VALIDATION OF A SHORT VERSION OF THE SCALE OF SATISFACTION WITH THE WORK ENVIRONMENT (ÉSET-24)

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Abstract: *The scale of satisfaction with the work environment (ÉSET-24) is a shortened version of the French scale of satisfaction with the work environment (Moffat, Mogenet & Rioux, 2016). Participants were 580 employees in various professional sectors. Confirmatory factor analysis showed eight latent factors with a second-order general latent factor structure. The implications for human resource management are discussed.*

Key words: *Satisfaction with the work environment, validity of assessment, confirmatory factor analysis, human resource management.*

1. Introduction

Environmental satisfaction is a widely addressed issue in environmental psychology (Danielsson & Bodin, 2008; Marcouyeux-Deledalle, Fleury-Bahi & Florin, 2009; Nabli-Bouzid, 2014), covering a variety of environments, including housing (e.g. Martins, Ornelas & Silva, 2016), the town (e.g. Fleury-Bahi, Félonneau & Marchand, 2008), and the work space (e.g. Mnif Masmoudi, 2013).

Regarding the office environment, satisfaction with the work environment can be defined (a) from the level of convergence between what office workers would like and their actual experience of the physical and social dimensions of the work environment, and (b) as the agreeable or positive emotional state reported by workers when appraising their work environment, either physical or social, or their experiences in that environment. In other words, it can be analysed as an evaluation and an emotional state (Moffat, 2016).

The Scale of Satisfaction with the Work Environment (ÉSET) developed by Moffat, Mogenet and Rioux (2016) is based on this definition, and adopts a multidimensional approach to explore the different spatial (e.g. architecture), human and social (e.g. social relationships), functional (e.g. the amenities), and contextual (e.g. quiet) aspects of office employees' work environment. More precisely, referring to Moles' (1977) theory of the shell, which includes both the geometric and the affective dimensions of the space that is experienced, satisfaction with the work environment can be seen as

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the evaluation of an ecological environment (Bronfenbrenner, 1979) composed of four spaces (the work station, the office, the organisation and the neighbourhood) (Moffat, 2016). Each space corresponds to a place, a unit of environmental experience in which individuals, activities and physical forms are closely linked (Canter, 1986).

The ÉSET was tested with a sample of office workers in occupational health centres and banks (Moffat, 2016; Moffat, 2017), and was shown to have acceptable psychometric properties. This scale has 58 items divided into ten dimensions: Layout, Safety, Quiet, Transport facilities, Sociability, Access to shops, Lack of environmental monotony, Neighbourhood attractiveness, Green spaces, Company attractiveness. Cronbach's Alphas were between .70 for "Green spaces" and "Company agreeableness", and .91 for "Layout". The test-retest correlation index, calculated using Spearman's Rho for a sample of under 30, was .75, which indicates relatively high temporal stability, with satisfactory correlations for the ten factors (from .60 to .83). The indexes of convergent validity are completely satisfactory, with a significant positive correlation at .001 (r=.74) between the scores for the overall factor of satisfaction with the work space and those for the overall factor of the questionnaire of satisfaction with the work environment, as well as positive correlations between the ten dimensions of our questionnaire and the "Comfort/Functionality" (from r=.17 to .84) and "Control/Privacy" (from r=.17 to .74) dimensions of Fleury-Bahi and Marcouyeux's (2011) scale.

Although its psychometric properties indicate that the ÉSET can be used to measure office workers' satisfaction with their work environment, it has some limitations regarding its administration. For example, it is too long to be used with poorly qualified workers, who are often put off by written language. Its length also makes it difficult to use with other questionnaires in order to analyse the relationship between environmental satisfaction in the professional sphere and other constructs. A short version is thus called for.

1.1. Constructing the short version of the ÉSET

Analysis of the dimensions and items of the ÉSET raised questions about the relevance of two dimensions: *Safety* and *Sociability*. From a conceptual point of view, *Sociability* involves the facility and capacity to form social relationships and the possibility of having contact with friendly and sociable people within the organization. It appears that this refers more to a type of personality than to a place as a unit of environmental experience. Likewise, *Safety* can be defined as a state linked to circumstances and thus momentary; it also reflects current concern of the French about a lack of safety of property and people (Brouard & Foucault, 2015), probably accentuated by the attacks of January 2015 (Moffat, Bouzid & Rioux, 2018). We thus decided to remove these two dimensions, 15 items altogether.

This version was presented to a sample of 111 office workers (60 women and 51 men), with a length of service ranging from 3 to 21 years. First, we checked the skewness and kurtosis indexes and removed the items that were not sensitive. Next, we analysed the loadings of each item on the eight items of the ÉSET and decided to retain only those items that were strongly correlated with the factors deemed to be the most important

(Evrard et al., 2003). In this way, we removed the items loading on two or more dimensions, and for each dimension we chose the three items with the highest correlations. Finally, we evaluated the reliability of our tool and removed the items with a Cronbach's Alpha below .70 (Nunnally, 1978). In this way, we obtained a short 24-item version of the ÉSET.

1.2. Validation of the short version of the ÉSET

The second part of this study presents the structural and internal validation of the ÉSET (short version) to produce a reliable and valid tool to measure satisfaction with the work environment, with a shorter administration time better suited to empirical studies.

2. Material and Methods

2.1. Participants

Our sample was composed of 580 office workers from different professional sectors (higher education, banking, health, agro-food industry, industry, commerce). Age of participants ranged from 21 to 66 years (M=34.59; SD=10.27), and their length of service in the company ranged from 1 to 40 years (M=6.19; SD=6.44) and in their current job from 1 to 28 years (M=4.81; SD=5.14). Sixty-four per cent of the participants were women.

2.2. Instruments and procedure

Participants were recruited via professional social networks and by email to complete the short version of the Scale of Satisfaction with the Work Environment, with 24 items in 8 dimensions, as described above. The items were scored on a 5-point Likert scale, ranging from (1) Completely disagree to (5) Completely agree.

2.3. Statistical analysis

Confirmatory factor analysis with Structural Equations Modelling (SEM) with latent variables was used to compare three models with one general latent factor, 8 correlated latent factors and 8 latent factors with a second-order general latent factor.

Two types of index were identified. (1) Absolute fit indices, determining how well the a priori model reproduces the data collected. We chose the indices most commonly used in the relevant literature: the GFI (Goodness of Fit Index), AGFI (Adjusted Goodness of Fit Index), $\chi2/df$, and the RMSEA (Root Mean Square Error of Approximation) by Steiger and Lind. (2) Incremental indices to measure the improvement in adjustment when comparing the tested model with a baseline model. We chose the NNFI (Non-Normed Fit Index) and the CFI (Comparative Fit Index). Statistical analyses were performed using AMOS 20.0.

3. Results

3.1. Descriptive statistics

Before conducting the Confirmatory Factor Analysis, we first checked the univariate normality of the items. The kurtosis and skewness indexes were satisfactory (between -1 and 1). Next, we analysed the multivariate normality using Mardia's index (=606.19 < the threshold value of 960). Finally, we tested sampling adequacy using the Kaiser-Meyer-Olkin (KMO) coefficient, which measures the psychometric relationships among the items. The KMO index of the scale is .784 (*p*<.001), indicating that factor analysis could be applied. The following tables (table 1 and table 2) show the descriptive statistics of the 8 factors of the ÉSET.

Descriptive statistics of the 8 factors of the ÉSET-24   Table 1

Abbreviations	Factors	Number of items	M	SD	Cronbach's Alpha
AM	Layout	3	3.12	0.85	.72
CA	Quiet	3	3.58	0.94	.66
TR	Transport	3	3.21	1.05	.61
CO	Shops	3	3.31	1.14	.71
ALE	Lack of monotony	3	3.09	1.11	.73
AQ	Neighbourhood attractiveness	3	3.55	1.02	.82
EV	Green spaces	3	3.49	1.01	.70
AE	Company attractiveness	3	3.07	1.08	.70
ÉSET		24	3.29	0.58	.83

French version: AM = Aménagement; CA = Calme; TR = Transport; CO = Commerces; ALE = Aliénation Environnementale; AQ = Agréabilité du Quartier; EV = Espaces Verts; AE = Agréabilité de l'Entreprise

Mardia's index: 606.19 < threshold value of 624

Kaiser-Meyer-Olkin Measure of Sampling Adequacy: .784, *p*<.001

ÉSET: Échelle de Satisfaction Environnementale au Travail (Scale of Satisfaction with the Work Environment)

The overall mean score was 3.29 (SD=0.58) and the means for each dimension ranged from 3.01 (SD=1.08) (for Company Attractiveness) to 3.58 (SD=0.94) (for Quiet). We examined the matrix of inter-dimension correlations; all the correlations are significant at .01.

Correlations between factors Table 2

Abbre-viations	Factors	Correlations between factors							
		1	2	3	4	5	6	7	8
AM	Layout	-							
CA	Quiet	.36***	-						
TR	Transport	.14**	.14**	-					
CO	Shops	.16***	.13**	.34***	-				
ALE	Lack of monotony	.23***	.14**	.25***	.24***	-			
AQ	Neighbourhood attractiveness	.23***	.29***	.15***	.30***	.25***	-		
EV	Green spaces	.16***	.32***	.29***	.32***	.26***	.36***	-	
AE	Company attractiveness	.14**	.14**	.18***	.13*	.25***	.27***	.28***	-
ÉSET		.50***	.51***	.56***	.58***	.58***	.61***	.62***	.52***

* *p*<.05; ** *p*<.01; *** *p*<.001

3.2. Confirmatory Factor Analysis

Three models were compared. The first was a one-factor model where all items loaded on the same general latent factor. The second was a confirmatory model consisting of 8 related factors, and the third had 8 factors and a second-order general factor.
The fit indices of the models are shown in Table 2.

Main fit indices of the models of satisfaction with the work environment Table 3

Model	χ^2	df	p	χ^2/df	GFI	AGFI	CFI	NNFI	RMSEA (Lo)(Hi)
Model 1	670	252	<.001	2.60	.90	.88	91	88	.054 (.049)(.059)
Model 2	580	224	<.001	2.58	.90	.90	93	91	.053 (.050)(.060)
Model 3	621	244	<.001	2.54	.93	.91	95	92	.052 (.047)(.057)

Model 1 = One-factor model; Model 2 = Correlated 8 latent factors solution; Model 3 = 8 latent factors + second order general factor.

We retained the model with 8 latent factors and a second-order general latent factor, which showed the most satisfactory overall fit, with a χ^2/df value of 2.54. The GFI of .93 and AGFI of .91 are acceptable, and the RMSEA value of 0.52 is completely acceptable as it is below .06. Finally, the incremental values ranged from .95 for the CFI to .92 for the NNFI. The values of the indices and the factor contributions for this CFA are shown in Figure 1. All the structural indices are significant at p<.001.
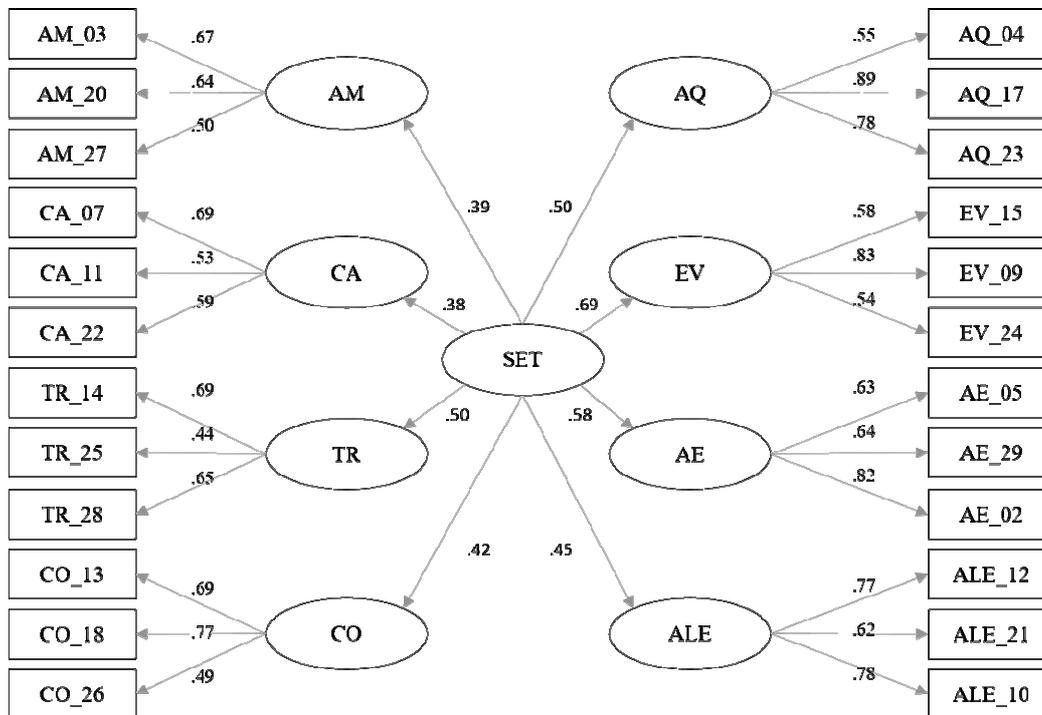
Fig. 1. *Model obtained to measure satisfaction with the work environment (N = 580)*

The factor analysis confirms the 8-dimension structure. These results suggest that in addition to the scores for each of the 8 dimensions, it is possible to calculate an overall score of satisfaction with the work environment.

4. Conclusions and Discussion

We created a short version of the Scale of Satisfaction with the Work Environment (ÉSET). The Confirmatory Factor Analysis (CFA) confirms a version composed of 24 items divided into 8 dimensions: Layout, Neighbourhood attractiveness, Company attractiveness, Lack of monotony, Green spaces, Quiet, Access to shops and Access to transport. The internal consistency of the 8 items varies between α=.61 for Access to transport and α=.82 for Neighbourhood attractiveness. Correlations between dimensions are significant at .01 and hence completely satisfactory. Confirmatory factor analysis validated the 8-factor model of satisfaction with the work environment. The values of the fit and incremental indices justify the relevance of the model.

The ÉSET-24 is a valid and useful tool to evaluate office workers' satisfaction with their work environment. It can thus be used in work aiming to improve the quality of life within work environments. At the theoretical level, the 24-item ÉSET could be used in association with other questionnaires to understand more clearly the subjective relationships of employees with their work environment. At a practical level, this short version could be valuable for Human Resource managers and officers concerned with employees' satisfaction with their work environment and who also wish to improve

employees' organisational productivity and comfort. Indeed, "a well-designed environment can produce job satisfaction and/or comfort and can increase productivity. This can be due not only to physical factors (removing or attenuating nuisance factors, suitable layout of space) but also to psychological processes that can be enhanced by the organization (control over the environment, possibility of personalizing the work-station, workplace attachment, etc.) (Rioux, 2017, p. 413).

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