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Validation of a French Version of the Impact of Event Scale-Revised

Alain Brunet, PhD¹, Annie St-Hilaire, MA², Louis Jehel, MD³, Suzanne King, PhD⁴

Objective: This report presents a French translation and validation of the Impact of Event Scale-Revised (IES-R) in a population of women exposed to a natural disaster during or preceding pregnancy.

Method: A total of 223 francophone women who were either pregnant at the time of the 1998 ice storm or who became pregnant shortly thereafter completed the IES-R and other questionnaires 6 months after the disaster.

Results: The French IES-R has good internal consistency, with alpha coefficients ranging from 0.81 to 0.93 for its 3 subscales and total score. The test–retest reliability of the scale, although examined with another sample, proved to be satisfactory, with correlation coefficients ranging from 0.71 to 0.76 for its 3 subscales and total score. Its convergent validity with perceived life threat and general psychiatric symptoms was judged to be marginally acceptable. Finally, a principal components analysis was conducted and a 3-factor solution, which explained 56% of the variance, was retained: a hyperarousal factor (7 items), an avoidance factor (6 items), and an intrusion factor (6 items).

Conclusions: The French version of the IES-R has satisfactory internal validity and test–retest reliability. Further, the factor structure of the translation was similar to the proposed theoretical structure of the IES-R.

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Information on funding and support and author affiliations appears at the end of the article.

Clinical Implications

A validated French version of the Impact of Event Scale-Revised (IES-R) is now available to researchers and clinicians.

Future studies should investigate the psychometric properties of the French IES-R in other populations exposed to different traumatic events.

Limitations

The study had a low response rate.

The level of symptoms was moderate.

Key Words: *Impact of Event Scale-Revised (IES-R), French validation, 1998 ice storm, natural disaster, women, pregnancy*

Natural disasters are unexpected environmental events that affect entire communities and are likely to endanger life and property (1). In addition to causing casualties and economic losses, exposure to natural disasters can precipitate transient and more enduring somatic and psychological symptoms that relate to depression and posttraumatic stress disorder (PTSD) (1).

Over the past 20 years, several instruments have been developed to measure posttraumatic stress symptoms following

exposure to potentially traumatic events such as natural disasters. The Impact of Event Scale (IES) (2) was the first instrument developed for this purpose and remains the most widely used self-report scale of trauma-related symptoms (3). However, because the original IES did not measure symptoms of arousal, one of the core features of PTSD (4), Weiss and Marmar (5) recently proposed a revised version of the IES, which includes 7 new items. The Impact of Event Scale-Revised (IES-R) has been shown to have good psychometric properties, and its use has increased over the last few years.

Further, the scale has already been translated and validated in the German language (6). The instrument, however, has not yet been translated into French and awaits validation. Therefore, the purpose of this paper is to present the translation and validation of a French version of the IES-R.

Method

The Event

Between January 5 and 9, 1998, the southern regions of the provinces of Quebec and Ontario, as well as the northeastern regions of the US, were hit by a series of freezing rainstorms. The 1998 ice storm was the worst natural disaster ever to hit Quebec. It resulted in the death of 27 people and left over 1.4 million households in more than 700 municipalities without power. Power failures ranged from a few hours to more than 4 weeks.

Sample and Procedure

Project Ice Storm is a longitudinal study of the effects of prenatal maternal stress on perinatal and infant outcomes (7). On June 1, 1998, 50 randomly chosen family doctors and obstetricians working in hospitals in the Montérégie (one of the areas most affected) sent out survey packets to 1435 women. These women were either pregnant at the time of the ice storm or became pregnant between January 9 and April 9, 1998. A total of 224 French-speaking women (15.6% response rate) completed the survey. Although low, this response rate is not unusual for studies using mailed questionnaires (8). The physicians obtained written informed consent from all participants.

Instruments

French Version of the Impact of Event Scale-Revised (IES-R)

The IES-R comprises 22 items that measure symptoms of intrusion (dreams about the event), avoidance and numbing (effort to avoid reminders of the event), and hyperarousal (feeling watchful and on guard) with respect to a particular life-threatening event. Participants rate on a 5-point Likert scale the extent to which each item applies to their experiences during the preceding 7 days. Total score on the IES-R ranges between 0 and 88. Selected items were totalled to create the 3 subscales (Table 1). For the purposes of this study, participants were asked to complete the French translation of the IES-R with respect to the 1998 ice storm. The IES-R was first translated into French, then back-translated into English, and was finally reviewed and approved by Daniel Weiss. Table 2 provides a copy of the French version of the IES-R.

Storm Questionnaire. The Project Ice Storm research group designed the "storm" questionnaire to collect information about the degree of exposure to the ice storm. Likewise, the questionnaire includes several items related to perceived threat; specifically, injury to self and feeling in danger owing to cold, electricity, CO₂, falling ice, contaminated water, and food poisoning. The scale comprises 8 items, and scores range from 0 to 8.

General Health Questionnaire. The 28-item General Health Questionnaire (GHQ-28) is a self-report measure used to screen for somatization, anxiety, depression, and social maladjustment symptoms (9). For each item on the 4-point Likert scale, subjects circled the answer that corresponded best to how they had felt in the previous 2 weeks. The scale has been shown to have satisfactory psychometric properties (9,10), and numerous studies have reported significant correlations between the scale and the intrusion and avoidance subscales of the IES (11,12).

Results

Description of the Sample

Of the 224 women who returned the survey packet, 223 (99.6%) completed the French IES-R. Table 3 presents the demographics of the study sample and the mean scores on the IES-R. Spotty missing values (0.3%) for the completed IES-R were replaced by the group mean for the item.

Internal Consistency

Pearson correlations between the subscales and the total score were high and were significant at the 0.01 level (Table 4). Cronbach's coefficients were also high, suggesting that the French IES-R has good internal consistency: intrusion subscale $\alpha = 0.86$, avoidance subscale $\alpha = 0.86$, hyperarousal subscale $\alpha = 0.81$, and total score $\alpha = 0.93$.

Convergent Validity

To evaluate the convergent validity of the French IES-R, Pearson correlations were calculated between the IES-R and the threat subscale of the Ice Storm Questionnaire (intrusion $r = 0.29$, avoidance $r = 0.22$, hyperarousal $r = 0.23$, total $r = 0.29$) and between the IES-R and the total score on the GHQ (intrusion $r = 0.28$, avoidance $r = 0.27$, hyperarousal $r = 0.44$, total $r = 0.37$). Although modest, all correlations were significant at the 0.01 level.

Factorial Structure of the IES-R

To assess the construct validity of the French IES-R, a principal components analysis (PCA) was performed on the 22 items of the scale. While 5 components had eigenvalues > 1.0 , Cattell's scree test was used to determine the number of components to be extracted. The scree plot comprised a large first factor (eigenvalue = 8.6), followed by 2 other factors (eigenvalues = 2.1 and 1.5) and 19 smaller factors, which levelled off. The scree test was ambiguous: it allowed for 2 or 3 components to be extracted. Thus, in accordance with the theoretical structure of the IES-R proposed by Weiss and Marmar, it was decided to extract 3 factors (5). A PCA using an orthogonal (varimax) rotation was then performed with the 3-factor forced solution. Factor loadings > 0.50 were considered significant. The solution, which explained 56% of the variance, generated a hyperarousal factor (items 2, 4, 10, 14, 15, 18, 21), an avoidance factor (items 8, 11, 12, 13, 17, 22), and an intrusion factor (items 1, 3, 5, 6, 9, 16) (Table 1). Items 7, 19, and 20

Table 1 Principal components analysis (varimax rotation) of the French translation of the Impact of Event Scale

Original factors and items	Hyperarousal	Avoidance	Intrusion
Hyperarousal			
4	0.65 ^a	0.30	0.25
10	0.66 ^a	0.16	0.32
15	0.71 ^a	0.09	0.03
18	0.65 ^a	0.21	0.23
19	0.47	0.43	-0.06
21	0.74 ^a	0.13	0.20
Avoidance			
5	0.06	0.43	0.53 ^a
7	0.14	0.15	0.18
8	0.17	0.78 ^a	0.27
11	0.28	0.64 ^a	0.32
12	0.38	0.70 ^a	0.27
13	0.34	0.65 ^a	0.18
17	0.02	0.83 ^a	0.18
22	0.04	0.78 ^a	0.12
Intrusion			
1	0.10	0.27	0.77 ^a
2	0.64 ^a	-0.04	0.29
3	0.22	0.15	0.79 ^a
6	0.39	0.13	0.68 ^a
9	0.29	0.13	0.74 ^a
14	0.62 ^a	0.19	0.31
16	0.43	0.34	0.61 ^a
20	0.25	0.18	0.22
Eigenvalue	8.6	2.1	1.5
Total variance explained (%)	38.9	9.5	6.7
^a Items that have a factor loading 0.50			

did not load on any of the 3 factors. A PCA was subsequently performed without these items, increasing the variance explained to 62%. Removing these items from the analysis did not alter the results. The 2-factor solution included an avoidance factor and an intrusion-arousal factor.

Discussion

This study assessed the internal consistency, convergent validity, and construct validity of a French translation of the IES-R in a sample of future mothers exposed to the 1998 ice storm.

First, we showed that the French translation of the IES-R possesses good internal consistency. Our alpha coefficients, ranging from 0.81 to 0.93, compare with the findings of Weiss and Marmar (5) for the original English version of the IES-R and with Maercker and Schützwohl (6) for the German version of the scale.

Although test-retest data were not available for this sample, we did obtain data from another francophone sample. The sample consisted of 39 individuals (60.5% women; mean age 35.4 years, 55.6% married, 30.6% single) living in the area surrounding Paris. All participants experienced a traumatic event in 2001 and were at their first or second visit to a

Table 2 IES-R en français

Instructions. Voici une liste de difficultés que les gens éprouvent parfois à la suite d'un événement stressant. Veuillez lire chaque item et indiquer à quel point vous avez été bouleversé(e) par chacune de ces difficultés *au cours des 7 derniers jours* en ce qui concerne _____. Dans quelle mesure avez-vous été affecté(e) ou bouleversé(e) par ces difficultés.

	Pas du tout	Un peu	Moyennement	Passablement	Extrêmement
1. Tout rappel de l'événement ravivait mes sentiments face à l'événement	0	1	2	3	4
2. Je me réveillais la nuit	0	1	2	3	4
3. Différentes choses m'y faisait penser	0	1	2	3	4
4. Je me sentais irritable et en colère	0	1	2	3	4
5. Quand j'y repensais ou qu'on me le rappelait, j'évitais de me laisser bouleverser	0	1	2	3	4
6. Sans le vouloir, i'y repensais	0	1	2	3	4
7. J'ai eu l'impression que l'événement n'était jamais arrivé ou n'était pas réel	0	1	2	3	4
8. Je me suis tenu loin de ce qui m'y faisait penser	0	1	2	3	4
9. Des images de l'événement surgissaient dans ma tête	0	1	2	3	4
10. J'étais nerveux (nerveuse) et je sursautais facilement	0	1	2	3	4
11. J'essayais de ne pas y penser	0	1	2	3	4
12. J'étais conscient(e) d'avoir encore beaucoup d'émotions à propos de l'événement, mais je n'y ai pas fait face	0	1	2	3	4
13. Mes sentiments à propos de l'événement étaient comme figés	0	1	2	3	4
14. Je me sentais et je réagissais comme si j'étais encore dans l'événement	0	1	2	3	4
15. J'avais du mal à m'endormir	0	1	2	3	4
16. J'ai ressenti des vagues de sentiments intenses à propos de l'événement	0	1	2	3	4
17. J'ai essayé de l'effacer de ma mémoire	0	1	2	3	4
18. J'avais du mal à me concentrer	0	1	2	3	4
19. Ce qui me rappelait l'événement me causait des réactions physiques telles que des sueurs, des difficultés à respirer, des nausées ou des palpitations	0	1	2	3	4
20. J'ai rêvé à l'événement	0	1	2	3	4
21. J'étais aux aguets et sur mes gardes	0	1	2	3	4
22. J'ai essayé de ne pas en parler	0	1	2	3	4

psychologist or psychiatrist when they were asked to participate in the study. After giving their informed consent, participants completed the French version of the IES-R at the time of the initial assessment and again at 3 months. Satisfactory test-retest reliability was obtained in this sample: intrusion $r = 0.73$, avoidance $r = 0.77$, hyperarousal $r = 0.71$, total scale $r = 0.76$, with $P < 0.01$ for all correlations.

Unexpectedly, the correlations between the French IES-R, threat perception, and the GHQ were fairly low. Perhaps the low correlations between the threat perception subscale and the IES-R owe to the low variance in the women's responses on the threat subscale. Further, the responses on the GHQ-28 may have also affected the correlations: according to the women's responses, about 30% met criteria for depression,

but a clinical psychologist found that only 2 were actually suffering from depression. Many of the somatic indicators of psychological symptoms addressed in the GHQ could be associated with simply being pregnant or with caring for an infant (for example, sleep problems).

Exploring the Factorial Structure of the IES-R

Our results suggested that a 2- or 3-factor solution was acceptable for the IES-R. We chose to report a 3-factor solution, explaining 56% of the variance, because it is consistent with the proposed theoretical structure of the scale. Other studies on the psychometric properties of the scale have reported different factor structures. For instance, Weiss and Marmar (5) found a 1-factor solution that explained 49% of the variance. Conversely, Maercker and Schützwohl (6) reported a 4-factor

	% (n)	Mean	SD	Range
Marital status				
Never married	3.6 (8)			
Common-law	55.6 (124)			
Married	40.4 (90)			
Divorced	0.4 (1)			
Hollingshead classes				
Lower class	2.7 (6)			
Lower middle class	3.6 (8)			
Middle class	30.9 (68)			
Upper middle class	48.6 (107)			
Upper class	14.1 (31)			
Age		29.1	4.7	18–41
Days without power		14.9	8.9	0–45
Days without telephone		4.4	8.4	0–34
Threat perception (ice storm questionnaire)		1.5	1.4	0–7
General Health Questionnaire		6.6	6.0	0–26
The Impact of Event Scale-Revised				
Intrusion subscale		5.7	5.4	0–24
Avoidance subscale		3.9	5.2	0–26
Hyperarousal subscale		2.3	3.6	0–18
Total score		11.8	12.4	0–58

solution (intrusion, avoidance, hyperarousal, and avoidance and numbing), which explained 63.8% of the variance. To sum up, it remains unclear at this stage whether the IES-R is composed of 1, 2, 3, or 4 factors. This ambiguity is also reflected in the factor structure of the DSM-IV criteria for PTSD, which have yielded 2-, 3-, and 4-factor solutions (13). More studies will be required before a satisfactory answer to this important theoretical issue is found.

Item 7 (“I felt as if it hadn’t happened or wasn’t real”), item 19 (“Reminders of it cause me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart”), and item 20 (“I had dreams about it”) did not load on any of the 3 factors. Compared with the theoretical 8 intrusion, 8 avoidance, and 6 hyperarousal items, the PCA performed in this study resulted in 6 intrusion, 6 avoidance, and 7 hyperarousal symptoms. This could be owing to the fact that item 7 measures a dissociative-like symptom, and items 19 and 20 were not highly endorsed by the women in this study.

Finally, items 2, 5, and 14 loaded on factors that differed from those in the theoretical model. Item 2 (“I had trouble staying asleep”) should have loaded on the intrusion factor but instead

Table 4 Correlations between the Impact of Event Scale-Revised subscales and total score

	Intrusion	Avoidance	Hyperarousal
Intrusion	—	—	—
Avoidance	0.62	—	—
Hyperarousal	0.69	0.56	—
Total score	0.90	0.86	0.83
All correlations are significant at the 0.01 level (2-tailed)			

loaded on the hyperarousal factor. This item has also been problematic for Weiss and Marmar (5), who found that it correlated equally on the intrusion and hyperarousal subscales. This led the German translation to include item 2 in the hyperarousal subscale. Item 5 should have loaded on the avoidance factor but instead loaded on the intrusion factor. This may be because the first part of the statement, “I avoided letting myself get upset” taps into avoidance, whereas the second

part, “when I thought about it or was reminded of it” taps into intrusion symptoms. Item 14 (“I found myself acting or feeling like I was back at that time”) should have loaded on the intrusion factor but actually loaded on the hyperarousal factor. It is possible that the word “feeling” was interpreted as a manifestation of hyperarousal symptoms.

In conclusion, the French IES-R has proven to be a reliable measure for posttraumatic stress symptoms in our sample of future mothers exposed to the 1998 ice storm. Given the popularity of the IES, the translation and validation of the IES-R into French fills an important gap in our ability to assess PTSD symptoms among French-speaking populations.

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Résumé : Validation d’une version française de l’échelle de l’effet des événements révisée

Objectif : Ce rapport présente une traduction française et une validation de l’échelle de l’effet des événements révisée (IES-R) auprès d’une population de femmes exposées à une catastrophe naturelle durant ou avant la grossesse.

Méthode : Un total de 223 femmes francophones, qui étaient soit enceintes à l’époque du verglas de 1998 ou qui le sont devenues peu après l’événement, ont répondu à l’IES-R et à d’autres questionnaires, 6 mois après la catastrophe.

Résultats : La version française de l’IES-R a une bonne cohésion interne, les coefficients de cohérence allant de 0,81 à 0,93 pour les 3 sous-échelles et la note totale. La fiabilité de test-retest de l’échelle, bien qu’examinée avec un autre échantillon, s’est avérée satisfaisante, les coefficients de corrélation allant de 0,71 à 0,76 pour les 3 sous-échelles et la note globale. Sa validité convergente avec le danger de mort perçu et les symptômes psychiatriques généraux a été jugée marginalement acceptable. Enfin, une analyse des principales composantes a été effectuée et une solution de 3 facteurs, qui expliquait 56 % de la variance, a été retenue : un facteur d’hypervigilance (7 items), un facteur d’évitement (6 items), et un facteur d’intrusion (6 items).

Conclusions : La version française de l’IES-R a une validité interne et une fiabilité de test-retest satisfaisantes. En outre, la structure factorielle de la traduction était semblable à la structure théorique proposée de l’IES-R.