considered as open systems take energy from outside and resist against entropy or depletion. In order for organizations to resist entropy, they need constant input and success, especially in the field of economics (Demirtaş, Usta, 2011). In organizations, energy is transferred among others as resources, duties, communication, responsibilities; and energy is conveyed to managers and decision-makers through a chain of command (Forero, 2018).

Organizational entropy is the breakdown of the parts that make up the organization and of the processes and relations between the organization and its environment. Entropy is an indicator of

the irregularity of the system and every element that fosters that disorder also increases the entropy of the organization (Erol, 2001). These elements include injustice, irregularity, miscommunication and distrust. The entropic climate reduces the energy of the employees of the organization and thus reflects a situation that reduces efficiency. In other words, the energy of the organization is wasted (Coldwell, 2016).

While almost all the past research on the concept of entropy is related to other disciplines however, entropy research in the field of management and organization is almost non-existent. Undoubtedly, in the presence of this limited situation in management and organization literature, the negative contribution of the lack of a tool that can measure the perception of entropy within business life is enormous. With this study, it is aimed to fill the relevant gap in the literature.

The aim of this study is to develop a scale for the entropic organizational climate that we have revealed in order to express the negative perception of processes and relations in organizations. In this context, two different samples were analyzed. In the first study, while the construct validity and inter-item consistency of the scale were revealed; its confirmed structure, predictor validity, and reliability analysis once again were examined in the second study.

Method

This study, which aims to develop an entropic organizational climate scale, is designed with a quantitative research pattern. For this purpose, an expression pool consisting of 45 statements was created. In the study, convenience sampling method and online survey technique were used. Within the scope of the research, two different applications were carried out on samples from different sectors.

In the first study, the construct validity of the entropic organizational climate scale was determined. To this end, data were collected from bank employees in the private sector. The gathered data were investigated using exploratory factor analysis, convergent validity, discriminant validity and reliability analyses and so construct validity and inter-item consistency of entropic organizational climate scale were determined.

In the second study, it was tested whether the factorial structure of the entropic organizational climate scale developed in the first study matched a different sampling or not and also the predictive validity was tested. To this end, with the two different scales added to the entropic organizational climate scale via the newly-created online survey, and data were collected from the public school teachers. For the obtained data, confirmatory factor analysis, reliability analyses and common method variance test were performed together with the correlation and regression analysis. The data were analysed by IBM SPSS and IBM SPSS Amos statistical analysis software.

Participants

The sample group of the Study 1 consists of 407 bank employees in the private sector (N = 407). Looking at the demographic characteristics of the participants; the majority were female (51.8%) and the age range is 36–40 years (42.8%). The number of employees in the researched bank branches is mostly between 11–20 (46.2%). The average of the professional experience of the employees is 13 years and the average duration of employment in the current institutions is 18 years. The sample group of the Study 2 consists of 224 teachers in the public sector (N = 224). Looking at the demographic characteristics of the participants; the majority were male (67.4%) and the age range is 41–45 years (27.7%). Many of the schools surveyed are high schools (48.2%). The average of the professional experience of teachers is 18 years and the average duration of employment in current schools is 6.5 years.

Item generation and scale

In order to develop an entropic organizational climate scale, a pool of 45 expressions, consisting of 43 negative and two positive remarks, was created by the researcher for organizational processes and relations in the organizations for the entropic climate. The items were presented to the evaluation of five academicians working in the organizational behaviour field and they were asked to evaluate them in terms of content validity. The experts were asked to review the list of items and evaluate the degree to which each item was representative of the organizational entropy definition. This procedure acted as a content validity check for the development of the scale. After the necessary corrections were made, the scale was finalized by 12 participants from different private and public institutions. Within the framework of feedback from these people, the items that are difficult to understand have been revised and the scale items have been finalised. This procedure acted as a content validity check for the development of the scale. The scale is structured with a 6-point Likert scale (1 = "strongly disagree", 2 = "disagree", 3 = "slightly disagree", 4 = "slightly agree", 5 = "agree", 6 = "strongly agree").

In the first part of the questionnaire, there are questions about age, gender, institution, number of employees in the branch, duration of professional experience and employment duration in the current institution to determine the demographic characteristics of the employees.

Study 1

Scales and sample

In the first study, a new questionnaire was created by means of the entropic organizational climate scale, the job engagement and intention for leaving the job scales. In order to test the predictive validity of the entropic organizational climate scale, the ultra-short job engagement scale consisting of three statements developed by W. B. Schaufeli and colleagues, and the intention for leaving the job scale consisting of three statements developed by C. Cammann and colleagues, were used (Cammann, Fichman, Jenkins, Klesh, 1983; Schaufeli, Shimazu, Hakanen, Salanova, De Witte, 2017). The scales are structured with a 6-point Likert scale (1 = "strongly disagree", … 6 = "strongly agree").

In the first application, an online questionnaire with 45 propositions consisting of expressions measuring the climate of entropic organization was prepared. In order to determine the required number to reach the sufficient sample size, the rule is considered to be 'at least five times more than the number of expressions' (Bryman and Cramer, 2001). In this respect, the online survey form was delivered to 412 bank employees in the private sector. Construct validity and internal consistency of the entropic organizational climate scale determined by exploratory factor analysis, convergent validity, discriminant validity and reliability analyses. In the application, all statements in the online questionnaire were required to be answered. In addition, each expression in the data set was subjected to the missing value analysis to verify that there were no missing response errors (number of missing value = 0, percentage of missing value = 0%).

The *Mahalanobis Distance Method* was used to determine the subjects with outlier value in the statements belonging to the entropic organizational climate scale. In this method, $p < .001$ significance level was taken into consideration. As a result of the analysis, five expressions in the data set were excluded from the observation because they are found to be the subjects with outlier values (Mahalanobis, 1936). The number of participants in the last case was 407 ($N = 407$).

Skewness-kurtosis test was applied to each expression to perform a normal distribution analysis of entropic organizational climate scale. According to this, the biggest skewness value was 1.22 and the biggest kurtosis value was –1.42. Since the skewness-kurtosis values are within the ±1.5 threshold values, it is concluded that the data are normally distributed (Tabachnick, Fidell, 2013).

Construct validity

In order to examine the construct validity of the entropic organizational climate scale, exploratory factor analysis, convergent and discriminant validity tests were applied.

Exploratory factor analysis

Principal components analysis was used as the extraction method in the exploratory factor analysis (EFA) and the factors with an eigenvalue greater than 1 ($\lambda > 1$) were taken into account. Varimax axis rotation technique was used as the factor rotation method. In the analysis, 30 expressions with a low factor load and a cross-loading factor problem were excluded. In the last case of EFA, a two-dimensional structure consisting of 15 statements emerged. As 9 expressions of the first dimension are composed of expressions reflecting the entropic perceptions of the employees towards irregularity regarding the relationship / communication processes in the work environment, this dimension is called relational entropy. The six expressions that were uploaded to the second dimension were called processual entropy because they were statements that reflected the perceptions of the irregularity regarding processes in the work environment. The results are shown in Table 1.

Table 1. Exploratory factor analysis results

Items	Factor loadings	
	Relational Entropy	Processual Entropy
RE1 — People who work in this institution talk behind your back.	.847	
RE2 — I feel stressed when working in this institution.	.828	
RE3 — Employees in this institution are insecure about each other.	.813	
RE4 — There is discrimination among employees in this institution.	.755	
RE5 — Communication between employees in this institution is broken.	.749	
RE6 — There is a constant conflict between employees in this institution.	.716	
RE7 — I feel unhappy in this institution.	.697	
RE8 — Resources in this institution are not distributed fairly among employees.	.687	
RE9 — It is difficult to find true friends in this institution.	.570	
PE1 — The rules and instructions in this institution are not complied with.		.880
PE2 — No job is done by the book in this institution.		.876
PE3 — Ethical / moral rules are insignificant in this institution.		.839
PE4 — The decisions taken in this institution are not complied with laws and rules.		.817
PE5 — Jobs done in this institution do not comply with a corporate identity.		.807
PE6 — This institution uses informal communication channels rather than official ommunication channels.		.756
Explained Variance	36.50%	35.27%
Total Explained Variance	71.77%	
KMO = .942, Bartlett's test of Sphericity [$\chi^2(105) = 5385.719$, $p < .001$]		

Note. a. Rotation converged in three iterations. RE — Relational entropy; PE — Processual entropy.

Convergent and discriminant validity

In order for a scale to have convergent validity, the average variance extracted (AVE) of each dimension and to have discriminant validity the correlation coefficients between the variables and square root of the AVE value of each dimension were investigated. In the analysis, the average variance explained value is .55 for the relational entropy dimension and .68 for the processual entropy dimension. On the other hand, the square root of the AVE value is .74 for the relational entropy dimension, and .83 for the processual entropy dimension. The correlation coefficient between the relational entropy and the processual entropy dimension is .67.

Reliability analysis

Cronbach's alpha (α) and composite reliability (CR) coefficients were calculated to determine the inter-item consistency of the entropic organizational climate scale. In the analyses, the values of

the nine expressions of the relational entropy dimension are as follows: α = .93, CR = .91. The values for the six expressions of the processual entropy dimension are α = .93, CR = .92.

Study 2

Scales and sample

In the second application, the online questionnaire form was delivered to 224 teachers working in the public sector (N = 224). Confirmatory factor analysis was performed on the obtained data from the teacher sampling group, and it was checked whether the factorial structure belonging to the entropic organizational climate scale developed in the first study matched a different sampling. After that, necessary checks were done by reliability analyses and common method variance test. Finally, in order to test the predictive validity of the entropic organizational climate scale correlation and regression analyses were performed.

Confirmatory factor analysis

The factorial structure of the entropic organizational climate scale consisting of 15 expressions and two dimensions was tested with the first order confirmatory factor analysis (CFA). Due to the normal distribution of the obtained data with 6-point Likert scale from 224 teachers working in the public sector, the covariance matrix was created by using the maximum likelihood method (Kline, 2011). Figure 1 shows the confirmatory factor analysis measurement model marking the standardized values for the entropic organizational climate scale.
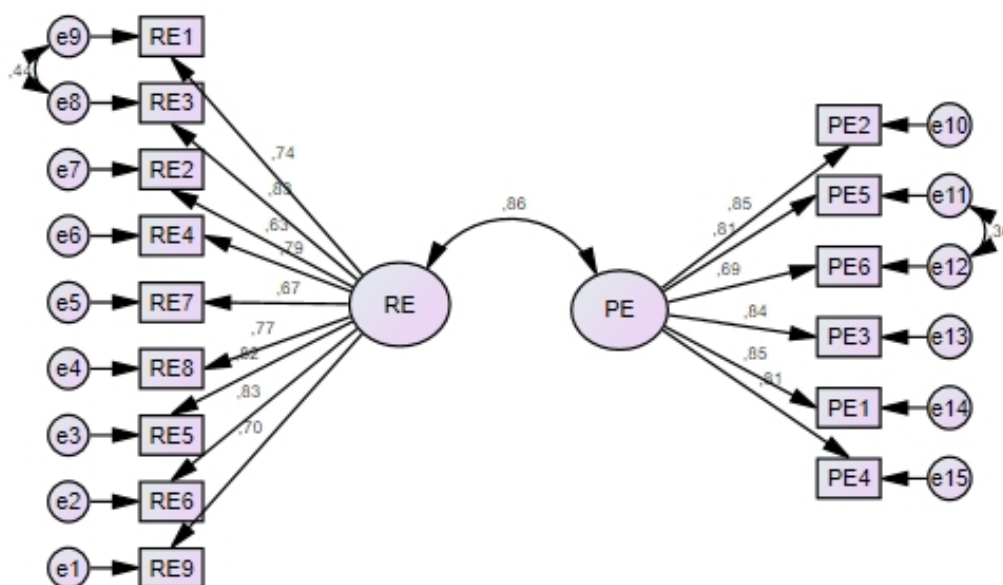

Figure 1. Entropic organizational climate scale confirmatory factor analysis measurement model. Note: The values in the figure show standardized coefficients. RE — Relational entropy; PE — Processual entropy.

The goodness of fit values for the entropic organizational climate scale according to the CFA result: χ^2/df = 2.32, p = .000, CFI = .95, IFI = .95, NFI = .92, TLI (NNFI) = .94, RMSEA = .07. Also, the average variance explained (AVE) values were obtained .56 for the relational entropy and .65 for the processual entropy.

Reliability analysis

Cronbach's alpha (α) and composite reliability (CR) coefficients were calculated in order to determine the internal consistency of the entropic organizational climate, job engagement and

intention for leaving the job scales. In the analyses, the values of the nine expressions of the relational entropy dimension: α = .92, CR = .92, the values of the six expression of the processual entropy dimension: α = .92, CR = .91, the values of the job engagement scale: α = .87, CR = .80, values for the intention for leaving the job scale: α = .70, CR = .71 were found.

Common method variance analysis

Use of more than one scale in the same questionnaire and the similar response types in scales in quantitative studies may lead participants to response bias (Podsakoff, Organ, 1986). One of the most commonly used methods for controlling this condition, expressed as common method variance, is Harman's single factor test. In this respect, the number of the dimensions obtained by the application of the principal component analysis to the total of 21 expressions of three scales used in the questionnaire were analysed without the rotation method. Afterwards, the variance explained by fixing the factor number to 1 was investigated. According to the findings, expressions were not collected in one dimension and showed a multidimensional structure consisting of four breaks and one-dimensional structure explained 44.86% of the variance (S^2 < .50), not the majority. The findings show that there is no common method variance problem in the data set (Podsakoff, MacKenzie, Lee, Podsakoff, 2003).

Predictive validity

The predictive validity is the level of future relationship between the measurement tool and another previously validated criterion. The predictive validity which is a type of criterion validity is the most powerful feature that indicates the effectiveness of a measurement tool (Gürbüz, Şahin, 2017). In order to determine the predictive validity of the entropic organizational climate scale, the relationships between the job engagement and intention for leaving the job scales were investigated through correlation and regression analysis.

Correlation analysis

The results of the correlation analysis showing the significance, direction, and level of the relationship between the entropic organizational climate, job engagement and intention for leaving the job scales are shown in Table 2.

Table 2. Correlation analysis results

Variables	M	SD	1	2	3	4
1. Relational Entropy	2.94	1.24	1			
2. Processual Entropy	2.37	1.21	.78 **	1		
3. Job Engagement	4.89	1.18	− .15 *	− .22 **	1	
4. Turnover Intention	2.55	1.27	.41 **	.33 **	− .36 **	1

Note. M — Sample mean, SD —Sample standard deviation; * — p < .05, ** — p < .01.

According to the results of correlation analysis, there was statistically significant, inverse and weak (p < .05, r = −.15 < −.30) relationship between relational entropy and job engagement at 5% significance level; also, there was a statistically significant, correct and moderate level (p < .01, r = .41 > .30) relationship between the intention for leaving the job at 1% significance level. On the other hand, there was statistically significant, inverse and weak (p < .01, r = −.22 < −.30) relationship between processual entropy and job engagement at 1% significance level; also, there was a statistically significant, correct and moderate (p < .01, r = .33 > .30) relationship at 1% significance level with the intention for leaving the job (Ratner, 2017).

Regression analysis

Hierarchical regression analysis was performed in order to determine the effects of the independent variables on the dependent variables by eliminating external effects. Firstly, age,

institution, tenure (overall), and tenure (at current job) variables were added to the model as control variables (Step 1). Afterward, the main variables were added to the model (Step 2). The results of regression analysis showing the predictive validity status of the entropic organizational climate on the job engagement and intention for leaving the job are shown in Table 3.

In the first regression model, the endpoints of the hierarchical regression analysis between the main independent variables: the relational entropy and the processual entropy; and the dependent variable: job engagement, are shown. F value was statistically significant at 1% significance level $[F_{(4.219)} = 2.428, p < .05]$. In other words, it is statistically possible to predict the job engagement with the entropic organizational climate scale. The adjusted determination coefficient shows that independent variables predict about 4% of this model (Adj. R^2 = .037). Based on the standardized beta values, it is seen that the only significant effect is in the processual entropy (β = −.25, $p < .05$). The relational entropy variable had no effect due to the insignificance of beta value (β = .03, $p > .05$). It is seen that; processual entropy makes a negative contribution to predicting job engagement.

Table 3. Regression analysis results

Model	Independent Variables b	Dependent Variables	β	R^2	Adj. R^2	F	ΔR^2
1st	Step 1	Job engagement					
	Age		−.075				
	Institution		.008	.014	−.004	.792	
	Tenure (overall)		.162				
	Tenure (at current job)		.037				
	Step 2	Job engagement					.049**
	Age		−.045				
	Institution		−.003				
	Tenure (overall)		.129	.063	.037	2.428*	
	Tenure (at current job)		.046				
	Relational Entropy		.038				
	Processual Entropy		−.250*				
2nd	Step 1	Turnover intention					
	Age		−.049				
	Institution		−.061	.012	−.006	.643	
	Tenure (overall)		.107				
	Tenure (at current job)		−.079				
	Step 2	Turnover intention					.175***
	Age		−.080				
	Institution		−.040				
	Tenure (overall)		.152	.186	.164	8.290***	
	Tenure (at current job)		−.112				
	Relational Entropy		.392***				
	Processual Entropy		.035				

Note: β — Standardized beta coefficient, R^2 —Determination coefficient, Adj. R^2 —Adjusted determination coefficient, F — The F-statistic, DW — Durbin —Watson statistic; a Variance inflation factor value: Relational Entropy = 2.661, Processual Entropy = 2.660
* — $p < .05$, ** — $p < .01$, *** — $p < .001$. Firstly, in the regression models, as the Durbin — Watson values are less than 2, there are no serial correlation problem (Durbin, Watson, 1971) and as the variance inflation factor (VIF) values are less than 5, and there is no multicollinearity problem (O'Brien, 2007).

In the second regression model, the endpoints of the hierarchical regression analysis conducted to identify the relation between the relational entropy and the processual which are main independent variables; and the job engagement, which is the dependent variable, are shown. The F value was statistically significant at 1‰ significance level $[F_{(4.2019)} = 8.290, p < .001]$. In other words, it is statistically possible to predict the intention for leaving the job with the entropic organizational climate scale. The coefficient of determinant indicates that independent variables predict about 16% of this model (Adj. R^2 = .164). When we look at the order in which independent variables in this

relationship affect the dependent variable based on standardized beta values, it is seen that the only significant effect is in relational entropy (β = .39, p < .001). The processual entropy variable had no effect because beta value was insignificant (β = .03, p > .05). It is seen that relational entropy makes a positive contribution to predicting intention for leaving the job.

Discussion and conclusion

The main purpose of this study is to develop a scale for measuring entropic climate in organizations. In this context, a valid and reliable Entropic Organizational Climate (EOC) scale was created. The EOC scale, which is a result of exploratory and confirmatory factor analysis, has a two-factor, strong psychometric structure. The first factor in the scale was called relational entropy and the second factor was called processual entropy. While the relational entropy organization expresses the deterioration in the communication processes among the employees, the processual entropy refers to the negativity of the sub-systems of the enterprise which is considered as a system and the business process within the system itself.

As a result of the study 1 in the private sector (N = 412) the exploratory factor analysis (EFA) and also convergent and discriminant validity analysis, Kaiser — Meyer — Olkin sample adequacy value (KMO = .94) shows that sample size is sufficient for factor analysis (Kaiser, Rice, 1974). The fact that the Barlett's test is meaningful [$\chi^2_{(105)}$ = 5385.719, p < .001] indicates that the correlation relationship between the subjects are suitable for factor analysis (Hair, Black, Babin, Anderson, 2010). In addition, factor loadings of expressions appear to be between .57 — .88. Entropic organizational climate scale expressions explain 71% of the total variance. Accordingly, the relational entropy dimension consisting of nine expressions explains 36.5% of the variance and the processual entropy dimension consisting of six explains 35.27% of the variance. According to result, the average variance extracted (AVE) value of the dimensions (AVE relational entropy = .55, AVE processual entropy = .68) indicate that the convergent validity is ensured (AVE ≥ .50). Besides, the correlation coefficients between the variables (r = .67) and the square root of each dimension ($\sqrt{}$AVE relational entropy = .74, $\sqrt{}$AVE processual entropy = .83) indicate that the discriminant validity is ensured ($\sqrt{}$AVE > r).

Considering the accepted opinions in the literature to evaluate the results of EFA, convergent and discriminant validity analysis revealing construct validity; firstly, the total variance explained should be at least 50% on more than one dimensional scale (Streiner, 1994). If the factors are composed of strong expressions, values equal to .50 and above should be considered as the acceptable factor loading (Hair et al., 2010). However, in order to avoid cross-loading problems, an expression should have a difference of more than .1 between two or more factors (Gürbüz, Şahin, 2017). On the other hand, there should be at least three expressions in one dimension as a result of EFA (Comrey, 1988). Afterwards to ensure the convergent validity of the scale the average variance extracted (AVE) of each dimension must be a value equal to .50 or higher. Besides, for the discriminant validity; the square root of the AVE value of each dimension should be larger than the correlation coefficients of the corresponding dimension with other dimensions of the same scale (Fornell, Larcker, 1981; Civelek, 2018). Considering the relevant opinions in the literature, the EFA and also convergent and discriminant validity analysis results show that the entropic organizational climate scale has a strong construct validity.

As a result of the study 2 in the public sector (N = 224) the confirmatory factor analysis results indicate that conceptually created two-dimensional entropic organizational climate scale is statistically verified by the sample. In other words, since the goodness of fit values within the desired threshold values (χ^2/df = 2.32 < 5; p = .000 < .05; *CFI* = .95 > 90; *IFI* = .95 > 90; NFI = .92 > 90; TLI (NNFI) = .94 > 90; RMSEA = .07 < .08) it is seen that the entropic organizational climate

scale was confirmed by the sample (Bentler, 1988; Brown, 2014; Fornell, Larcker, 1981; Hu, Bentler, 1999; Kline, 2011; Tabachnick, Fidell, 2013). On the other hand, since the correlation coefficients (r) in the correlation analysis and F values and beta coefficients (β) in the regression analysis of the processual and relational entropy dimensions are statistically significant it can be saying that the entropic organizational climate has a predictive validity. In other saying, according to the results of the correlation and regression analysis to determine the validity of the argument, the entropic organizational climate scale was found to be related to the job engagement and the intention for leaving the job. In addition, it was concluded that the entropic organizational climate scale has prediction power over the job engagement and the intention for leaving the job. According to this, processual entropy makes a negative contribution to predicting job engagement and relational entropy makes a positive contribution to predicting intention for leaving the job. These findings indicate that the entropic organizational climate scale has a predictive validity.

The reliability analyses both study 1 and study 2 indicate that the inter-item consistency of the entropic organizational climate scale is reliable as Cronbach's alpha coefficients provide a threshold equal to $\alpha \geq .70$ (Nunnaly, 1978), and the composite reliability coefficients provide a threshold equal to $CR \geq .70$ (Raykov, 1997). All these findings indicate that the EOC scale can be used for similar psychometric measurements.

This study was limited by two different samples in application. Therefore, the validity and reliability of the scale should be tested with different samples. In future studies, the EOC scale can be used to investigate the impact of the entropic climate on employee behaviour, such as job satisfaction, organizational citizenship behaviour, and burnout syndrome. The scale can be tested by working in different cultures and country samples. Besides, it is possible to generalize the research results to the universe by calculating the ideal sample size during the sampling process.

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Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Conflict of interest

Author declares there is no conflict of interest.

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Энтропийный организационный климат: разработка и валидизация новой шкалы

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Аннотация. Энтропия, которая является элементом системного подхода к оценке организации как системы, характеризует тенденцию к ухудшению. *Цель*. Это исследование направлено на разработку новой шкалы для оценки негативного климата в организациях. *Метод*. Исследование проводилось в два этапа. В первом исследовании конструктная валидность шкалы была выявлена с помощью эксплораторного факторного анализа, а также конвергентного и дискриминантного анализа в банковском секторе (N = 412). Второе исследование было проведено на выборке учителей для проведения конфирматорного факторного анализа и проверки прогностической валидности шкалы (N = 224). *Выводы*. Шкала энтропийного организационного климата, ЭОК (*entropic organizational climate, EOC*) обнаружила двумерную структуру. Принимая во внимание соответствующие мнения в литературе, результаты конфирматорного факторного анализа, а также конвергентного и дискриминантного анализа валидности показывают, что шкала энтропийного климата в организации имеет высокую конструктную валидность. «Процессная энтропия» вносит негативный вклад в прогнозирование вовлечённости сотрудника в работу, а «Энтропия отношений» вносит позитивный вклад в прогнозирование намерения уволиться с работы. Эти результаты показывают, что энтропийная шкала организационного климата имеет прогностическую ценность. Анализ надёжности как в исследовании 1, так и в исследовании 2, показывает, что согласованность между пунктами шкалы энтропийного климата в организации является высокой, поскольку значение α Кронбаха превышает порог, равный 0,7, а композитные коэффициенты надёжности (CR) также обеспечивают пороговое значение ≥ 0,7. Все эти данные указывают на то, что шкалу ЭОК можно использовать для подобных психометрических измерений. Субшкалы опросника получили названия «Энтропия отношений» и «Энтропия процесса». *Значение для практики*. Эта методика является действенным и надёжным инструментом для измерения энтропийного климата в организациях.

Ключевые слова: энтропийный климат; шкала энтропийного организационного климата; энтропия отношений; энтропия процесса.