The Team Climate Inventory as a Measure of Primary Care Teams' Processes: Validation of the French Version

L'Inventaire du climat d'équipe comme mesure des processus d'équipes de première ligne : validation de la version française

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Abstract

Purpose: Evaluate the psychometric properties of the French version of the short 19-item Team Climate Inventory (TCI) and explore the contributions of individual and organizational characteristics to perceived team effectiveness.

Method: The TCI was completed by 471 of the 618 (76.2%) healthcare professionals and administrative staff working in a random sample of 37 primary care practices in the province of Quebec.

Results: Exploratory factor analysis confirmed the original four-factor model. Cronbach's alphas were excellent (from 0.88 to 0.93). Latent class analysis revealed three-class response structure. Respondents in practices with professional governance had a higher probability of belonging to the "High TCI" class than did practices with community governance (36.7% vs. 19.1%). Administrative staff tended to fall into the "Suboptimal TCI" class more frequently than did physicians (36.5% vs. 19.0%).

Conclusion: Results confirm the validity of our French version of the short TCI. The association between professional governance and better team climate merits further exploration.

Résumé

Objet : Évaluer les propriétés psychométriques de la version française courte de 19 items de l'Inventaire du climat d'équipe (ICE) et examiner l'apport des caractéristiques individuelles et organisationnelles dans la perception de l'efficacité des équipes.

Méthode : Parmi un échantillon aléatoire de professionnels de la santé et de personnel administratif provenant de 37 établissements de première ligne de la province de Québec, 471 personnes sur 618 (76,2 %) ont répondu à l'ICE.

Résultats : L'analyse factorielle exploratoire a permis de confirmer le modèle original portant sur quatre dimensions. Les coefficients alpha de Cronbach étaient excellents (de 0,88 à 0,93). L'analyse de structure latente révèle une structure de réponses à trois classes. Les répondants provenant d'établissements dotés d'une gouvernance professionnelle sont plus susceptibles d'appartenir à la classe « ICE élevée » que ceux provenant d'établissements dotés d'une gouvernance de type communautaire (36,7 % contre 19,1 %). Le personnel administratif est plus enclin à se retrouver dans la classe « ICE sous-optimal » que les médecins (36,5 % contre 19,0 %).

Conclusion : Les résultats confirment la validité de notre version courte de l'ICE. Il serait pertinent d'étudier plus en profondeur le lien entre la gouvernance professionnelle et un meilleur climat d'équipe.

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TEAM-BASED CARE IS ONE OF THE KEY FEATURES OF HIGH-PERFORMANCE primary care (PC) settings (McMurchy 2009; Shortell et al. 2004). It is central to the Chronic Care Model (Bodenheimer et al. 2002) and to the Medical Home (Center for Policy Studies in Family Medicine and Primary Care 2007; College of Family

Physicians of Canada 2011). Moving from small or mid-size practices with family physicians practising "alone together" (Freidson 1975) to practices requiring structural and functional integration of multidisciplinary PC staff has been a key feature of, and a challenge to, primary care reform initiatives in many countries. Canada is no exception. Team-based work is a key feature of Ontario's Family Health Teams, Quebec's Family Medicine Groups and Alberta's Primary Care Networks, among others (Hutchison et al. 2011). Being able to measure team functioning reliably is of interest not only to health services researchers, but also to clinicians and managers so that they can monitor the evolution and effectiveness of newly formed teams, diagnose where teams may need help to be more effective or measure the impact of teamwork on the quality of care delivered.

The Team Climate Inventory (TCI) (Anderson and West 1998) is among the few instruments that have been validated and used in a variety of contexts and countries (Lemieux-Charles and McGuire 2006). It is based on a rigorous conceptual framework and on extensive research into group climate and innovation (Anderson and West 1998; West and Field 1995). Anderson and West (1998) stated that for individuals to function effectively in a group, they must interact, share common goals and have sufficient task interdependence to develop shared understandings. Those authors proposed a four-factor theory of group climate for innovation: (a) *participative safety* acknowledges that trust is essential for members' involvement; (b) *support for innovation* is the expectation of and support for the introduction of new ways of doing things; (c) *vision* refers to valued outcomes and a common higher goal as motivating factors; and (d) *task orientation* refers to a shared concern for excellence. The TCI has been validated in different languages, and the four-factor structure has always been confirmed (Agrell and Gustafson 1994; Kivimäki et al. 1997; Mathisen et al. 2004; Ouwens et al. 2008; Ragazzoni et al. 2002; Strating and Nieboer 2009).

Higher performance on the TCI has been associated with improved health outcomes (Beaulieu et al. 2013; Bower et al. 2003), better access to care, improved patient satisfaction (Bower et al. 2003; Goh and Eccles 2009; Poulton and West 1999; Proudfoot et al. 2007) and improved job satisfaction and openness to innovation (Gosling et al. 2003; Lemieux-Charles and McGuire 2006; Poulton and West 1999; Proudfoot et al. 2007). Team effectiveness, as measured by the TCI, is one of the 24 priority indicators for providers in the Canadian Institute for Health Information's Pan-Canadian Primary Health Care Indicator Update Report (CIHI 2012).

Most of the work linking results of the TCI to a variety of outcomes has been done with the original 38-question version of the questionnaire (Anderson and West 1998). A shortened 14-question version has been proposed by a Finnish team (Kivimäki and Elovainio 1999), but that version is not based on a robust methodology and has yet to be associated with health outcomes. However, the authors of the original TCI have validated a shorter 19-item version (M. West, personal communication, October 1, 2008) that we translated into French and used

in a study of the association between organizational characteristics of PC practices and quality of care (Beaulieu et al. 2013). In that study, we demonstrated that this short version of the TCI was among the predictors of better quality of care. The objectives of this paper are to report on the psychometric properties of the French version of the short TCI and to explore the contributions of individual and organizational characteristics to perceived team effectiveness.

Methods

Study population
The study population is composed of 471 family physicians, healthcare professionals (mainly nurses) and administrative staff working in a random sample of 37 primary care practices recruited in the province of Quebec for an observational study of organizational predictors of quality of care (Beaulieu et al. 2013). Community primary care centres (CLSCs), traditional fee-for-service practices and Family Medicine Groups (FMGs) are the three main PC organizational models in Quebec. CLSCs are large public organizations providing an array of PC services to a geographically defined population. The teams are mainly composed of family physicians, nurses and social workers. Physicians are salaried. Traditional fee-for-service practices are composed mainly of family physicians and their administrative staff; a few hire nurses, and the premises are privately owned. FMGs typically comprise eight to 10 full-time equivalent family physicians, not necessarily in a single location. In becoming an FMG, the group receives funding for two registered nurses, an administrative assistant and a secretary, above and beyond any existing staff. FMGs can be public, with salaried physicians in CLSCs, or privately owned, with physicians being paid fees for service.

TCI questionnaire and French translation
The original TCI is a 44-item questionnaire. Items are grouped under five scales, four related to dimensions of team functioning (38 items) and a fifth containing social desirability questions (6 items) (Anderson and West 1998). The short 19-item version eliminates the social desirability scale and keeps the original four team-functioning scales. Participative safety (6 items, Cronbach 0.84) and support for innovation (5 items, Cronbach 0.81) are scored on a 5-point Likert scale, and vision (4 items, Cronbach 0.86) and task orientation (4 items, Cronbach 0.84) on a 7-point scale (M. West, personal communication, October 1, 2008). The distribution of the global score ranges between 4 and 24, higher values indicating higher levels of team functioning. The authors recommend excluding practices with response rates of 30% and less (Borrill and West 2001). We produced a French version using the following steps: A first translation into French by a professional translator not expert in the domain, followed by an analysis to resolve discrepancies; a back-translation into English by a different translator

who was unaware of the original version; a review by the researchers on the team, who had expertise in organizational research. The two English versions were also compared with regard to number of words and readability statistics. We did not perform a formal pretest.

Independent variables: Individual and organizational characteristics

Individuals' characteristics (sex, age and professional role) were collected on the TCI questionnaire. A questionnaire, validated in previous research (Lévesque et al. 2010), was completed by the physician in charge to provide information on organizational characteristics. This questionnaire was based on the conceptual framework of the main study, inspired by the work of Contandriopoulos and colleagues (2000) that defines an organization according to its *vision*, *structure*, *resources* and *organizational practices*. The organizational variables for this analysis were chosen based on the literature on teams (Lemieux-Charles and McGuire 2006) and included, among others, PC model (CLSC, FMG, etc.), governance and practice size.

Administration of the TCI

All family physicians, healthcare professionals, secretaries, receptionists and practice managers who were involved in providing comprehensive primary care to the practice population of patients were considered members of the PC teams. Such a definition was needed in CLSCs, where services are also provided to clients with specific needs (prenatal care, school care, home care) by multiple providers. TCI questionnaires were distributed to each member with a personalized letter. We sent two reminders over a six-week period. Questionnaires were anonymous.

Analysis

VALIDATION OF THE FRENCH VERSION

Although the instrument is administered at the individual level, the team climate is meant to reflect shared perspectives. To ascertain the level of inter-rater agreement we used James and colleagues' (1993) within-group inter-rater agreement multi-item $r_{wg(j)}$ indices as advised by the developers (Anderson and West 1998). Inter-rater agreement for each of the TCI subscales was satisfactory, with $r_{wg(j)}$ indices varying between 0.72 and 0.99. A value of 0.7 is the traditional cut-off point denoting high versus low agreement (LeBreton and Senter 2008).

Our plan was to perform confirmatory factor analysis (CFA) and exploratory factor analysis (EFA). However, owing to the relatively small sample size and presence of multi-collinearity, the necessary assumptions for CFA were not met. EFA was performed to test the validity of the French version of the TCI. Principal components analysis with varimax rotation of the factor loading matrix was used. To evaluate the fit of the models, we examined the Kaiser-Meyer-Olkin measure of sampling adequacy, Bartlett's test of sphericity, the diagonal elements on the anti-image correlation matrix and the communalities (Bartholomew et al. 2008).

To test reliability and internal consistency for each of the scales of the translated TCI, Cronbach's alphas were calculated for each of the four scales and for the global score and compared to those of the English version provided by the original authors (M. West, personal communication, October 1, 2008).

ASSOCIATION BETWEEN TCI SCORES AND INDIVIDUAL AND ORGANIZATIONAL CHARACTERISTICS

We used latent class analysis (LCA) (Clogg and Goodman 1984) and latent class regression (LCR) (Bandeen-Roche et al. 1997) to explore the influence of organizational and individual characteristics on the distribution of responses of the TCI scales. LCA allowed us to explore whether and how categories of respondents showed different patterns of responses and whether those patterns varied according to the instrument's items or subscales. LCA is a type of cluster analysis that posits the existence of an unobserved or latent classifier that explains relationships observed between categorical variables. It provides a parsimonious summary of the patterns of item responses in the data and can reveal features that are not apparent in an item-by-item analysis. Classical linear regression was less appropriate because of the small range of the TCI scores. LC regression, which can be viewed as multinomial logistic regression, defines the probability of belonging to a class of individuals who share a common characteristic. The decision on the optimal number of classes to retain was guided by the Bayesian Information Criterion (BIC) (Schwarz 1978). LCA was conducted on each TCI scale separately and then on the overall TCI score, using class membership for each of the individual scales as the items of analysis. Statistical analyses were performed with R 2.15.0 software and SPSS 20.0 software (IBM Corp., Armonk, NY, USA).

Ethics approval
The study was approved by the Research Ethics Committee of the University of Montreal Hospital Research Centre.

Results
The French TCI questionnaire was sent to 618 persons in the 37 participating practices and was completed by 471, for a total response rate of 76.2% (mean of 77.8% per practice; SD, 16.1%; range, 37.5%–100%). Table 1 describes practices' characteristics and Table 2, respondents' characteristics. Response rates differed according to the respondents' role in the practice, being 73.8% for physicians, 69.2% for other healthcare professionals and 83.1% for administrative staff.

TABLE 1. Participating practices' characteristics (N = 37)

Practices' characteristics	n (%) or m (SD)
Organizational model (n [%])	
• Community primary care centres (CLSCs)	9 (24.3%)
• Traditional fee-for-service	12 (32.4%)
• Family Medicine Groups (FMGs)	16 (43.2%)
Governance model (n [%])	
• Professional	25 (67.6%)
• Community	12 (32.4%)
Practice size (number of physicians) (m [SD])	7 (2.7)
Sharing of clinical activities among physicians (n [%])	
• Mostly all physicians share clinical activities (urgent care, hospital care, coverage during vacations, etc.)	30 (81.1%)
• Some or none of the physicians share clinical activities	7 (18.9%)
Presence of mechanisms for maintaining or evaluating competence at the practice (continuous professional development activities and chart audits) (n [%])	30 (81.1%)
Team climate inventory (TCI) (m [SD])	
• Participative safety (1–5)	3.8 (0.4)
• Support for innovation (1–5)	3.7 (0.4)
• Vision (1–7)	5.2 (0.5)
• Task orientation (1–7)	4.7 (0.6)
• Overall TCI score (4–24)	17.4 (1.8)
Mean response rate per practice, percent (m [SD])	77.8 (16.1)

TABLE 2. Respondents' characteristics (N = 471)

				Respondents only	
Role in the practice	Number contacted	Number responded	Response rate (%)	Age (m [SD])	Female (n [%])
Physician	260	192	73.8	48.0 (10.9)	87 (48.3%)
Other health professional	133	92	69.2	41.5 (10.1)	91 (91.9%)
Administrative staff	225	187	83.1	45.5 (10.7)	166 (94.9%)
Overall	618	471	76.2	45.6 (10.9)	344 (75.8%)

TABLE 3. Factor loadings and communalities: Principal components analysis with varimax rotation on the 19-item short version of the French Team Climate Inventory (F-TCI)

Items	Factors				Communality
	Participative safety	**Support for innovation**	**Vision**	**Task orientation**	
We have a "we are in it together" attitude.	0.77				0.63
People keep each other informed about work-related issues in the team.	0.66				0.61
People feel understood and accepted by one another.	0.66				0.64
There are real attempts to share information throughout the team.	0.63	0.42			0.69
There is a lot of give and take.	0.63				0.61
We keep in touch with one another as a team.	0.65				0.70
This team is always moving towards the development of new answers.		0.69			0.77
This team is open and responsive to change.		0.71			0.77
People in this team are always searching for fresh, new ways of looking at problems.		0.77			0.79
Members of the team provide and share resources to help in the application of new ideas.		0.90			0.80
Team members provide practical support for new ideas and their application.		0.75			0.74
How clear are you about what your team's objectives are?			0.76		0.72
How far are you in agreement with these objectives?			0.86		0.83
To what extent do you think other team members agree with these objectives?			0.80		0.81
To what extent do you think members of your team are committed to these objectives?		0.43	0.71		0.81
Do your team colleagues provide useful ideas and practical help to enable you to do the job to the best of your ability?				0.85	0.77
Are team members prepared to question the basis of what the team is doing?			0.42	0.55	0.73
Does the team critically appraise potential weaknesses in what it is doing in order to achieve the best possible outcome?				0.74	0.80
Do members of the team build on one another's ideas in order to achieve the highest possible standards of performance?		0.45		0.61	0.79

Note. Factor loadings <0.4 are suppressed.

Validation of the French version

EXPLORATORY FACTOR ANALYSIS

We first examined whether factorization would be appropriate. All the items were significantly correlated (Pearson's r>0.3) with at least one other item, indicating that factorization would be justified. The Kaiser-Meyer-Olkin measure for sampling adequacy was 0.95, well above the recommended threshold value of 0.6 (Tabachnick and Fidell 2007). Bartlett's test of sphericity was significant ($X2 = 6464.72$, df = 171; $p<0.001$). The diagonal elements on the anti-image correlation matrix were all well above 0.5, supporting the inclusion of all 19 items in the factor analysis. Finally, communalities (shown in Table 3, last column) were all superior to 0.3, confirming that each item shared common variance with the others. All 19 items of the questionnaire were thus included in the EFA.

Table 3 presents the factor loading matrix for the final solution. Eigenvalues were superior to 1 for the first three components (participative safety, support for innovation, vision) and very close to 1 (0.9) for the last (task orientation). In the final model, the first component accounted for 22% of the variance, the second and third accounted each for 19% and the fourth accounted for 14%, for a total of 74% of the total variance accounted by the model. Item loadings closely matched the instrument's scales. The four-factor model supported by theory was thus confirmed.

RELIABILITY

As shown in Table 4, Cronbach's alphas for the four components were very good (from 0.88 to 0.93) and were slightly superior to the values provided by the authors of the original version (M. West, personal communication, October 1, 2008), indicating good internal consistency for each scale. The Cronbach's alpha for all 19 items was 0.95.

TABLE 4. Cronbach's alphas of the French version of the TCI compared to the original English 19-item version

	Cronbach's α	
TCI scales	**French version**	**Original version**
Participative safety	0.88	0.84
Support for innovation	0.93	0.81
Vision	0.91	0.86
Task orientation	0.88	0.84

Association between TCI scores and individual and organizational characteristics
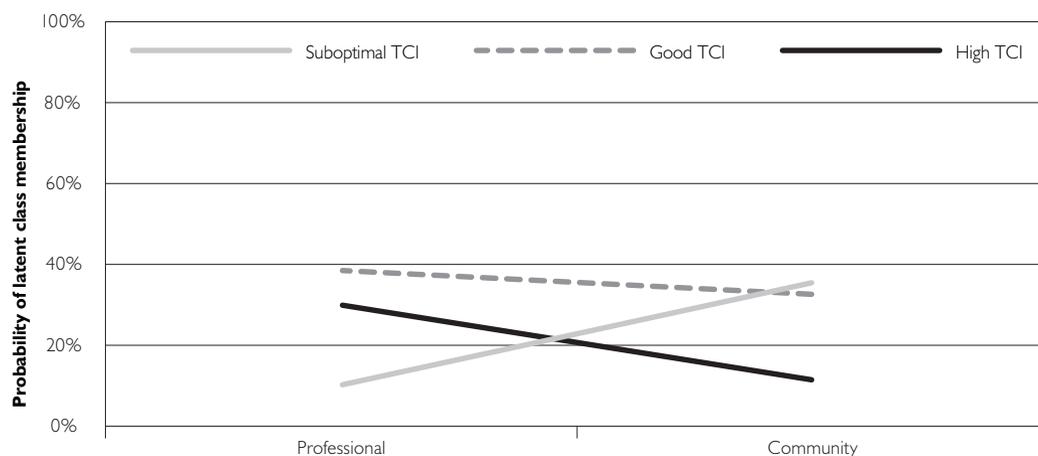
LATENT CLASS ANALYSIS

Three classes were obtained when conducting LCA on the overall TCI: Class 1 (Suboptimal TCI; 26.8% of respondents) corresponded to a rather neutral or subpar evaluation of each scale of the questionnaire; Class 2 (Good TCI; 44.6% of respondents) was indicative of an average–high team climate overall; and Class 3 (High TCI; 28.6% of respondents) indicated respondents were more likely to be in the most positive class for each individual scale. No class revealed a complex assessment of team climate that could have been very positive for some scales and clearly less so for others.

LATENT CLASS REGRESSION

Two characteristics, the governance model of the practice and the professional roles, significantly affected respondents' prior probabilities of belonging to any one of the three classes of the overall TCI defined by the LCA. Figures 1a and 1b present the results of the LCR and depict how the probability of latent class membership was affected by each of these characteristics. Respondents in practices with professional governance had a 36.7% probability of belonging in the "High TCI" class compared to respondents in practices with community governance (19.1%), and this was significantly different from the probability of belonging in the "Suboptimal TCI" class, which was greater in practices with community governance than in those with professional governance (41.8% vs. 18.8%) (Figure 1a).
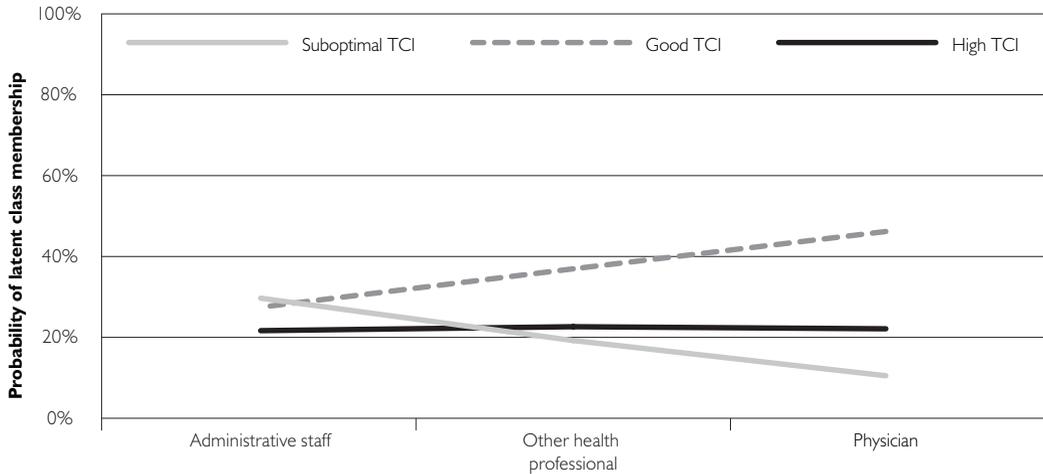
FIGURE 1A. PC practices' governance model as a predictor of latent class membership for the overall TCI

Administrative staff tended to fall more frequently into the "Suboptimal TCI" class than did physicians (36.5% vs. 19.0%), who were more likely to belong in the "Good TCI" class (51.5% vs. 34.4%) (Figure 1b). Interestingly, the probability of belonging in the "High TCI" class

was identical in all three professional groups, being in the range of 30%. The probability of belonging to the highest-scoring class was greater for respondents in practices where physicians shared their various clinical activities (unfavourable duty hours, coverage during absences, hospital coverage, etc.), but this association fell short of reaching statistical significance (p=0.053).

FIGURE 1B. Respondent's role in the practice as a predictor of latent class membership for the overall TCI

Discussion

Our results confirm the validity of our French version of the 19-item short TCI provided by the original developers and contribute to the scant body of knowledge on the relationships between individual and organizational characteristics and team processes in PC practices in Canada. In addition, the results of our observational study provide evidence on the construct validity of our short French version because the TCI score was associated with the overall technical quality of PC score (Beaulieu et al. 2013). Having access to a valid and reliable measure of team processes in both French and English is an asset for Canadian health services researchers and decision-makers.

Although the implementations of a variety of interdisciplinary teams in Canada have been studied (Oandasan et al. 2006; Primary Health Care Transition Fund 2007), we cannot draw a clear picture of the contribution of organizational factors to team processes in the practice settings that currently exist in Canada. Few studies have explored these associations using quantitative measures of team processes like the TCI. We know of only one published study conducted in a sample of 21 Family Health Teams in Ontario using the TCI (Howard et al. 2011). Team culture and access to information technology were the only factors associated with higher TCI scores. Team size, skill mix, governance model and provider type showed no relationship with the TCI.

In our study, the only individual characteristic associated with the TCI was the respondent's professional role in the practice. Family physicians were less likely to belong in the class of respondents who scored team processes lower, while administrative staff were more likely to belong in that class. This relationship has been observed by others (Goh and Eccles 2009;

Proudfoot et al. 2007), but not in the Ontario study (Howard et al. 2011). To a certain extent this finding is not surprising, but low perceived level of engagement by administrative staff should be disquieting, considering their unique contribution to team effectiveness (Crabtree et al. 1998; Schlosser 2003). However, the probability of belonging to the class reporting the highest team climate was the same for all three types of providers. Achieving a high degree of engagement in all team members is thus possible.

Professional governance was predictive of a more favourably assessed team climate. This was not reported by Howard and colleagues (2011) in the Ontario study, but the number of teams studied was small (n = 21) and only four had a community governance model. Data are scant on the impact of governance models on team climate. In the United Kingdom, Poulton and West (1999) reported that team climate was higher in fundholding practices – perhaps a more entrepreneurial culture – than in non-fundholding ones. Also in the United Kingdom, others have reported that tensions occurred in PC trusts where community nurses were engaged by the community authorities and practice nurses were engaged by the physicians (Williams and Laungani 1999).

How do the results from our study settings compare to what is expected or has been observed in terms of TCI scores? Comparisons with specific studies are not easy because the studies differ in how TCI scores are reported. According to the published user guide (Borrill and West 2001), our sample scored above average on the vision subscale and average on the three others. It has been observed that PC teams' subscale scores tend to be lower than those of other multidisciplinary teams (Goh and Eccles 2009).

We did not carry out a test–retest evaluation, which is a limitation of our study. Our main objective was not to perform a formal validity assessment of the French version, as this would have been too demanding of the study participants. Test–retest reliability was not reported in any of the validation studies in other languages (Agrell and Gustafson 1994; Kivimäki et al. 1997; Mathisen et al. 2004; Ragazzoni et al. 2002; Strating and Nieboer 2009). However, Loo and Loewen (2002) performed test–retest evaluations on the long and short English versions of the TCI and found them to be good.

Some might also question why the Cronbach's alpha on the global score is so high when the tool is described as having four dimensions. Do the subscales really discriminate between different aspects of team climate? First, it should be noted that this finding has been observed for both the long and short versions of the TCI (Agrell and Gustafson 1994; Anderson and West 1998; Kivimäki and Elovainio 1999; Loo and Loewen 2002). Anderson and West (1998: 245) reported correlations in the 0.35 to 0.62 range among subscale scores and commented that "while these correlations are not high enough to give rise to concerns over multicolinearity, they do highlight the possibility that perceptions of climate may be prone to a halo effect."

Conclusion
In addition to validating a French version of the original short TCI, our analysis showed how useful this tool may be to researchers who want to study team processes using quantitative

study designs on larger numbers of teams. We see that the TCI is not only useful as a global measure of team function but also makes possible a finer analysis of the four central processes of team functioning. More research is needed to explore the TCI subscales' sensitivity to change, as this could make the TCI an interesting outcome measure for interventions aimed at enhancing team processes.

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References

Agrell, A. and R. Gustafson. 1994. "The Team Climate Inventory (TCI) and Group Innovation: A Psychometric Test on a Swedish Sample of Work Groups." *Journal of Occupational and Organizational Psychology* 67: 143–51.

Anderson, N.R. and M.A. West. 1998. "Measuring Climate for Work Group Innovation: Development and Validation of the Team Climate Inventory." *Journal of Organizational Behavior* 19: 235–58.

Bandeen-Roche, K., D.L. Miglioretti, S.L. Zeger and P.J. Rathouz. 1997. "Latent Variable Regression for Multiple Discrete Outcomes." *Journal of the American Statistical Association* 92(440): 1375–86.

Bartholomew, D.J., F. Steele, I. Moustaki and J.I. Galbraith. 2008. *Analysis of Multivariate Social Science Data* (2nd ed.). Boca Raton, FL: Chapman & Hall/CRC Statistics in the Social and Behavioral Sciences.

Beaulieu, M.D., J. Haggerty, P. Tousignant, J. Barnsley, W. Hogg, R. Geneau et al. 2013. "Characteristics of Primary Care Practices Associated with High Quality of Care." *Canadian Medical Association Journal* 185(12): E590–96. doi: 10.1503/cmaj.

Bodenheimer, T., E.H. Wagner and K. Grumbach. 2002. "Improving Primary Care for Patients with Chronic Illness." *Journal of the American Medical Association* 288(14): 1775–79.

Borrill, C. and M. West. 2001. *How Good Is Your Team? A Guide for Team Members.* Birmingham, UK: Aston Centre for Health Service Organisation Research.

Bower, P., S. Campbell, C. Bojke and B. Sibbald. 2003. "Team Structure, Team Climate and the Quality of Care in Primary Care: An Observational Study." *Quality and Safety in Health Care* 12(4): 273–79.

Canadian Institute for Health Information (CHIH). 2012. *Pan-Canadian Primary Health Care Indicator Update Report.* Ottawa: Author.

Center for Policy Studies in Family Medicine and Primary Care. 2007. *The Patient Centered Medical Home: History, Seven Core Features, Evidence and Transformational Change.* Washington, DC: Robert Graham Center.

Clogg, C.C. and L.A. Goodman. 1984. "Latent Structure Analysis of a Set of Multidimensional Contingency Tables." *Journal of the American Statistical Association* 79(388): 762–71.

College of Family Physicians of Canada. 2011 (September). *A Vision for Canada. Family Practice: The Patient's Medical Home.* Retrieved December 15, 2013. <http://www.cfpc.ca/uploadedFiles/Resources/Resource_Items/PMH_A_Vision_for_Canada.pdf>.

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Validation of the French Version

Contandriopoulos, A.P., F. Champagne, J.L. Denis and M.C. Avargues. 2000. "L'Évaluation dans le domaine de la santé : concepts et méthodes." *Revue d'Épidémiologie et de Santé Publique* 48(6): 517–39.

Crabtree, B.F., W.L. Miller, V.A. Aita, S.A. Flocke and K.C. Stange. 1998. "Primary Care Practice Organization and Preventive Services Delivery: A Qualitative Analysis." *Journal of Family Practice* 46(5): 403–9.

Freidson, E. 1975. *Doctoring Together: A Study of Professional Social Control.* New York: Elsevier.

Goh, T.T. and M.P. Eccles. 2009. "Team Climate and Quality of Care in Primary Health Care: A Review of Studies Using the Team Climate Inventory in the United Kingdom." *BMC Research Notes* 2: 222.

Gosling, A.S., J.I. Westbrook and J. Braithwaite. 2003. "Clinical Team Functioning and IT Innovation: A Study of the Diffusion of a Point-of-Care Online Evidence System." *Journal of the American Medical Informatics Association* 10(3): 244–51.

Howard, M., K. Brazil, N. Akhtar-Danesh and G. Agarwal. 2011. "Self-Reported Teamwork in Family Health Team Practices in Ontario: Organizational and Cultural Predictors of Team Climate." *Canadian Family Physician* 57(5): e185–91.

Hutchison, B., J.F. Lévesque, E. Strumpf and N. Coyle. 2011. "Primary Health Care in Canada: Systems in Motion." *Milbank Quarterly* 89(2): 256–88.

James, L.R., R.G. Demaree and G. Wolf. 1993. "rwg: An Assessment of Within-Group Interrater Agreement." *Journal of Applied Psychology* 78(2): 306–09.

Kivimäki, M. and M. Elovainio. 1999. "A Short Version of the Team Climate Inventory: Development and Psychometric Properties." *Journal of Occupational and Organizational Psychology* 72(2): 241–46.

Kivimäki, M., G. Kuk, M. Elovainio, L. Thomson, T. Kalliomäki-Levanto and A. Heikkilä. 1997. "The Team Climate Inventory (TCI) – Four or Five Factors? Testing the Structure of TCI in Samples of Low- and High-Complexity Jobs." *Journal of Occupational and Organizational Psychology* 70(4): 375–89.

LeBreton, J.M. and J.L. Senter. 2008. "Answers to 20 Questions about Interrater Reliability and Interrater Agreement." *Organizational Research Methods* 11(4): 815–52.

Lemieux-Charles, L. and W.L. McGuire. 2006. "What Do We Know about Health Care Team Effectiveness? A Review of the Literature." *Medical Care Research and Review* 63(3): 263–300.

Lévesque, J.F., R. Pineault, S. Provost, P. Tousignant, A.Couture, R. Borges Da Silva et al. 2010. "Assessing the Evolution of Primary Healthcare Organizations and Their Performance (2005–2010) in Two Regions of Quebec Province: Montreal and Monteregie." *BMC Family Practice* 11: 95.

Loo, R. and P. Loewen. 2002. "A Confirmatory Factor-Analytic and Psychometric Examination of the Team Climate Inventory. Full and Short Versions." *Small Group Research* 33: 254. doi: 10.1177/104649640203300205.

Mathisen, G.E., S. Einarsen, K. Jorstad and K.S. Bronnick. 2004. "Climate for Work Group Creativity and Innovation: Norwegian Validation of the Team Climate Inventory (TCI)." *Scandinavian Journal of Psychology* 45(5): 383–92.

McMurchy, D. 2009. *What Are the Critical Attributes and Benefits of a High-Quality Primary Healthcare System?* Ottawa: Canadian Health Services Research Foundation.

Oandasan, I., G.R. Baker, K. Barker, C. Bosco, D. D'Amour, L. Jones et al. 2006. *Teamwork in Healthcare: Promoting Effective Teamwork in Healthcare in Canada. Policy Synthesis and Recommendations.* Ottawa: Canadian Health Services Research Foundation.

Ouwens, M., M. Hulscher, R. Akkermans, R. Hermens, R. Grol and H. Wollersheim. 2008. "The Team Climate Inventory: Application in Hospital Teams and Methodological Considerations." *Quality and Safety in Health Care* 17(4): 275–80.

Poulton, B.C. and M.A. West. 1999. "The Determinants of Effectiveness in Primary Health Care Teams." *Journal of Interprofessional Care* 13(1): 7–18.

Primary Health Care Transition Fund. 2007. *Summary of Initiatives – Final Edition.* Ottawa: Health Canada.

Proudfoot, J., U.W. Jayasinghe, C. Holton, J. Grimm, T. Bubner, C. Amoroso et al. 2007. "Team Climate for Innovation: What Difference Does It Make in General Practice?" *International Journal for Quality in Health Care* 19(3): 164–69.

Ragazzoni, P., P. Baiardi, A.M. Zotti, N. Anderson and M. West. 2002. "Research Note: Italian Validation of the Team Climate Inventory: A Measure of Team Climate for Innovation." *Journal of Managerial Psychology* 17(4): 325–36.

Schlosser, J. 2003. "Commentary on 'Primary Health Care Teams': 'Opportunities and Challenges in Evaluation of Service Delivery Innovations.'" *Journal of Ambulatory Care Management* 26(1): 36–38.

Schwarz, G. 1978. "Estimating the Dimension of a Model." *Annals of Statistics* 6(2): 461–64.

Shortell, S.M., J.A. Marsteller, M. Lin, M.L. Pearson, S.Y. Wu, P. Mendel et al. 2004. "The Role of Perceived Team Effectiveness in Improving Chronic Illness Care." *Medical Care* 42(11): 1040–48.

Strating, M.M. and A.P. Nieboer. 2009. "Psychometric Test of the Team Climate Inventory – Short Version Investigated in Dutch Quality Improvement Teams." *BMC Health Services Research* 9: 126.

Tabachnick, B.G. and L.S. Fidell. 2007. *Using Multivariate Statistics* (5th ed.). Boston: Pearson Education/Allyn and Bacon.

West, M. and R. Field. 1995. "Teamwork in Primary Health Care. 1. Perspectives from Organisational Psychology." *Journal of Interprofessional Care* 9(2): 117–22.

Williams, G. and P. Laungani. 1999. "Analysis of Teamwork in an NHS Community Trust: An Empirical Study." *Journal of Interprofessional Care* 13(1): 19–28.