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## **WORKING PAPERS**

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Stress Indicator (OSI):**

**Preliminary study on reliability and  
validity assessment.**

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# **French Version of the Occupational Stress Indicator (OSI):**

**Preliminary study on reliability and validity assessment.**

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## **Summary**

As a preliminary study of the validation of the French version of the OSI, this paper examines the first steps of the validity and the reliability of the Occupational Stress Indicator (OSI) for use in France. The OSI is a diagnostic research tool, which assesses seven different aspects of the stress-strain relationship. On the strain side, the scope of the outcomes focuses on three indicators: job satisfaction, mental health and physical health. On the stress side, the assessment includes sources of job stress, type A behaviour, locus of control and coping styles.

Although workplace stress costs are now well recognized in France, there is little research or methodology available to assess job and organizational stress. The aim of the global research will be to bridge the gap. The purpose of the present study was to test a French translation of the OSI and investigate the reliability as well as the convergent and discriminant validity for six of its scales - Mental and Physical health, Type A, Locus of Control, Sources of Pressure, and Coping Styles.

Six of the seven scales of the OSI showed statistically good reliability through Cronbach's  $\alpha$ . The seventh scale, Locus of control, showed a lower and unsatisfactory level of reliability, confirming previous studies on the original version and various foreign versions.

Significant and acceptable construct validity was also found for the Type A, Locus of Control, Mental Health, Physical Health scales and for one of the coping subscales: Social Support.

These findings are encouraging for a future, broader and more complete assessment of the psychometric quality of the French version of the OSI.

## **Résumé**

Approche préliminaire d'un travail de validation global de la version française de l'OSI, cette étude en examine les premières étapes de validité et de fidélité pour une utilisation en France. L'OSI est un outil d'audit du stress qui mesure différents aspects de la relation « stress-strain ».

Bien que les coûts du stress professionnel soient reconnus en France, il existe peu de recherches ou de méthodologies disponibles pour évaluer le stress au travail. Le but de l'étude globale sera de combler en partie se vide. Dans une approche préliminaire, l'objet de ce travail est de tester une version traduite de l'OSI et d'investiguer autant sa fidélité que sa validité convergente et discriminante pour six des sept échelles : santé physique et mentale, Type A, Lieu de Control, Sources de Pressions et stratégies de Coping.

Six des sept échelles montrent une bonne fidélité par la mesure de l'Alpha de Cronbach. La septième, Lieu de Contrôle, montre un niveau de fidélité plus bas et non satisfaisant, confirmant ainsi les études précédentes sur la version originale et sur d'autres versions étrangères.

Une validité de construit significative a également été trouvée pour Type A, Lieu de Contrôle, Santé Mentale et Physique et pour l'une des sous-échelles des stratégies de Coping : le Support Social.

Ces résultats sont encourageants pour engager une recherche plus approfondie et complète des qualités psychométriques de la version française de l'OSI.

*Keywords: France, OSI, validity, reliability, Type A, Locus of control.*

## 1. Introduction

For more than a decade, many studies have suggested that occupational stress is a major concern in companies for both individuals and organizations (BIT, 1992; Robinson & Inkson, 1994).

Even if stress is starting to be recognized in France as a real strategic concern, there are few studies assessing the whole concept. Historically and culturally, French companies do not reflexively deal with stress as an entire consulting process. They systematically prefer to ask for training programs. This way of dealing with stress, associated with a deep national difficulty to accept the concept of stress as a part of life, seems to be postponing the development of efficient strategies to balance the stress problem. To follow Gordon's point of view (Gordon, 1994), these are certainly some of the problems which lead to poor quality stress management policies.

In this context, it is important for occupational psychologists and physicians, managerial executives, stress management consultants and even government policy-makers to be able to understand and to accurately assess the problem of occupational stress. This constitutes the first step in the whole process of occupational stress management.

Even if the OSI has been used in France (Stora, 1999; Stora & Cooper, 1988), it has never been validated. Therefore, this paper describes the assessment of some psychometric qualities of an OSI translated into French.

In the following section, we will present methodology through sample characteristics and measure descriptions. Results will be discussed in section 3 while section 4 will conclude by presenting the steps required to lead to a global French OSI validation study.

## 2. Methodology

### 2.1 Sample characteristics

This study was conducted with a sampling of assistant-managers. They were all engaged in a two-year further education program in which they alternate two weeks in companies with one week in Grenoble Graduate School of Business. For this reason, the Chief Scientific Adviser and the Director of Academics of the school were asked to grant permission to access this population. Since the participants were French, this research complied with the deontological code of the French “Commission Nationale Consultative de Déontologie des Psychologues” (CNCDP) and the European Psychologist Charter (Caverni, 2001) on the protection and respect of human participants.

The initial population surveyed included 95 assistant-managers. 11 of the returned questionnaires had missing data and were eliminated. Table 1 presents the characteristics of the sample population (N=84).

All the respondents were future business managers, working in companies as assistant managers within a 2-year alternate work/study program. Ages ranged from 20 to 48 (n = 82). 81% were between 21 and 24 years old. 53 participants were female (63,1%) and 31 were male (36,9%).

The majority of them (77 – 91,7%) have 1 to 2 years of work experience and 7 (8,3%) have been working for more than two years. They all were involved in a stress management seminar as part of their education as future managers. They completed the measurement tools during this seminar all at one time and in groups.

Table 1. Sample characteristics (N=84)

<b>Variables</b>	<b>Categories</b>	<b>N</b>	<b>%</b>
Sources	<i>Assistant-managers</i>	84	100%
Age	<22	14	16,7%
	22-24	55	64,5%
	25-26	6	7,2%
	>26	7	8,4%
	missing	2	2,4%
Gender	Male	31	36,9%
	Female	53	63,1%
Work	White-collar	84	100%
Length of service	1-2 years	77	91,7%
	> 2 years	7	8,3%

## 2.2 Measures

The OSI was translated into French by the author and back-translated by two English natives. Three experts, one professor in applied psychology, one bi-lingual psychologist and one member of the English editor of the OSI were consulted to give detailed comments and a correction of the French OSI draft and to validate the translation. The formulation of some items was then refined. This process was presented as one of the most reliable of this kind of trans-cultural work by Vallerand (Vallerand, 1989).

Before conducting the sample survey, a pre-test was conducted with a small volunteer group of white-collar workers of 20 people.

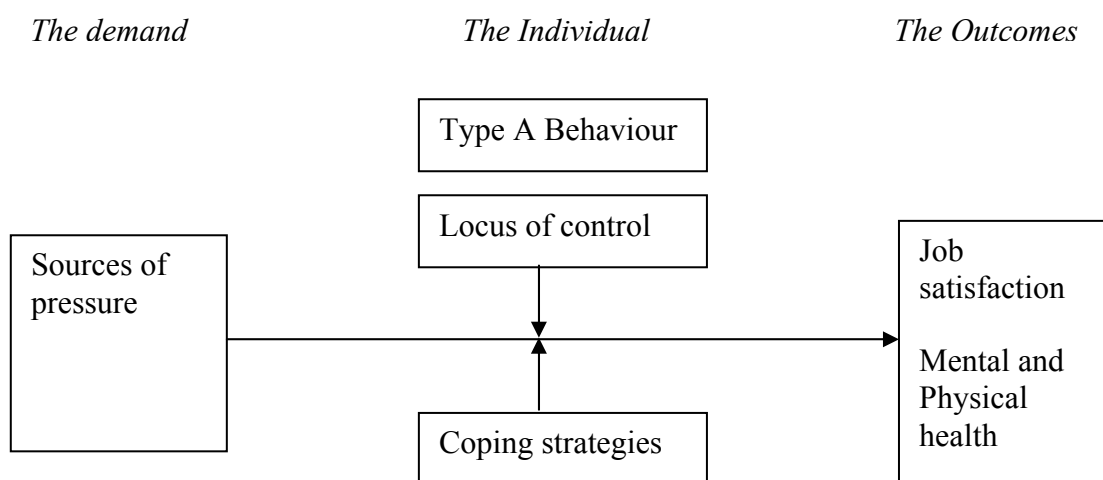
Two self-report sets of questionnaires were used to collect data.

In the first one, the OSI is divided into seven component scales, each of which is then divided into a set of subscales. The scales are: job satisfaction (22 items); mental (18 items) and physical health (16 items); Type A behaviour pattern (14 items); locus of control (12 items); sources of pressure in your job (61 items); coping skills (28 items).

Reliability and normative data for the English version are provided in Cooper *et al.* (Cooper, Sloan, & Williams, 1988), validity data in Robertson *et al.* (Robertson, Cooper, & Williams, 1990) and in Cooper and Bramwell (Cooper & Bramwell, 1992).

This set was used for reliability assessment.

The basic conceptual relationship among the component scales of the OSI is shown in Fig.1 which presents the strain-stress approach of this assessment tool. This figure states how some major sources of professional pressure could lead to different stress-related outcomes moderated by individual differences in the way the person interprets events, behaves, and in the strategies they implement to deal with stress.



*figure 1. The conceptual basis for the OSI*

The second set, used as a basis for exploring the construct validity, was a compilation of existing, French validated alternative measures designed to provide construct validity data. This set of measures was compiled into a booklet, together with instructions for the completion of each questionnaire. It was designed to explore the construct validity of 5 of the 6 subscales of the OSI. These are discussed below.

Sources of pressure:

The Cohen “perceived stress scale” (Bruchon-Schweitzer, 2002; Cohen, 1986; Cohen & Williamson, 1988) was used to validate the sources of stress. This scale, in its French version, presented in Bruchon-Schweitzer (2002), is composed of 14 items assessing the perception of stressors by the individuals, which is the aim of the OSI Sources of Stressors Scale. This scale was chosen primarily because of its excellent psychometric qualities and its brevity. The internal consistency through Cronbach’s alpha is between .84 and .86 in the different sample (Cohen, Kamark, & Mermelstein, 1983). However,

the scale is not situation specific; it is applied to a large panel of general situations. This point is a limitation to testing the validity of Sources of Pressure in the work setting.

#### Mental and physical health:

The QSG (Questionnaire de Santé Global) is a French questionnaire developed by LPA<sup>1</sup>, from a French translation of the Langner questionnaire by Amiel and Lebigre (Amiel & Lebigre, 1970; Langner, 1962). It comprises 27 items divided into 4 subscales to assess the global health.

Two subscales of the QSG were used to validate the OSI mental and physical health subscales: for the “Mental Health” subscale, we used the QSG V1 “humeur” (mood) subscale which includes 9 items. For the “Physical Health” OSI subscale, we used the QSG V3 subscale – Physique (physical) – which comprises 8 items.

Spielberger’s STAI Y1 and STAI Y2 (Spielberger, 1971; Spielberger, Gorsuch, & Lushene, 1970) includes two scales to assess anxiety: form Y1, to measure anxiety state and form Y2, to measure anxiety trait. The French versions, composed of 20 items each, were used to validate the OSI mental health subscale.

#### Type A behaviour pattern:

Bortner’s short rating scale translated and adapted in French by the Groupe Cooperatif P. Neumann, (P. Neuman, Mai 1977; P. Neumann, 1985) is composed of 14 items, quoted from 1 to 24 (24 representing Type A), under three factors: U for time urgency, I for social recognition and A for ambition. The psychometric data assessed through a sample

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<sup>1</sup> Applied Psychology Laboratory of Reims University, France.

of 2147 participants “seem to be equivalent to the original version set by Bortner” (P. Neumann, 1985, p239).

#### Locus of control:

Rotter’s internal versus external locus of control measure (Rotter, 1966) is composed of 30 items. It was used to validate the OSI locus of control subscale. The reliability (split-half Spearman-Brown) was .73 and criterion validity between .55 and .60 was obtained with James Phares Internal-External control scale (Phares, 1965). This scale was translated and adapted in French by Agathon and Salehi (Agathon & Salehi, 1985; Salehi, 1981) and obtained the “*same data as Rotter results*” (p195).

#### Coping styles:

The French version of Vittaliano’s coping styles scale (Paulhan, Nuissier, Quintard, Cousson, & Bourgeois, 1994) is composed of 29 items in 5 subscales: “Résolution de problèmes” (Problem solving) - “Evitement positif (positive avoidance) – “Soutien social” (social support) – “Réévaluation Positive” (positive revaluation) – “auto-accusation” (self-accusation). It is composed of 29 items to quote on a 4 points Likert scale that was sub-divided into 5 subscales by means of a Principal Components Analysis with varimax rotation. All subscales had an eigenvalue (E) > 1 and an explained variance (EV) > 5%. It was used to validate the OSI coping subscales.

### 3. Results and Discussion

All the analyses were performed using the SPSS 10.1 - PC software.

#### 3.1 Reliability

The reliability was estimated through Cronbach's alpha. Cronbach's alpha was used as an appropriate method for instruments with items scored along a continuum (on a Likert scale) (Mueller, 1986). Alpha's scores scope is between 0 and 1. As presented by Evers for group studies (Evers, Frese, & Cooper, 2000, p224), an alpha coefficient between .60 and .70 is considered as "sufficient" and a coefficient of  $>.70$  or higher as "good". The present study will follow this proposition. However, it is important to note that McIver and Carmines (McIver & Carmines, 1981) explained that values over .90 could be the output of a redundancy in items and a measure of a restricted aspect in the targeting concept.

To present the reliability with Cronbach's coefficients of the present study, we chose to compare it with the results of similar previous studies of other foreign versions. They are presented in Table 3 (last column).

Considering Evers criteria for Cronbach's alpha results (above), all seven measures except one are reliable. In addition, four of them were found to be high ( $>.70$ ): Job Satisfaction, Mental and Physical Health and Sources of Pressure. Only Locus of Control was found to be lower than the sorts of value expected, with a coefficient of .48. As it can be seen, all the results are comparable, close and varying in the same way as those reported with the scales of the original English version and with the foreign versions.

The same pattern was observed for the Locus of Control scale but at a non-acceptable level. Moreover, observing "alpha if item deleted" as a guide to allow identifying items

that did not contribute significantly to Locus of Control scale internal consistency, showed that no improvement could be made at this stage of the study. Thus, it does not seem to be a problem of a specific item or even a problem of translation, but more of a construct problem of this scale as found in the other studies (Cunha, Cooper, Moura, Reis, & Fernandes, 1992; Ingledew, Hardy, & Cooper, 1992; Lu, Cooper, Chen, & al., 1997; Swan, Renault de Moraes, & Cooper, 1993).

*Table 2. Reliability of the OSI in the foreign versions and in the present French version*

Scale domain	Number of items	$\alpha$ UK Version <sup>1</sup>	$\alpha$ Brazilian Version <sup>2</sup>	$\alpha$ Chinese Version <sup>3</sup>	$\alpha$ Portuguese Version <sup>4</sup>	$\alpha$ French Version <sup>5</sup>
Job satisfaction	22	.92	.92	.93	.92	<b>.90</b>
Mental Health	18	.88	.52	.86	.80	<b>.79</b>
Physical Health	12	.85	.87	.89	.89	<b>.79</b>
Type A Behaviour	14	.70	.60	.70	.44	<b>.72</b>
Locus of Control	12	.61	.32	.59	.53	<b>.48</b>
Sources of Pressure	61	-	.91	.86	.91	<b>.93</b>
Coping Strategies	28	-	.69	.95	.82	<b>.74</b>

<sup>1</sup>(Williams & Cooper, 1997), <sup>2</sup>(Cunha et al., 1992), <sup>3</sup>(Swan et al., 1993), <sup>4</sup>(Lu et al., 1997), <sup>5</sup>Present study.

### 3.2 Validity

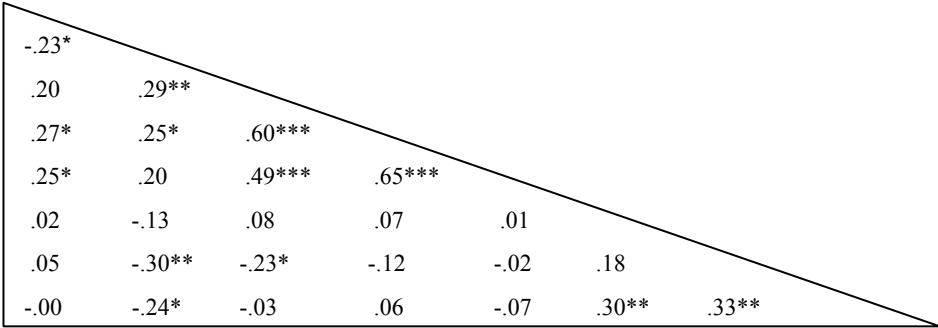
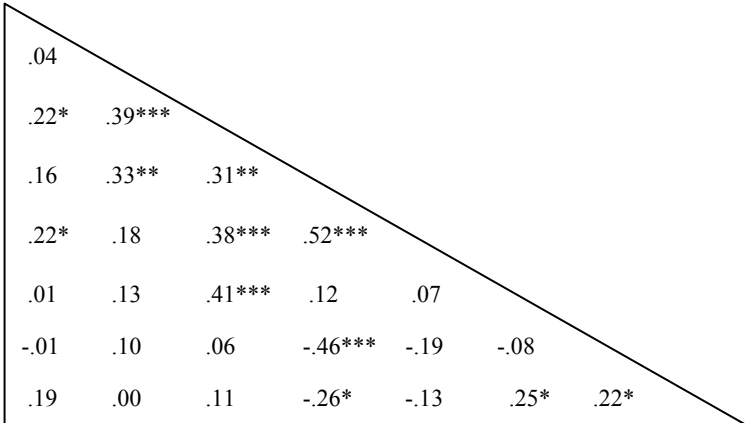
As previously explained, the construct validation proposed in this study focuses on six of the seven components of the OSI: Sources of Pressures, Mental Health, Physical Health, Type A Behaviour, Locus of Control and Coping Strategies.

Intercorrelations (Pearson correlation coefficients) between the OSI scales and the alternative measures of the same construct are shown on table 3.

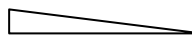
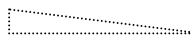
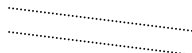
This table may be viewed as a multitrait-multi-method matrix, as proposed by Campbell and Fiske (Campbell & Fiske, 1959), where two methods (the OSI and a set of established questionnaires) are used to assess six traits. This methodology enables the demonstration of both convergent and discriminant validity. Convergent validity looks to the focal effect of various methods of measuring a construct (Leedy, 1997). It is supposed to be high. Discriminant validity, presented here in the Heterotrait-monomethod and Heterotrait-heteromethod triangles, means that different traits measured by the same or by different methods, should be able to discriminate the construct being studied from other similar constructs. It is supposed to be lower than the correlation scores of convergent validity for a given trait.

Analysis of Table 3 shows a correlation matrix that provides a significant and reasonably good ( $>.60$ ) convergent and discriminant validity for the OSI scales. It is especially true for Type A, Locus of Control, Mental Health, Physical Health and for Coping Social Support to a minor degree. In addition, we can note that the OSI Type A related to Bortner' Type A scale and the OSI Locus of Control related to Rotter's measure are not only statistically acceptable, but are also more reliable than in similar previous studies (Cunha et al., 1992; Lu et al., 1997; Robertson et al., 1990).

Table 3. Correlations for OSI and Established Scales

	Established questionnaires							OSI								
	Type A	Locus of Control	Perceived Stress	QSG <sup>a</sup> Mood	QSG <sup>a</sup> Physical	Social Support	Problem Solving	Positive revaluation	Type A	Locus	Sources Pressure	Mental Health	Phys. Health	Coping Social Support	Coping Logic	Coping Involvement
<b>Type A</b>																
<b>Locus Control</b>																
<b>Perceived Stress</b>																
<b>QSG Mood</b>																
<b>QSG Physical</b>																
<b>Social Support</b>																
<b>Problem Solving</b>																
<b>Positive revaluation</b>																
<b>Type A</b>																
<b>L. of Control</b>																
<b>S. of Pressure</b>																
<b>Mental Health</b>																
<b>Physical Health</b>																
<b>Coping Social Sup.</b>																
<b>Logic</b>																
<b>Involvement</b>																

\* $p < .05$  ; \*\* $p < .01$  ; \*\*\* $p < .001$  – <sup>a</sup>QSG : Questionnaire de Santé Globale

-  Heterotrait-monotrait triangles
-  Heterotrait-heterotrait triangles
-  Validity diagonal

As shown in Table 3 Sources of Pressure, Coping Logic and Coping Involvement scales have a significant but low convergent validity. Furthermore, the discriminant validity is not as low as would be expected. For Sources of Pressure this is probably due to the use of a global questionnaire, Cohen Perceived Stress Scale (Cohen, 1986; Cohen & Williamson, 1988). Effectively, this test focuses on a perceived stress (relation with mental health) by integrating items that measure the perception of the stressors and the capacity to cope and to control the situation (relation with Locus of Control) through feeling restructuring.

Table 4. Other significant correlations

	Bortner Mean	Bortner Time Urgency	Bortner Social Recognition	Bortner Ambition	STAI Y1	STAI Y2
<b>Type A</b>	.68***					
Style of behaviour		.65***				
Attitude to living			.39***			
Ambition				.36***		
<b>Mental Health</b>					.51***	.57***

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

As it can be seen in Table 4, Type A and Mental Health data were also computed with other alternative methods to complete the results.

Therefore, Bortner's Type subscales were used to assess OSI Type A subscales validity. Bortner's U subscale is concerned with "Time Urgency" exactly as mentioned in Cooper (Cooper et al., 1988) for the OSI "Style of Behaviour". Botner's A subscale, for "Ambition", and the OSI Ambition assess the same variable with items concerning essentially the degree

to which the individual feels involved in his/her activities. Finally, both Bortner's I subscale, for "Social Recognition", and the OSI "Attitude to Living" are concerned with a more cognitive approach through achievement and social valuation items. If correlation were significant for the three subscales, only Style of Behaviour is correlated at an acceptable level of .65.

For Mental Health, where the QSG "Mood State" was used in a first approach, we also computed Spielberger's (Spielberger, 1971; Spielberger et al., 1970) STAI form Y1 (for state anxiety) and Y2 (for trait anxiety) results. These tools were used to assess the extent to which the OSI Mental Health scale allows us to measure this important facet of mental health. As shown in the Table 4, the significant correlations approached an acceptable level.

#### **4. Conclusion**

This study assessed the reliability and the convergent and discriminant validity of six of the seven components of the OSI on an assistant-manager sample. The French version of the Job Satisfaction scale was not tested because of a lack of validated alternative French questionnaires on this topic.

The results demonstrated a fairly good reliability on five of the six scales observed. The Locus of Control scale internal consistency, as found in other studies, is not reliable.

The validity of several components tested was very significant with a good convergent and divergent validity. It was especially true for Type A and Locus of Control, Mental Health, Physical Health and Coping Social Support subscales.

The Sources of Pressure and Coping Strategies scales showed a high reliability. Nevertheless, for these scales, convergent validity was significant but at a level lower than expected, and discriminant validity was not good except for the Coping Social Support subscale.

In summary, the preliminary results of this research note, from a sample of assistant-managers, have shown that the French OSI could be considered as a promising instrument. Nevertheless, to allow such a use, an in-depth validation study has to be conducted based on the present results that encourage a more important commitment. For that purpose, the following points may be considered:

- Involvement of a large sample of managers, given that OSI was initially built for managers,
- Conducting an exploratory factor analysis and a confirmatory factor analysis to assess factorial validity,
- Assessment of all subscales' sensitivity, reliability and validity.

It is only after the completion of this work and, if the results are reasonably valid, that the French OSI could be used in operational settings for stress audit in the French context.

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