

Measurement and management of work climate: Cross-validation of the CRISO Psychological Climate Questionnaire

by Serge Gagnon, Maxime Paquet, François Courcy, and Christopher P. Parker



Serge Gagnon, PhD, is principal investigator and associate director at the Research and Intervention Centre for Healthy Workplaces (CRISO-MUHC), and a senior consultant in organizational change management.



Maxime Paquet, PhD, is co-principal investigator at the Research and Intervention Centre for Healthy Workplaces, affiliated with the McGill University Health Centre.



François Courcy, PhD, is an associate professor of organizational psychology at the University of Sherbrooke. His research projects and consulting practice encompass antisocial behaviors, psychological well being and health promoting practices within health institutions. He is a regular collaborator of the Research and Intervention Centre for Healthy Workplaces.



Christopher P. Parker, PhD, is associate professor of psychology at the Northern Illinois University. His main research interests are related to psychological and organizational climate, job satisfaction and employee work attitudes, leadership, and organizational politics.

Abstract

This paper presents research results that offer answers to the “why,” “what” and “how” of work climate measurement. It also submits to the scientific community a confirmatory cross-validation procedure applied to a new measurement tool, consistent with the works of Jones and James’s (1979) and of Parker et al. (2003) on psychological climate. The results depict a good model fit for both the English and French versions of the questionnaire. This new instrument offers a comprehensive and manageable approach for the development of a healthy workplace.

Résumé

Cet article présente des résultats de recherche relativement aux questions du « pourquoi », du « quoi » et du « comment » de la mesure du climat de travail. Il soumet aussi à la communauté scientifique une procédure de validation confirmatoire interculturelle appliquée à un nouvel outil de mesure du climat psychologique. Cet outil est issu des travaux de Jones et James (1979) et de Parker et coll. (2003). Les résultats sont probants tant pour la version française que la version anglaise du questionnaire. Cette nouvelle instrumentation offre une approche globale et concrète de développement et de maintien de la santé des organisations.

“A fundamental way to better healthcare is through healthier healthcare workplaces. It is unacceptable to work in, receive care in, govern, manage and fund unhealthy healthcare workplaces.”

Quality Worklife Quality Healthcare Collaborative, 2006

Ensuring the quality of work environments in such a way that allows health systems to address disabling diseases and reach national and world objectives is an imperative.¹ In that regard, several strategies have been employed in the last few years by the Canadian health and social services system in an attempt to stimulate and maintain the creation of healthier work environments.

For many years, Health Canada has been financing healthy workplaces initiatives such as the “Quality Worklife Quality Healthcare Collaborative” (QWQHC)² and the “Multi-Site Work Climate Action Research Program,” which was conducted between 2005 and 2008 in Quebec by the Research and Intervention Center for Healthy Workplaces (CRISO-McGill). This article presents the results of the confirmatory cross-validation of the measurement tool used in this program.

Creating healthier work environments has now become a priority, and measuring the quality of work environments is now part of the accreditation processes of the Canadian health and social services institutions. It is therefore relevant to take interest in measurement tools that may be useful in this

respect, especially those shown to demonstrate a capacity to predict strategic outcomes, both at the individual (satisfaction, commitment, health at work) and organizational levels (performance, quality of care).

This article submits that (1) the psychological work climate has significant impacts on individuals' behaviours and organizational results, and (2) that a scientific measurement of work climate, able to predict some of these significant impacts, can be obtained with the CRISO Psychological Climate Questionnaire, which, as we demonstrate in the methodological section of the article, has undergone a rigorous confirmatory cross-validation procedure in both of Canada's official languages.

Literature review

Study and assessment of work climate

The concept of work climate formally appeared in the scientific literature in the 1960s. Its origins are embedded in the notions of "behaviour environment" and "life space" introduced, respectively, by Koffka³ and Lewin.^{4,5} As mentioned above, researchers agree that work climate plays an important role in shaping individuals' behaviour in a particular organizational context.⁶⁻⁸ The scientific community's interest in work climate over the last 40 years has led to numerous attempts to develop an adequate measurement instrument.⁹⁻¹² Taking into consideration previous methods of measuring work climate, this paper presents the results of a confirmatory cross-validation procedure obtained with the CRISO Psychological Climate Questionnaire (CRISO-PCQ), which was inspired by the works of Jones and James (1979).¹³

On the one hand, the study of work climate has given rise to numerous operational definitions.^{6,14-17} On the other, the development of an unambiguous measurement tool is problematic, mostly because of the absence of consensus regarding the concept definition.^{12,15,18} The difficulty arises from the absence of an accord regarding a theoretical model that explains the processes involved when individuals, interacting with a multitude of stimuli in their organizational environment, arrive at roughly the same perceptions of these stimuli and give them a relatively similar meaning.¹⁷ Coming up with a short list of environmental factors that are likely to influence the behaviour of the members of an organization also proves difficult. Consequently, in this field, it is not surprising to observe many approaches and conceptualizations^{12,17,19} and, by extension, numerous ways to assess work climate. Verbeke et al.¹⁹ organize the field into four conceptual approaches: structural, interactional, cultural and perceptual.

The structural approach postulates that work climate is an objective manifestation of an organizational structure, which exists independently of the individuals in the organization.²⁰⁻²² How members of an organization perceive work climate is the result of their daily exposure to the same objective characteristics of the work environment, namely, the size, number of standardized procedures, centralization of authority, number of hierarchical levels, and so on.¹⁴ According to this approach, similar structural aspects in two different

organizations produce two identical organizational climates.¹⁷

According to the interactional approach, work climate stems from interactions between the members of an organization. Thus, the meaning attributed to a specific situation or organizational event is the product of daily interactions in the context of which people collectively mould a perception of the "organizational reality."^{7,23-24} Supporters of this approach recognize the principle of intersubjectivity and claim that the interpretation of the organizational reality made by the organization's members is not only based on structural aspects such as politics, programs and procedures, but also on the members' subjective awareness and interpretation of those aspects.¹⁷

Integrating the "fabric" of an organization's history into the conceptualization of work climate, the cultural approach proposed by Moran and Volkwein¹⁷ is an emerging approach. Notably based on the suggestion by Ashforth²³ that work climate and culture mutually influence one another, the meaning of a specific situation is the result of the interactions between the organization's members who share a common knowledge of the organization's history, values, and goals. This common perception results from a long process of collective interpretation. According to this approach, culture influences the work climate by modifying individual perceptions through the construction of common-sense knowledge about organizational realities. The work climate then modulates the interactions between the individuals, which, in turn, shape the work climate and later on, the organizational culture.

Finally, the perceptual approach – which is a counter-theory to the structural approach – defines work climate as the result of symbolization processes that lead individuals to "extract" from organizational situations and events only what is most psychologically significant to them.^{7,25-27} Therefore, and without denying the influence of objective organizational processes, the perceptual approach stresses the primary importance of the psychological processes involved in the production of individual attitudes and behaviours that aim to "adjust" to organizational attributes. From that perspective, work climate is identified as "psychological work climate" and it is conceptualized as an individual characteristic rather than an organizational one.¹⁶ The CRISO-PCQ emanates from this last theoretical tradition.

The role of climate perceptions in predicting organizational and individual outcomes

As Lewin formulated in 1951,²⁸ the behaviour of individuals [B] is a function of not only their personal characteristics [P], but also of those of their environment [E], hence the formula: $B = f(P \times E)$. Thus, members of an organization express their evaluation of the work environment by adopting strategic behaviours that protect from or promote this work environment. Depending on the fit of their behaviours to the expectations and realities of this environment, not only do members of the organization end up maintaining, or not, their efficiency and performance, but also their physical and psychological health.

a) Repercussions on performance

The works of Bowers²⁹ and Likert³⁰⁻³¹ confirm the supportive role of work climate regarding work efficiency and individual performance. A positive perception of psychological work climate not only increases job satisfaction, organizational commitment, motivation, productivity,³² but also contributes to decreased absenteeism, turnover rates,³³⁻³⁷ and nurses' overtime.³⁸⁻⁴⁰

In addition, favourable work climates help employees accept planned⁴¹ changes and help control antisocial workplace behaviour.⁴² Moreover, we have recently identified evidence in the multi-site work climate action research program, financially supported by Health Canada, that variations in the hospital medication error-rate are partly linked, in terms of psychological climate, to the variations in perceptions related to role clarity, role conflict and overload. In the same study, we also found that variations in mean length of stay are partly linked to variations in the perceptions related to job autonomy, job importance, job challenge, role clarity, role conflict and overload.⁴³ These research outcomes confirm the importance of work climate on individuals' performance and quality of care and services.

b) Repercussions on health

Research done with the psychosocial approach points to important links between the workplace climate perception with stress indicators,⁴⁴⁻⁴⁵ burnout (emotional exhaustion, lack of achievement and depersonalization) and psychological violence,⁴⁶ as well as workplace accidents.⁴⁷ We also demonstrated in a recent study that the perception of work climate can help predict whether the workplace psychosocial environment poses health risk.⁴⁸

Having examined questions relative to the "how" and "why" of work climate, let us now turn to the question of "how to measure it" in a valid, reliable and manageable way in terms of the preoccupations link to the translation of the diagnosis into a mobilizing action plan.

Description of existing measurement instruments

The last 40 years of research has yielded a multitude of instruments that measure work climate. We found almost 30 instruments developed between 1963 and 2005 that are still widely cited. Analysis of those questionnaires helped to guide us in creating a new tool to measure work climate. The first instruments (one of which was developed by Forehand and Gilmer)²⁰ that measured work climate were based on the structural approach. By the mid-1970s, the initial instruments gave way to conceptualizations based mainly on the perceptual approach, as initiated by James and his colleagues.^{16,26,27,49-50}

Since that time, there has been very little consultation between members of the scientific community to develop a reliable and valid instrument to measure work climate. Mostly, researchers create their own new measurements or adapt existing ones to their needs. This has led to the creation of many measurement scales that differ widely in terms of the number and types of dimensions they include.¹⁶ However, we observed

TABLE 1
Split sample demographics

	English group ^a	French group ^b	Total sample
Gender			
Male	328; 60%	215; 40%	543; 22%
Female	1365; 70%	595; 30%	1960; 78%
Job category			
Nursing staff	558; 34%	235; 29%	793; 32%
Health care professionals and technicians	490; 30%	356; 44%	846; 35%
Office staff	308; 19%	70; 9%	378; 15%
Support staff	172; 10%	85; 11%	257; 11%
Management staff	92; 6%	38; 5%	181; 7%
Tenure			
M	14.50	10.84	13.31
SD	9.54	8.63	9.70
Lowest	< 1 year	< 1 year	< 1 year
Highest	40 years	42 years	42 years

^aN = 1692; ^bN = 811.

several work climate dimensions common to the questionnaires, namely, task autonomy, pressure at work or workload, supervisors' trust in employees, goals emphasis and work facilitation, warmth, cooperation, pride, innovation, risk-taking, decision-making mechanisms, reward system and organizational support.^{11,13,51-59}

In spite of the ingenuity and creativity involved in developing these instruments, we have witnessed persistent methodological pitfalls when it comes to their validation. Indeed, very few instruments measuring work climate are submitted to a rigorous validation process.^{14,60} In most cases, the investigators proceed with only the principal component analyses or exploratory factor analyses, and report internal consistency indices to demonstrate the quality of the instrument.^{13,61-62} These procedures partially support a satisfactory validity and reliability level as they correspond to an exploratory research step. But confirmatory factor analyses lend stronger support to the validity of a model fit.⁶³ One should also note that the vast majority of the questionnaires elaborated in English have to be translated into other languages (French, in our case), and the translated versions are rarely subjected to a parallel psychometrical validation.⁵⁷ Finally, it seems imperative to develop work climate assessment instruments for specific organizational environments, for example, health care institutions.⁶⁰

With these considerations in mind, we now present the results of the procedure to validate the factorial structure of the CRISO-PCQ (English version) as well as of its translated version in French.

Method

Participants

The sample, collected in 2005 (N = 2,503), comprised health care workers at a public university health care centre in Quebec, Canada. Out of 7,616 potential respondents, 3,142 returned their questionnaire (41.3% response rate). As a prerequisite to the statistical analyses, we had to eliminate 639 cases containing too many missing values. More sample demographics are available in Table 1.

TABLE 2
CRISO Psychological Climate Questionnaire - Definitions of the 15 dimensions and examples of items (two out of four by dimension)

JOB	
Importance	<i>The feeling that one's contribution and the results of one's work are important.</i>
Q21.	I feel that my job is important to the functioning of my work team.
Q36.	I feel that my work makes a meaningful contribution.
Autonomy	<i>Autonomy in accomplishing tasks and making decisions within one's own work area.</i>
Q4.	I have a great deal of freedom to decide how to do my job.
Q19.	Control is assigned so that I have authority to make decisions within my own work area.
Challenge	<i>The feeling of being able to fully use one's knowledge and of being able to meet challenges.</i>
Q35.	My job challenges my abilities.
Q50.	I am able to make full use of my knowledge and skills in my job.
ROLE	
Clarity	<i>No ambiguity about responsibilities, decisional structure and objectives.</i>
Q16.	The goals and objectives of my work team are clearly defined.
Q31.	My job responsibilities are clearly defined.
Conflict	<i>No conflict arising from the number of rules or people who interfere in one's work.</i>
Q32.*	There are too many people telling me what to do.
Q47.*	I am held responsible for things over which I have no control.
Workload	<i>Employees are not overloaded and they can deal with the level of pressure on their job.</i>
Q3.*	I have more work to do than I could ever get done.
Q18.*	The amount of work I am assigned keeps me from doing a good job.
LEADERSHIP	
Trust & support	<i>Trust in the supervisor and in his/her feedback and support.</i>
Q9.	My supervisor treats his/her people with respect.
Q39.	My supervisor is eager to recognize and reward good performance.
Goal emphasis	<i>Goals and improvement objectives are clear and restated regularly.</i>
Q37.	My supervisor stresses the importance of work goals.
Q52.	My work team has specific, measurable goals for improvement.
Work facilitation	<i>Work is facilitated and the supervisor's behaviours can be used as examples.</i>
Q8.	My supervisor shows me how to improve my performance.
Q53.	My supervisor helps me solve job-related problems.
TEAM WORK	
Warmth	<i>Quality of interpersonal relationships within the team.</i>
Q12.	There is a friendly atmosphere among people in this work team.
Q42.	People in this work team are concerned about each other.
Pride	<i>The pride associated to a sense of belonging to the team.</i>
Q11.	There is a feeling of pride in my work team.
Q26.	Most people in my work team would not want to change for another work team.
Cooperation	<i>The level of cooperation within the team.</i>
Q40.*	There is friction among the people in my work team.
Q55.	The people in my work team cooperate to get the job done.
ORGANIZATION	
Innovation	<i>Innovation is encouraged and employees are invited to find new ways around old problem.</i>
Q28.	I am encouraged to try new ways of doing my job.
Q58.	This organization encourages me to find new ways around old problems.
Justice	<i>Fairness in the decisions that impact directly one's job or role.</i>
Q30.	Before decisions about my job are made, all of my concerns are heard.
Q60.	I can obtain additional information when decisions about my job are unclear.
Support	<i>The organization plays a positive role in regard to work satisfaction and really cares about the employees' well being.</i>
Q14.*	The organization shows very little concern for me.
Q44.	This organization cares about my general satisfaction at work.

* Reversed scoring

Procedure

The questionnaire was distributed in both its original English version and translated French version; it was completed in either language, depending on the participant's preference. The survey packet also contained a consent form (indicating that participation was voluntary, anonymous and that responses would only be reported in the aggregate), and a short socio-demographic section. All of the university health care centre units received a survey packet for each of its employees. In addition to a hospital-wide communication from administration, asking employees to participate, each manager was to ensure that all employees received their questionnaire. The respondents had four weeks to complete and return the survey directly to the research group, using the prepaid envelope enclosed in the packet.

CRISO Psychological Climate Questionnaire

The CRISO-PCQ is based on the framework initially proposed by Jones and James,¹³ which organizes psychological climate dimensions according to situational referents related to one's job, role, leader, work group and organization.^{27,52} This framework was used by Parker et al.³² to successfully summarize, as mentioned above, relationships between psychological climate dimensions and important individual-level outcome variables (job satisfaction, organizational commitment, motivation and productivity). Jones and James's original questionnaire comprised 145 items, organized in 35 dimensions. To ensure manageability of the questionnaire and facilitate feedback to managers and discussion with employees about improvement priorities, the number of dimensions was reduced to 15, while keeping the same structure of the five situational referents introduced above.

Also, it was decided to reduce the number of items within each dimension, and selection was based according to the item's analysis qualities (the items which best correlated with their original dimension) and its contribution to the face and content validity of the questionnaire. On that basis, we ran a large survey, in a bilingual hospital, to confirm the structure of the new model, using confirmatory factor analyses procedures. Thus, the CRISO-PCQ consists of 60 items, rated on a 5-point Likert-type scale with anchors ranging from 1 (strongly disagree) to 5 (strongly agree), and organized according to 15 dimensions. Table 2 contains a short definition of each dimension, along with two example items by dimension. The French version of the survey materials was developed using the forward-backward translation procedure.⁶⁴

Confirmatory factor analyses

Confirmatory factor analyses (CFA) were conducted on each sub-sample, using maximum likelihood (ML) estimation, in LISREL 8.54. The procedure was first performed separately on both the English and French samples, and then we conducted multi-group comparisons to determine whether the measurement properties of the two scales were equivalent.⁶⁵⁻⁶⁶ We used mean and covariance structure analyses (MACS)⁶⁷⁻⁶⁸ to examine the measurement properties construct

TABLE 3

Psychological climate questionnaire – Descriptive statistics and scale reliabilities for English and French respondents

Scales	English version ^a			French version ^b		
	Mean	S.D.	Alpha	Mean	S.D.	Alpha
Job						
Importance	4.16	0.69	0.64	4.03	0.67	0.57
Autonomy	3.45	0.88	0.76	3.68	0.87	0.79
Challenge	4.00	0.80	0.73	4.06	0.71	0.71
Role						
Clarity	3.46	0.94	0.79	3.30	0.92	0.79
Conflict	3.30	0.95	0.74	3.44	0.90	0.70
Workload	2.79	1.02	0.85	2.85	1.02	0.87
Leadership						
Trust & support	3.29	1.23	0.91	3.28	1.20	0.91
Goal emphasis	3.24	0.99	0.83	3.07	1.00	0.84
Work facilitation	3.06	1.12	0.87	3.04	1.08	0.87
Work group						
Warmth	3.22	1.07	0.89	3.25	1.10	0.92
Pride	3.22	1.01	0.83	3.24	1.07	0.88
Cooperation	3.28	1.03	0.86	3.37	1.04	0.88
Organization						
Innovation	2.84	0.98	0.84	2.78	0.97	0.83
Justice	2.82	1.00	0.87	2.88	1.01	0.87
Support	2.64	1.05	0.87	2.74	1.06	0.88

^aN = 1692; ^bN = 811.

relationships of the two language versions of the questionnaire.

Results of the CFAs were evaluated using several indices of fit.⁶⁹ Based on Tanaka's multi-faceted conceptions,⁷⁰ Sun⁷¹ suggests a hierarchical classification scheme to help choose goodness-of-fit indices, compare them and facilitate their interpretation. When conducting a construct validity evaluation, the root mean square error of approximation (RMSEA), comparative fit index (CFI), non-normed fit index (NNFI) and standardized root mean residual (SRMR) should be the indices of choice. For both the NNFI and CFI, values of above .90 are generally considered indicative of a good model fit,⁷² though other authors suggest that the value should be close to .95.⁷³ For the RMSEA, a value of .06 is required to conclude that there is a relatively good fit.⁷³⁻⁷⁴ Lastly, a SRMR value of less than .08 is necessary for a good fit, and a value between .08 and .10 may be interpreted as acceptable.⁷³

Results

The scale reliabilities for both the English and French versions of the PCQ were computed. As reported in Table 3, almost all scale reliabilities were acceptable and showed only small differences between both language versions. Only the "Importance" dimension obtained a problem score, notably in the French version, indicating the need for further item content analysis of the four affected questions. Descriptive statistics for both samples are also included in Table 3.

TABLE 4
Summary of Goodness of Fit Statistics for Confirmatory Factor Analyses

Model	χ^2	df	RMSEA	CFI	NNFI	SRMR
English^a						
15 Factors	8,123.3	1605	.0522	.983	.982	.0602
Single Factor	28,082.9	1710	.139	.932	.930	.0910
French^b						
15 Factors	4,912.6	1605	.0533	.985	.983	.0569
Single Factor	14,552.6	1710	.143	.941	.939	.0865
Combined						
Same pattern	13,035.9	3210	.0525	.984	.982	.0602
Loadings invariant	13,284.5	3255	.0529	.984	.982	.0579
Intercepts invariant	14,013.3	3300	.0540	.982	.981	.0579
Means invariant	14,253.4	3315	.0545	.982	.981	.0581
Supplemental						
Job categories	16,362.3	5265	.0549	.981	.981	.0881

Note. RMSEA = root mean square error of approximation; CFI = comparative fit index; NNFI = non-normed fit index; SRMR = standardized root mean residual.

^aN = 1692; ^bN = 811.

*p < .05.

Results from the CFAs are reported in Table 4. The hypothesized factor structure fits the data very well for both language versions. Further, each hypothesized structure fits markedly better than a single-factor model. We also verified four different invariance models (similar pattern of factor loadings, invariant construct loadings, invariant indicator intercepts, invariant means). A good overall fit was obtained for each model. Finally, as a complementary analysis, we verified invariance across job categories. To obtain groups of similar size, we used the nursing group, the health professionals and technicians group, and merged all others in a non-health workers group. As shown in Table 4, the model fit did not appreciably worsen. The CFI, NNFI and RMSEA indices were still in the good fit range. The SRMR, on the other hand, was a little worse than in the previous analyses and fell in the acceptable fit range (< .10). Overall and added to an already well-documented content validity and good reliability, the results of the cross-validation procedure clearly indicate that this instrument allows a valid and reliable measure of the psychological work climate in Canadian Anglophone and Francophone health care organizations.

Discussion and implications for managers

The CRISO-PCQ not only provides a valid and reliable evaluation of the work climate, it gives health care managers a comprehensive diagnostic tool that offers a clear picture of the actual work climate and thus facilitates action plans and targeting of improvement priorities. At a time of drastic staff shortages and serious human resources management challenges, this work environment improvement tool can be critical for the survival of an entity!

On the one hand, managers of health care organizations that implement an action plan based on the results of the CRISO-PCQ can be confident that the investment of time and

resources to improve work climate will also positively affect vital individual and organizational outcomes such as high job satisfaction and organizational commitment, low absenteeism, turnover and overtime rates, and both improved health at work and quality of care and services.

These investments will be beneficial if senior management ensures the conditions conducive to successful implementation of continuous work climate improvement processes. We have concluded in the multi-site study on work climate⁷⁵ that 12 conditions for success can be organized around the five dimensions of Hunt's change management model⁷⁶, as follow:

1. Pressures to change: ensure the credibility quality of the « mobilization call » by management and incorporate work environment quality values in management practices and decision-making;
2. Leadership and vision: use evidence with respect to the quality of psychosocial environment in relation to the organizational behaviour and the security/quality of care and services when considering strategic planning, and establish interactive modes of communication that promote commitment and dialogue;
3. Capable persons: establish a participatory approach for the improvement of work climate, which involves "all" teams at "all" levels of the organization, and provide support to managers accordingly; create a dynamic labour-management collaboration to improve the workplace environment quality; allocate adequate resources and set up an internal strategic watch to maintain conditions promoting continuous improvement;
4. Concrete and rapid actions: launch synergistic global and local initiatives; put in place mechanisms that shape organizational behaviour (e.g., Board HR Committee, organizational performance indicators, execu-

tive performance reviews, etc.), ensure progress follow-up and communicate results so that employees make the link with the initial diagnosis;

5. Effective rewards: finally, design effective reward programs, intrinsic (e.g. using similar language to define problems and solutions) and extrinsic (e.g., performance bonus).

On the other hand, since Accreditation Canada has integrated in its new "Omentum" accreditation procedure a measure of the quality of work environment, using a short and standardized questionnaire named "Pulse Tool", the CRISO-QCP can be used as a "specialized" instrumentation to help analyze the causes of and solutions to the problems identified during the accreditation procedure. It also can be used as a preventative measure, aimed at decreasing the number of "red flags" surfacing during the auto-evaluation period of the accreditation process.

Over the past five years, we used an action research approach, throughout the Quebec health care and social services network, to help senior managers of many large and medium-size organizations measure work climate and design successful improvement strategies, as demonstrated with many post-test measurements. Executives of these institutions chose the CRISO-PCQ because they felt it described precisely and simply what people experienced when working in a "healthy workplace," and they hoped to mirror that environment in their own organizations.

Acknowledgments

The authors wish to recognize the important contribution of Annie LaFrenière, PhD (candidate), research professional at CRISO between 2005 and 2007 for the literature review and Marylène Gagné, PhD, Professor at the John Molson School of Business, Concordia University, Montreal, for her methodological guidance.

References

1. World Health Organization. The World Health Report 2006 – Working together for health. Available from: <http://www.who.int/whr/2006/en/index.html>
2. Quality Worklife Quality Healthcare Collaborative. Within our grasp. A healthy workplace action strategy for success and sustainability in Canada's health care system. Ottawa, ON: Accreditation Canada;2008.
3. Koffka K. Principles of Gestalt theory. New York: Hartcourt; 1935.
4. Lewin K. Principles of topological psychology. New York: McGraw-Hill;1936.
5. Lewin K. Field theory in social science. New York: Harper and Bros;1951.
6. Schneider B. Organizational climates: An essay. *Personnel Psychology* 1975;28:447-479.
7. Schneider B, Reichers AE. On the etiology of climates. *Personnel Psychology* 1983;36:19-39.
8. Hellriegel D, Slocum JW, Jr. Organizational climate: Measures research and contingencies. *Academy of Management Journal* 1974;17:255-280.
9. Brunet L, Savoie A. Le climat de travail. Montréal, QC: Les Éditions Logiques;1999.
10. Foucher R, Soucy G. Le climat organisationnel. In: Tessier R, Tellier Y, editors. *Changement planifié et développement des organisations. T. 4 : Pouvoirs et cultures organisationnels* (pp. 197-232). Presses de l'Université du Québec.
11. Litwin G, Stringer R. *Motivation and organizational climate*. Boston, MA: Harvard University Press;1968.
12. Rousseau DM. The construction of climate in organizational research. In: Cooper CL, Robertson I, editors. *International review of industrial and organizational psychology* (pp. 139-158). Chicago, IL: Wiley;1988.
13. Jones AP, James LR. Psychological climate: Dimensions and relationships of individual and aggregated work environment perceptions *Organizational Behaviour and Human Performance* 1979;23:201-250.
14. Patterson MG, West MA, Shackleton VJ, Dawson JF, Lawthom R, Maitlis S, et al. Validating the organizational climate measure: Links to managerial practices, productivity and innovation. *Journal of Organizational Behaviour* 2005;26:379-408.
15. Glick HW. Conceptualizing and measuring organizational and psychological climate: Pitfalls in multilevel research. *Academy of Management* 1985;10(3):601-616.
16. James LR, Jones AP. Organizational climate: A review of theory and research. *Psychological Bulletin* 1974;81(12):1096-1112.
17. Moran ET, Volkwein JF. The cultural approach to the formation of organizational climate. *Human Relations* 1992;45:19-47
18. Johannesson RE. Some problems in the measurement of organizational climate. *Organizational Behaviour and Human Performance* 1973;10:118-144.
19. Verbeke W, Volgering M, Hessels M. Exploring the conceptual expansion within the field of organizational behaviour: Organizational climate and organizational culture. *Journal of Management Studies* 1998;35(3):303-329.
20. Forehand G, Gilmer B. Environmental variation in studies of organizational behaviour. *Psychological Bulletin* 1964;62:361-382.
21. Inkson JH, Pugh DS, Hickson DJ. Organization context and structure: An abbreviated replication. *Administrative Science Quarterly* 1970;15:318-329.
22. Payne RF, Pugh D. Organizational structure and climate. In: Dunette MD, editor. *Handbook of industrial and organizational psychology* (pp.1125-1173). Chicago, IL: Rand McNally; 1976.
23. Ashforth BE. Climate formation: Issues and extensions. *Academy of Management Review* 1985;10(4):837-847.
24. Poole MS, McPhee RD. A structural analysis of organizational climate. In: Putnam LI, Paconowsky ME, editors. *Communication and organizations*. Beverly Hills, CA:Sage;1983.
25. Ekehammar B. Interactionism in personality from a historical perspective. *Psychological Bulletin* 1974;81:1026-1048.
26. James LR, Hater JJ, Gent MJ, Bruni JR. Psychological climate: Implications from cognitive social learning theory and interactional psychology. *Personnel Psychology* 1978;31:783-813.

27. James LR, Sells SB. Psychological climate: Theoretical perspectives and empirical research. In: Magnusson D, editor. *Toward a psychology of situations: An interactional perspective* (pp. 275-295). Hillsdale, NJ: Erlbaum;1981.
28. Lewin K. *Field theory in social science*. New York: Harper and Bros.;1978.
29. Bowers DG. *Systems or organizations: Management of the human resource*. Ann Arbor, MI: The University of Michigan;1977.
30. Likert R. *New patterns of management*. New York: McGraw-Hill;1961.
31. Likert R. *The human organization*. New York: McGraw-Hill; 1967.
32. Parker CP, Baltes BB, Young SA, Huff JW, Altmann RA, LaCost HA, et al. Relationships between psychological climate perceptions and work outcomes: A meta-analytic review. *Journal of Organizational Behaviour* 2003;24:389-416.
33. Ceria CD. Nursing absenteeism and its effects on the quality of patient care. *Journal of Nursing Administration* 1992;22(12): 11, 38.
34. Shamian J, O'Brien-Pallas L, Thomson D, Alksnis C, Kerr MS. Nurse absenteeism, stress and workplace injury: What are the contributing factors and what can/should be done about it? *The International Journal of Sociology and Social Policy* 2003;23:8/9, 81-103.
35. Gellatly IR. Individual and group determinants of employee absenteeism: Test of a causal model. *Journal of Organizational Behaviour* 1995;16(5):469-485.
36. Harter TW. Minimizing absenteeism in the workplace: Strategies for nurse managers. *Nursing Economics* 2001;19(2):53-55.
37. Ivancevich JM, Szilagyi AD, Wallace MJ. *Organizational behaviour and performance*. Pacific Palisades, CA: Goodyear Publishing;1977.
38. Washington K. The health risks of mandatory overtime. The hidden costs of this all-too-common practice. *American Journal of Nursing* 2001;101(5):96.
39. Rogers AE, Hwang W-T, Scott LD, Aiken LH, Dinges DF. The working hours of hospital staff nurses and patient safety. *Health Affairs* 2004;23(4):202-212.
40. Berney B, Needleman J. Impact of nursing overtime on nurse-sensitive patient outcomes in New York hospitals, 1995-2000. *Policy, Politics & Nursing Practice* 2006;7(2):87-100.
41. Latham GP, Yulk GA. A review of research on the application of goal setting in organizations. *Academy of Management Journal* 197;18:824-845.
42. Skarlicki DP, Folger R. Retaliation in the workplace: The roles of distributive, procedural, and interactional justice. *Journal of Applied Psychology* 1997;82(3):434-443.
43. Gagnon S, Paquet M, Lavoie-Tremblay M, Courcy F. Programme inter établissement de recherche action sur le climat de travail: Rapport final. 2008. Healthy Workplaces Initiative Program. Office of Nursing Policy, Health Policy Branch, Health Canada. Available from: <http://www.criso.ca/fr/news/100>
44. Archambault J, Brunet L, Goupil G. *Directions d'école et enseignants face au stress: le rôle du climat organisationnel dans l'anxiété*. Montréal, PQ: Faculté des sciences de l'éducation de l'Université de Montréal;1984.
45. Michela JL, Lukaszewski MP, Allegrante JP. Organizational climate and work stress: A general framework applied to inner-city school teachers. In: Sauter SL, Murphy LR, editors. *Organizational risk factors for job stress* (pp. 61-80). Washington, DC: American Psychological Association;1995.
46. Courcy, F, Harvey, S, Belleau, B, Marceau, A, Rochon, A. Work climate and professional exhaustion. *Proceedings of the 14e Congress of Francophone International Association of Work Psychology, Hammamet, Tunisie*. July, 2006.
47. Zohar D. Safety climate in industrial organizations: Theoretical and applied implications. *Journal of Applied Psychology* 1980; 29(1):96-102.
48. Gagnon, S, Paquet, M, Courcy, F. Psychological climate and healthy workplaces. *Proceedings of the 15e Congress of Francophone International Association of Work Psychology, Université Laval, Québec, Canada, August, 2008*.
49. James LR, Gent MJ, Hater JJ, Coray GE. Correlates of psychological influence: An illustration of the psychological climate approach to work environment perceptions. *Personnel Psychology* 1979;32:563-588.
50. Bowers DG, Taylor JC. *Survey of organizations*. Ann Arbor, MI: Institute of Social Research, University of Michigan;1970.
51. Duxbury ML, Henly GA, Armstrong GD. Measurement of the nurse organizational climate of neonatal intensive care units. *Nursing Research* 1982;31(2):83-88.
52. James LA, James LR. Integrating work environment perceptions: Explorations into the measurement of meaning. *Journal of Applied Psychology* 1989;74(5):739-751.
53. Joyce WF, Slocum JW. *Climates in organizations*. In: Kerr S, editor. *Organizational behaviour* (pp. 317-333). Columbus, OH: Grid;1979.
54. Likert R. *The human organization*. New York: McGraw-Hill; 1967.
55. Moos RH, Insel PM. *The work environment scale*. Palo Alto, CA: Consulting Psychologists Press Inc.;1974.
56. Pritchard RP, Karasick BW. The effects of organizational climate on managerial job performance and job satisfaction. *Organizational Behaviour and Human Performance* 1973; 9:126-146.
57. Roy F. *Élaboration et validation d'un questionnaire sur le climat de travail*. Master's in Psychology thesis. Université de Montréal, Montréal, PQ;1989.
58. Savoie C, Savoie A, Brunet L. *Validation de construit du questionnaire sur le climat de travail (QCT)*. (Research report). Montréal, PQ: Université de Montréal;1994.
59. Young SA, Parker CP. Predicting collective climates: Assessing the role of shared work values, needs, employee interaction and work group membership. *Journal of Organizational Behaviour* 1999;20:1199-1218.
60. Gershon RRM, Stone PW, Bakken S, Larson E. Measurement of organizational culture and climate in healthcare. *Journal of Nursing Administration* 2004;34(1):33-40.
61. Gavin JF. Organizational climate as a function of 61. and organizational variables. *Journal of Applied Psychology* 1975;60(1): 135-139.

62. Lawler EE, Hall DT, Oldham GR. Organizational climate: Relationship to organizational structure, process and performance. *Organizational Behaviour & Human Decision Processes* 1974;11:139-155.
63. Kline RB. Principles and practice of structural equation modeling, 2nd edition. New York: Guilford Press;2005.
64. Brislin RW. Translation and content analysis of oral and written material. In: Triandis, HC, Berry JW, editors. *Handbook of cross-cultural psychology: Vol. 2., methodology* (pp. 389-444). Boston, MA: Allyn and Bacon;1980.
65. Marsh HW, Hocevar D. Application of confirmatory factor analysis to the study of self-concept: First and higher order factor models and their invariance across groups. *Psychological Bulletin* 1985;97:62-582.
66. Vandenberg RJ, Lance CE. A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods* 2000;3:4-69.
67. Browne MW, Arminger G. Specification and estimation of mean- and covariance-structure models. In: Arminger G, Clogg C, Sobal M, editors. *Handbook of statistical modeling for the social and behavioural sciences*. New York: Plenum;1995.
68. Little TD. Mean and covariance structure (MACS) analyses of cross-cultural data: Practical and theoretical issues. *Multivariate Behavioural Research* 1997;32:213-219.
69. Medsker G, Williams LJ, Holahan PJ. A review of current practices for evaluating causal models in organizational behaviour and human resources management. *Journal of Management* 1994;20:439-464.
70. Tanaka JS. Multifaceted conceptions of fit in structural equation models. In: Bollen KA, Long JS, editors. *Structural equation models* (pp. 11-39). Newbury Park, CA: Sage Publications; 1993.
71. Sun J. Assessing goodness of fit in confirmatory factor analysis. *Measurement and Evaluation in Counseling and Development* 2005;37:240-256.
72. Hoyle RH. *Structural equation modeling: Concepts, issues, and applications*. Thousand Oaks, CA: Sage;1995.
73. Hu L, Bentler PM. Cutoff criteria for fit indices in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling* 1999;6:1-55.
74. Browne MW, Cudeck R. Alternative ways of assessing model fit. In: Bollen KA, Long JS, editors. *Structural equation models* (pp. 136-162). Newbury Park, CA: Sage Publications;1993.
75. Gagnon, S, Lavoie-Tremblay, M. The key factors of work climate improvement in Quebec health care and social services organizations. Proceedings of the 15^e Congress of the Franco-phone International Association of Work Psychology, Université Laval, Québec, Canada, August, 2008.
76. Hunt JW. Changing organizations. In: Hunt JW, editor. *Managing people at work* (3rd ed., pp. 259-300). London: McGraw-Hill International Ltd.;1992.



Canadian College of
Health Service Executives
Collège canadien des
directeurs de services de santé

In the Spring 2007 issue of *Healthcare Management FORUM*, we launched a regular ethics column to provide practical advice to health leaders as part of our commitment to follow the College's Code of Ethics.

We are pleased with your participation and again invite you to send us your questions or ethical dilemma to ethics@cchse.org.

Dans le volume du printemps 2007 du *FORUM Gestion des soins de santé*, nous avons lancé une chronique sur l'éthique afin d'offrir des conseils pratiques pour aider les directeurs de services de santé dans le cadre de notre engagement à l'égard de l'application du Code de déontologie du Collège.

Nous sommes heureux de votre participation et vous invitons de nouveau à envoyer vos questions ou vos dilemmes d'ordre déontologique à ethics@cchse.org.