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# How to measure socioemotional ties in workgroups? Validation of Workgroup Socioaffective Interdependence Scale

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### Abstract

The main purpose of this study is the validation of the Workgroup Socioaffective Interdependence Scale – WSAIS developed by the authors in a preliminary study. The authors aim is to confirm the multidimensional structure of the measure and to analyse its psychometric properties in a sample of 488 employees from 92 teams. To test construct validity a confirmatory factor analysis was conducted, and social network density of socioemotional ties were calculated to assess convergent and discriminant validity. The findings confirm the underlying factor structure of the scale and provide support for the adequacy of the instrument as a team multidimensional measure of socioaffective interdependence.

© 2013 The Authors. Published by Elsevier Ltd. Selection and peer-review under responsibility of Prof. Dr. Huseyin Uzunboylu & Dr. Mukaddes Demirok, Near East University, Cyprus *Keywords: Socioaffective interdependence, teams, construct validity, social network analysis* 

## 1. Introduction

## 1.1. Group interdependence in the workplace: task and results

Interdependence has been consistently referenced as a fundamental characteristic in most of group definitions (e.g. Cartwright & Zander, 1968; Guzzo & Dickson, 1996; McGrath, 1984; Miguez & Lourenço, 2001). The commonly studied group interdependence dimensions are related to task and results (e.g., Van der Vegt & Van de Vliert, 2002; Wageman, 2001; Wageman & Baker, 1997). We find that emotions are relatively neglected while rationality is valorized in group interdependence studies within organizational contexts. At the same time, it is commonly assumed that within teams people are also linked by socioemotional ties with important implications on group functioning and effectiveness. In fact, several empirical studies indicate a positive correlation between positive emotions and group performance (e.g., Barsade, 2002; Totterdell, 2000) and between relational proximity and trust within teams and positive group outcomes (e.g., Anderson, Martin, & Riddle, 2001; Chang & Bordia, 2001; Tse, Dasborough, Spears, & Ashkanasy, 2008; Webber, 2008).

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#### 1.2. Group socioaffective interdependence: social and emotional ties

In this paper we would like to contribute to answering this main question: What can be exchanged between team members apart from resources and information? At first sight, we could think, for example, about emotions, affection, friendship, opinion and concern for others as well as and personal information. So, group *socioaffective interdependence* could be generally defined by the group social and affective relationships and by social interaction and emotional exchange developed within the workgroup. In literature, we find many constructs that define different yet related aspects of social and emotional group life. Some of the more relevant constructs that have already been empirically studied within groups are emotional contagion (e.g., Barsade, 2002), emotion crossover (e.g., Bakker, Emmerik, & Euwema, 2006), emotional intelligence (e.g., Hamme, 2003), social cohesion (e.g. Carron, Widmeyer, & Brawley, 1985) and affective trust (e.g., Webber, 2008). Therefore, based on these constructs we intend to develop a valid, comprehensive and parsimonious measure of socioaffective workgroup interdependence that accounts for social and emotional relationships and affective exchange developed within the workgroup. The main purpose of this study is the validation of the first version of Workgroup Socioaffective Interdependence Scale - WSAIS (Alves, Lourenço, & Miguez, 2009).

## 2. Method

### 2.1. Participants

A total of 488 employees (41.4% female and 58.6% male) from 92 management and administrative teams from different Portuguese companies participated in this validation study. Most employees (69.9%) were between 30 and 50 years old, 17.0% were younger than 30 years old, and 13.1% were older than 50 years old. All of the teams executed tasks with considerable autonomy and responsibility on decision-making. The size of the teams ranged from three to ten members (M = 5.00; DP = 2.00).

## 2.2. Procedure

The first version of the scale (WSAIS – I) was obtained by the authors in a preliminary study with a developmental sample (N=310) of teamwork employees from 70 teams (industrial, management, administrative, conception, commercial) of different Portuguese companies. The instrument development followed these five core steps: (1) a wide literature review; (2) the construction and selection of an item pool; (3) an item review by experts; (4) a scale pre-test among a relevant set of people; (5) the test of 35 items scored on a Likert scale (I=never to 7=always) in a developmental sample; (6) an exploratory factor analysis.

In the present study we aimed to confirm the multidimensional structure of the first version of measure and to analyse its psychometric properties in an independent sample. To test construct validity we began with an exploratory and a confirmatory factor analysis, and then we calculated social network density of socioemotional ties in workgroups to assess convergent and discriminant validity based on multitrait-multimethod analysis principles.

## 2.3. Results

The results are presented in two parts: (1) confirmatory analysis; (2) convergent and discriminant analysis.

#### 2.3.1. Confirmatory factor analysis

In accordance with some authors (e.g., Brown, 2006; Kline, 1994), we decided to firstly conduct an exploratory factor analysis (EFA) to evaluate the scale structure stability and verify the factor interpretability in a different sample. Based on the theoretical framework, the extracted factors are expected to correlate to some extent. Thus, an EFA with oblique rotation was run with SPSS software (IBM SPSS Statistics 20.0) with the 27 items-version scale

obtained in the preliminary study (i.e., WSAIS – I) and where eight items of the initial version were excluded due to statistical criteria (Stevens, 2009). The Kaiser-Mayer-Olkin (KMO) was .94, and the Barlett test for sphericity was significant ( $\chi^2$  (351) =8030.22, p < .001), indicating the adequacy of this data for factor analytic procedures. As in the first study, a three-factor solution was suggested by application of the Scree-test criterion. Based on statistical criteria (Stevens, 2009), we decided to eliminate two items. One of them has identical and relatively low loadings in more than one factor, and all the other item loadings were above .40. The final 25-item version of the measure (i.e., WSAIS – II) explained 52.99% of the total variance and comprises the same three distinct and related factors of WSAIS – I: Factor 1(Relational Closeness) includes 10 items; Factor 2 (Work-related Emotionality) includes six items; and Factor 3 (Open Expression) comprises six items. In Table 1 factors are conceptually defined and item examples are given.

Factors	Definition	Item examples
Factor 1 Relational closeness	Presence of affective ties between same team members, characterized by personal information sharing and concern for others».	In my team we talk about issues of our personal and familiar lives. we talk with each other about our feelings.
Factor 2 Work-related emotionality	The way that team members emotional states influence others and their work performance; the emotional charge within a team.	In my team our interaction is characterized by strong emotions. the climate experienced within the group depends on the way we are feeling.
Factor 3 Open expression	Free expression of emotions, opinions, and behaviour in the presence of the other team elements.	In my team we show ourselves truthfully. we are comfortable with each other to behave as we think we should.

#### Table 1.WSAIS - II three-factor definition and item examples

As we obtained in this study a very similar three-factor structure to that resulting from the preliminary study, we decided to estimate the model through confirmatory factor analysis (CFA) with AMOS software (IBM SPSS AMOS 20.0) using ML estimation. In accordance with several authors (e.g., Brown, 2006; Byrne, 2010; Kline, 2005; Maroco, 2010), we performed two complementary data analysis. First, the quality of local model adjustment was evaluated through factor loading magnitude and item reliability analysis (i.e., proportion of variance in each indicator that is explained by the latent factor). Then, overall goodness-of-fit evaluation, based on interpretation of a set of indices, provided information concerning hypothetical model adjustment.

In respect to the evaluation of model local fit, satisfactory results were obtained. All standardized estimates were greater than .50; with the exception of one item which standardized regression weight was .30. All non-standardized estimates were significant (p < .001) and critical values were considerably above 1.96. To analyze the reliability of items multiple correlation coefficients ( $R^2$ ) were taken in account. All items could be considered reliable (i.e.,  $R^2$  greater than .25), with the exception of the same item ( $R^2 = .09$ ). Despite reporting these results, we decided to keep this item for two reasons. Firstly, the item was conceptually and statistically associated with the same factor. Secondly, although we consider that in future analyses this item should be evaluated with caution and greater detail, its removal did not improve the model fit significantly.

Concerning overall model fit analyses, obtained results for the initial model indicate poor fit. Therefore, as modification indices values indicated, fit model could be improved by adding covariances between two error terms pairs associated with same-factor items, which were in fact content related. After including these error covariance parameters, we ran a new CFA. Goodness-of-fit indexes showed that the final respecified model fitted the data moderately. Table 2 reports initial and final CFA models fit statistics.

84	108
.04	.10 -
.86	.09 <sup>b</sup>
	.86

Table 2.Goodness-of-fit indices: initial and final CFA models

b. IC90% =].08; .09[, P [rmsea≤.05] <.001

0. 1000/0-j.00, .00[, 1 [finisea 2.00] <.001

#### 2.3.2. Convergent and discriminant validity analysis

Convergent and discriminant analysis were conducted at group-level. For that reason, within each team individual scores where aggregated. To justify this procedure three indices were calculated. First, in order to assess within-group interrater agreement, average deviation index (AD<sub>M</sub>; Burke & Dunlap, 2002; Burke, Finkelstein, & Dusig, 1999) was computed. Then, according to the guidelines of Bliese (2000) and LeBreton and Senter (2008), intraclass coefficients indices (ICC1 and ICC2) were also considered. Taking in account several authors criteria for cut-off values (Bliese, 2000; Burke & Dunlap, 2002; James, 1982; LeBreton & Senter, 2008) we concluded that results were indicative of a considerable agreement and relative consistency that justifies individual score aggregation at team level. Table 3 presents average intragroup agreement indices obtained for each variable, considering all the teams that participate in this study (N = 87). Five teams were excluded because they had a within-group response rate lower than the cut-off considered. Social network methodology requires that all the group elements responses are available (Wasserman & Faust, 2007). Therefore, teams where there was more than one missing element were not considered in those analyses.

#### Table 3. Intragroup agreement indices

	$AD_M$	ICC(1)	ICC(2)
Relational closeness	.79	.40	.77
Work-related emotionality	.81	.28	.66
Open expression	.75	.31	.70

The multitrait-multimethod approach of Campbell and Fiske (1959) consists in evaluating each of several constructs (traits) through the same set of methods. This methodology allows construct validity evaluation of psychological measures. The result is a Trait × Method correlation matrix which could be interpreted with respect to convergent validity, discriminant validity, and methods effects. Particularly we analyzed in a comparative way the magnitude of the correlations between group socioaffective interdependence when assessed by two different instruments: (1) the WSAIS–II; (2) a social network questionnaire.

In the first case, overall perception concerning team socioaffective interdependence was assessed through WSAI – II subscales and group mean scores were calculated for each team. In the second case, for each group directed and valued data was collected by questionnaire using social network analysis (SNA) methodology. Team members responses were given on a 7-point scale from 1 (*never*) to 7 (*always*) regarding of a set of items which assess the frequency of each dyadic socioaffective interdependence tie. SNA questions were obtained by content analysis of each of the three WSAIS – I subscale items. Team social network data was analysed using routines available in the UCINET 6 computer program (Borgatti, Everett, & Freeman, 2002) and group density was calculated through the sum of the values of all ties divided by the number of possible ties (Wasserman & Faust, 2007).

Based on the assumptions of multitrait-multimethod principles (Campbell & Fiske, 1959), it is expected that (1) the highest values observed in the matrix will be the coefficients for the internal consistency of the measure (reliability); (2) reliability indicators will be higher than correlations obtained when the same trait is measured by two different methods (convergent validity), (3) and correlations between measures of same trait by two different methods will be higher than correlations obtained when different traits are measured by the same method (method effects), and when different traits are measured by different methods (discriminant validity). Considering these three

propositions, results displayed in Table 4 support construct validity of WSAIS – II and social networks measures in the measuring group socioaffective interdependence constructs.

		WSAIS - II			Social network density		
		RC	WE	OE	RC	WE	OE
WCAIC H	RC	(.93)					
w 5A15 - 11	WE	.64**	(.85)				
	OE	.69**	.43**	(.89)			
	RC	.83**	.44**	.63**			
Social network density	WE	.60**	.66**	.44**	.66*	*	
	OE	.54**	.35**	.81**	.62*	* .50**	

Table 4. Multitrait-multimethod matrix of socioaffective interdependence measures

Note 1. RC=Relational closeness; WE=Work-related emotionality; OE=Open expression.

*Note 2.* Values on the diagonal in parentheses are internal consistency indicators; correlations in boldface type represent convergent validities; single-line box is heteromethod block; double-line boxes are monomethod blocks; correlations in monomethod blocks represent heterotrait-monomethod coefficients; nonbolded correlations in heteromethod block represent heterotrait-heteromethod coefficients (adapted from Brown, 2006, p.215).

\*\* *p* <.01

#### 2.4. Discussion and conclusions

The results confirmed the three-factor structure of Workgroup Socioaffective Interdependence Scale which supports the multidimensionality of group socioaffective interdependence construct. Additionally, the instrument could be considered as a comprehensive, valid and reliable measure of social and emotional ties in workgroups. Although the SNA methodology allows the analysis of the relational structure of a group, WSAIS has the advantage of being a more pragmatic measurement tool that is easier to administer in work-related contexts for team research, diagnosis and intervention purposes.

Social and emotional aspects should be considered in teamwork design, particularly for teams which are very interdependent, where emotional transmission and informal social ties are more likely to occur and will have a meaningful impact in team outcomes. In order to better understand the role of socioemotional processes in group functioning, the possible moderators (e.g., group development phase) of group socioaffective interdependence and team effectiveness relationship, as well the group socioaffective interdependence antecedents, should be some of the topics of future research in this domain.

#### References

Alves, M., Lourenço, P. R., & Miguez, J. (2009). Workgroup socio-affective interdependence scale: a preliminary empirical study. Oral communication presented at 14th European Congress of Work and Organizational Psychology, 13-16 May, Santiago de Compostela, Spain.

Anderson, C., Keltner, D., & John, O. P. (2003). Emotional convergence between people over time. *Journal of Personality and Social Psychology*, 84, 1054-1068.

Bakker, A. B., van Emmerik, H., & Euwema, M. C. (2006). Crossover of burnout and engagement in work teams. *Work and Occupations*, 33, 464-489

Barsade, S. G. (2002). The ripple effect: Emotional contagion and its influence on group behavior. *Administrative Science Quarterly*, 47, 644-675.

- Bliese, P. D. (2000). Within-group agreement, non-independence and reliability: Implications for data aggregation and analysis. In K. J. Klein & S. W. J. Kozlowski (Eds.), *Multilevel theory, research and methods in organizations: Foundations, extensions and new directions* (pp.349-381). San Francisco: Jossey-Bass.
- Borgatti, S. P., Everett, M. G., & Freeman, L. C. (2002). UCINET for Windows: Software for social network analysis. Harvard, MA: Analytic Technologies.
- Brown, T. A. (2006). Confirmatory factor analysis for applied research. New York: The Guilford Press.
- Burke, M. J., & Dunlap, W. P. (2002). Estimating interrater agreement with the average deviation index: A user's guide. Organizational Research Methods, 5, 159-172.
- Burke, M. J., Finkelstein, L. M., & Dusig, M. S. (1999). On average deviation indices for estimating interrater agreement. Organizational Research Methods, 2, 49-68.
- Byrne, B. M. (2010). Structural equation modelling with AMOS: Basic concepts, applications and programming (2<sup>nd</sup>ed.). New York: Routledge.
- Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by multitrait-multimethod matrix. Psychological Bulletin, 56, 81-105.
- Carron, A. V., Widmeyer, W. N., & Brawley, L. R.(1985). The development of an instrument to assess cohesion in sport teams: The Group Environment Questionnaire. *Journal of Sport Psychology*, 7, 244-266.
- Cartwright, D., & Zander, A. (1968). Group dynamics: Research and theory (3rd ed.). New York: Harper & Row.
- Chang, A., & Bordia, P. (2001). A multidimensional approach to the group cohesion-group performance relationship. *Small Group Research*, 32, 379-405.
- Guzzo, R. A., & Dickson, M. W. (1996). Teams in organizations: Recent research on performance and effectiveness. Annual Review of Psychology, 47, 307-338.
- Hamme, C. (2003). Group emotional intelligence: the research and development of an assessment instrument. *Dissertation Abstracts International*, 64, 09B, 4663.
- James, L. R. (1982). Aggregation bias in estimates of perceptual agreement. Journal of Applied Psychology, 67, 219-229.
- Kline, P. (1994). An easy guide to factor analysis. London: Routledge.
- Kline, R. B. (2005). Principles and practice of structural equation modeling (2<sup>nd</sup> ed.). New York: Guilford Press.
- LeBreton, J. M., & Senter, J. L. (2008). Answers to 20 questions about interrater reliability and interrater agreement. Organizational Research Methods, 11, 815-852.
- Maroco, J. (2010). Análise de equações estruturais: Fundamentos teóricos, software e aplicações. Pêro Pinheiro: Report Number.
- McGrath, J. E.(1984). Groups: Interaction and performance. Upper Saddle River, NJ: Prentice-Hall.
- Miguez, J., & Lourenço, P. R. (2001). Qual a contribuição da metáfora "equipa" para a abordagem da eficácia organizacional? Comunicação apresentada no IV Encontro Luso-Espanhol de Psicologia Social, Porto, Portugal.
- Stevens, J. (2009). Applied multivariate statistics for the social sciences (5<sup>th</sup> ed.). New York: Routledge.
- Totterdell, P. (2000). Catching moods and hitting runs: Mood linkage and subjective performance in professional sport teams. *Journal of Applied Psychology*, 85, 848-859.
- Tse, H. H. M., & Dasborough, M. T. (2008). A study of exchange and emotions in team member relationships. Group & Organization Management, 33, 194-215.
- Van der Vegt, G., & Van de Vliert, E. (2002). Intragroup interdependence and effectiveness: Review and proposed directions for theory and practice. *Journal of Managerial Psychology*, 17, 50-67.
- Wageman, R. (2001). The meaning of interdependence. In M. E. Turner (Ed.), Groups at work: Theory and research (pp. 197-217). Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Wageman, R., & Baker, G. (1997). Incentives and cooperation: The joint effects of task and reward interdependence on group performance. *Journal of Organizational Behavior*, 18, 139-158.
- Webber, S. S. (2008). Development of cognitive and affective trust in teams: A longitudinal study. Small Group Research, 39, 746-769.
- Wasserman, S., & Faust, K. (1994). Social network analysis: Methods and applications. Cambridge: Cambridge University Press.