Is there an all-embracing construct of emotion reactivity? Adaptation and validation of the emotion reactivity scale among a French-speaking community sample

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Abstract

Background: Emotion reactivity is defined as the extent to which an individual experiences emotions in response to a wide array of stimuli, intensely, and for a prolonged period. This construct is a key psychological factor in the development and maintenance of psychopathological disorders. The aim of the current study was to develop and validate a French version of the Emotion Reactivity Scale (ERS), which gauges three aspects of emotion reactivity: (1) emotional sensitivity, (2) emotional intensity, and (3) emotional persistence.
Method: The French ERS and both concurrent and divergent validated scales were administered to 258 participants from the community.
Results: Confirmatory factor analyses revealed good fit indices for: (1) a single-factor model, (2) a three-factor model, and (3) a hierarchical three-factor solution with a single-factor solution as a second-order latent variable for a generic construct of emotion reactivity. The French version of the Emotion Reactivity Scale also exhibits acceptable internal scale score reliability (total scale and subscales). Eventually, meaningful relationships were found between factors of emotion reactivity and depression, distinct aspects of impulsive behaviors, and maladaptive emotion regulation strategies.
Conclusion: Findings of the confirmatory factor analyses are consistent with previous studies suggesting that the ERS is mainly captured by a single major construct of emotion reactivity.
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1. Introduction

Over the last decade, emotion reactivity has been widely considered a key construct underlying the process of emotion dysregulation [1]. According to Nock and colleagues [1] ER is defined as "the extent to which an individual experiences emotions (a) in response to a wide array of stimuli (i.e., emotion sensitivity), (b) strongly or intensely (i.e., emotion intensity), and (c) for a prolonged period of time before

returning to baseline level of arousal (i.e., emotion persistence)." In order to best gauge these factors of ER, Nock and colleagues [1] recently developed the 21-item Emotion Reactivity Scale, a self-report instrument that measures emotion sensitivity, intensity, and persistence. The ERS includes (a) ten items to measure Emotion Sensitivity, (b) seven items to measure Emotion Arousal/Intensity; and (c) four items to measure Emotion Persistence.

Besides the development of the ERS, Nock and colleagues [1] also reported preliminary psychometric properties of the ERS among a sample of 94 (73 female) adolescents and young adults (mean age = 17.14 years). The scale and its three factors had good scale score reliability (Cronbach's alpha = .94 for the total scale; .88 for the Sensitivity factor; .86 for the Arousal/Intensity factor; and .81 for the Persistence factor). They also tested the structural validity of the ERS by using unconstrained exploratory

factor analyses. Their results suggested that a single factor of ER best characterized the data.

More recently, a Dutch version of the scale [2] has been developed and validated with confirmatory factor analyses. Claes and colleagues [2] were the first to use CFA to test the structural validity of the scale among a sample of 651 high school students (mean age = 16.38 years). While they also found good scale and subscale score reliabilities (Cronbach's alpha = .95 for the total scale; .89 for the Sensitivity subscale; .88 for the Arousal/Intensity subscale; and .77 for the Persistence subscale), their CFA revealed that both a single-factor and a three-factor model fit the data well. However, as the three-factor model did not obtain a significantly better fit than the more parsimonious model, they preferred the single-factor model.

As a consequence, uncertainty still abounds regarding the structural nature of the scale. This point is critical as, although the EFA and CFA of these two studies both suggest that a single-factor model best fit the data, the studies also pointed out that the three factors exhibited good scale score reliability. In our opinion, one innovative way to tackle this problem may be to test a hierarchical model that combines both the overarching ER construct and its three factors. Moreover, both Nock and colleagues [1] and Claes and colleagues [2] conducted their EFAs and CFAs on a sample of adolescents and young adults, hence restricting their sample in terms of the age and educational level of participants. Ensuring structural validity among a more representative sample (age range from 18 to 79 years) is a critical point so that one can generalize from this measure to the concept that it is intended to index. Alongside this limitation, no French adaptation of the ERS has previously been conducted. This is an important issue, given that French is the official language in 32 countries and territories worldwide.

Recent studies have shed light on the link between ER and psychopathology. Indeed, several studies showed that higher ERS scores were associated with a wide range of psychopathological symptoms and problematic behaviors. For instance, ERS scores were positively related to self-injurious thoughts and behaviors [3]. Moreover, this study showed that the link between nonsuicidal self-injury and ER is mediated by the use of cognitive suppression (i.e., a dysfunctional emotion regulation strategy). Similarly, recent studies suggested that nonsuicidal self-injurers had higher ERS global scores (with no difference among the three factors) compared with those of a control group [4,5].

In the same vein, validation studies of the ERS also emphasized interesting relationships. On one hand, when developing the original ERS, Nock and colleagues [1] showed that ER was positively correlated with behavioral inhibition, fear, proneness to frustration, and aggressive tendencies. The scale also negatively correlated with attention and behavioral control measurements, thereby suggesting that a higher ERS score relates to poor self-control, in line with previous studies showing that emotional arousal may impair top-down control processes [6,7]. Nock

and colleagues [1] also reported positive correlations between the ERS and indices of psychopathology such as negative mood, anxiety, and proneness to eating disorders. Additionally, they found that the ERS score mediated the relations between the presence of psychopathology and both nonsuicidal self-injury and suicide-related ideation. On the other hand, Claes and her colleagues [2] showed that ER related positively to negative affect and negatively to effortful control. These authors also shed light on the specific links between ER and the use of emotion regulation strategies. ERS scores positively correlated with a higher frequency in the use of distinct emotional regulation strategies (i.e., palliative coping, avoidance, social support seeking, passive/depressive reactions, and inadequate expressions of emotions). High ER has also been related to a reduced use of active problem solving, a cognitive emotion regulation strategy that helps reduce negative affect [8].

As a consequence, the present study was designed to address two main questions. First, does the ERS fit a single-factor solution among a French-speaking community sample? More specifically, we hypothesized that, as observed by both validation studies [1,2], a single-factor of ER should best characterize the data. However, we also predicted that a hierarchical CFA should support a hierarchical model that combines both the overarching ER construct as a second-order latent variable and its three factors as latent variables. Second, can the psychometric properties of the English version of the ERS be replicated in a French-speaking sample? To this end, we were particularly interested in exploring the scale and subscale score reliabilities, as well as external validity. Regarding this latter point, we aimed to explore its relation to depression, impulsivity, and emotional regulation strategies for consistency with previous studies [1–3]. We formulated several predictions. First, high ER would be associated with depression symptoms. Second, high ER would be related to urgency, a facet of impulsivity that is specifically related to the tendency to act rashly in intense emotional contexts [9,10]. Third, high ER would be positively associated with the frequent use of maladaptive emotion regulation strategies (rumination, catastrophizing, blaming others, and self-blame) and negatively associated with the use of adaptive emotion regulation strategies (acceptance, positive reappraisal, positive refocusing, refocus on planning, and putting into perspective). For this last point, we hypothesized that higher ER scores would affect the ability to produce a functional response to an emotional situation.

2. Method

2.1. Participants and Procedure

An online survey was administered to 258 French-speaking volunteers (56 men) from the community, with ages ranging from 18 to 79 years (M = 38.16, SD = 13.87). Participants were recruited by advertising through the mail and through

social (e.g., Facebook) and research networks (e.g., Groupe de Réflexion en Psychopathologie Cognitive; Relais d'Information sur les Sciences de la Cognition). All participants gave online consent prior to starting the survey. No personal data were recorded (including IP address). Some participants, who agreed to participate in a longitudinal study, were invited to provide an email address for further contact with the research team. After participants have decided to fill the online survey, they had to answer to all questions. The study protocol was approved by the Ethical Committee of the Psychology Department of the Catholic University of Louvain and carried out according to the 1964 Declaration of Helsinki.

2.2. Measures and procedure

Participants completed several questionnaires: the French version of the Center for Epidemiologic Studies Depression scale (CES-D) [11]; the short UPPS Impulsive Behavior scale (UPPS-P) [12]; the French version of the Cognitive Emotion Regulation Questionnaire (CERQ) [8]; and the French adaptation of the ERS.

The French ERS consisted of 21 items translated into French from the original English version of the ERS [1]. The scale was developed as follows: (1) Three authors of this study (J.B., L.R., M.V.D.L.), with the help of an English–French bilingual translator, translated the 21 items of the original ERS into French; (2) another English–French bilingual translator translated the French version back into English; and (3) all discrepancies identified between the original ERS and the back-translation were discussed until a satisfactory solution was found. The items of the scale measure three factors of ER: emotional *sensitivity* (e.g., "I tend to get emotional very easily"), *intensity* (e.g., "When I experience emotions, I feel them very strongly/intensely"), and *persistence* (e.g., "When I am angry/upset, it takes me much longer than most people to calm down"). Items are rated on a 5-point scale ranging from 0 (*not at all like me*) to 4 (*completely like me*).

The French CES-D [11] is a validated 20-item self-report questionnaire that assesses depressive symptoms over the past week. Items are rated on a 4-point scale: 0 (*rarely or none of the time* = less than 1 day); 1 (*some or a little of the time* = 1 to 2 days); 2 (*occasionally or a moderate amount of the time* = 3 to 4 days); or 3 (*most or all of the time* = 5 to 7 days). The validation study assessed four facets of depression and reported good scale score reliabilities [11]. Cronbach's alpha was .70 in the current sample, supporting a good score reliability.

The UPPS-P [12] is a 20-item self-report measure that assesses five facets of impulsivity: *positive urgency* (e.g., "When overjoyed, I feel like I can't stop myself from going overboard"); *negative urgency* (e.g., "When I feel rejected, I will often say things that I later regret"); (*lack of*) *perseverance* (e.g., "I am a person who always gets the job done"); (*lack of*) *premeditation* (e.g., "I usually make up my mind through careful reasoning"); *and sensation seeking* (e.g., "I welcome

new and exciting experiences and sensations, even if they are a little frightening and unconventional"). Items are rated on a 4-point scale ranging from 1 (*I agree strongly*) to 4 (*I disagree strongly*). This measure has good internal consistency and test-retest stability. The validation study of the short UPPS-P reported good scale score reliabilities [12]. Similarly, Cronbach's alphas in the current sample ranged between .76 and .87 for the various subscales, corroborating its good scale reliability.

The French CERQ [8] is a validated 36-item self-report questionnaire that assesses nine emotional regulation strategies. Five strategies are "adaptive": *acceptance* (e.g., "I think that I have to accept that this has happened"), *positive refocusing* (e.g., "I think of nicer things than what I have experienced"), *refocus on planning* (e.g., "I think of what I can do best"), *positive reappraisal* (e.g., "I think I can learn something from the situation"), and *putting into perspective* (e.g., "I think that it all could have been much worse"). Four strategies are "maladaptive": *self-blame* (e.g., "I feel that I am the one to blame for it"), *rumination* (e.g., "I often think about how I feel about what I have experienced"), *catastrophizing* (e.g., "I continually think how horrible the situation has been"), and *blaming others* (e.g., "I feel that others are to blame for it"). Items are rated on a 5-point scale ranging from 1 (*almost never*) to 5 (*almost always*). Cronbach's alpha in the current sample was .69 for *acceptance strategy*. Satisfactory to good indices of internal consistency were observed for other facets, with alphas ranging from .71 to .85. These results were consistent with previous studies [8,13].

3. Results

3.1. Data Analysis

Before performing the analysis, we conducted the Kolmogorov–Smirnov test on each item of the ERS. Normality was not achieved for all items ($p < .01$). Moreover, the standard method of estimation in structural equation modeling is maximum likelihood, which assumes multivariate normality of manifest variables. Indeed, a frequent error when performing CFA is that the normality of the data is not taken into account multivariately [14]. In our case, multivariate kurtosis was in fact high, with a Mardia's coefficient [15] of 89.02 (with a cutoff value of 23.00), indicating a lack of multivariate normality. The items of the ERS refer to a sample of psychological processes that can be present or absent with varying frequency. This makes non-normality and categorization problems likely [16,17]. Therefore, using standard normal theory estimators with these data could produce estimation problems. Various formulas can be applied to correct for the lack of multivariate normality when performing CFA. The most appropriate approach is to use an estimation method that makes no distributional assumptions, such as the unweighted least squares (ULS) estimation method. ULS is analogous to ordinary least squares in traditional regression.

Because the covariance matrix might not be as asymptotically distributed as chi-square with the ULS method, the chi-squared test and other fit indexes based on such statistics cannot be computed and are thus not reported [18]. Instead, we used the following fit indices: (a) Goodness-of-Fit Index (GFI); (b) Adjusted Goodness-of-Fit Index (AGFI); (c) Parsimony Goodness-of-Fit Index (PGFI); and (d) Parsimony Ratio (PRATIO). Incremental and residual fit indices cannot be used with the ULS method [18].

GFI is an absolute fit index with a corresponding adjusted version, the AGFI, developed to incorporate a penalty function for the addition of free parameters in the model [19]. The GFI is analogous to R-square and performs better than any other absolute fit index regarding the absolute fit of the data [20,21]. Both GFI and AGFI have values between 0 and 1, with 1 indicating a perfect fit. A value of .80 is usually considered as a minimum for model acceptance [22].

PGFI and PRATIO are parsimony-based fit measures. Absolute fit measures judge the fit of a model per se without reference to other models that could be relevant in the situation [23]. Parsimony-adjusted measures introduce a penalty for complicating the model by increasing the number of parameters in order to increase the fit. Usually parsimony fit indices are much lower than other normed fit measures. Values larger than .60 are generally considered satisfying [24].

The present context also requires comparing fit across different models that are not necessarily nested (i.e., one model is not simply a constrained version of the other). Therefore, we also reported the Akaike Information Criterion (AIC), the Browne–Cudeck Criterion (BCC), and the Expected Cross-Validation Index (ECVI) [25], which are most suited for comparison of non-nested models [24]. AIC, BCC, and ECVI are fit measures that are based on information theory. These indices are not used for judging the fit of a single model, but are used in situations in which one needs to choose from several realistic but different models. These indices are a function of both model complexity and goodness of fit. For these indices, low scores refer to simple well-fitting models, whereas high scores refer to complex poor-fitting models. Therefore, in a comparison-model approach, the model with the lower score is to be preferred.

3.2. Structural validity

On the basis of previous studies [1,2], three structural models were tested with CFA: (a) a model including only the three factors as latent variables (Model A); (b) a model with a single principal factor (Model B); and (c) a hierarchical model with the three factors as latent variables and a general ER factor as a second-order factor (Model C). These three models correspond to a standard approach to testing the structure of potentially hierarchically structured constructs [26].

Table 1 displays the fit indices of the three models, which are very good in all three. However, although the AIC was favorable to Model A, both the BCC and ECVI were

Table 1
Fit index values for the different tested models ($N = 258$).

Model	df	GFI	AGFI	PGFI	PRATIO	AIC	BCC	ECVI
A	186	.95	.94	.76	.89	1136.60	1345.03	5.20
B	189	.95	.94	.77	.90	1346.20	1354.06	5.24
C	**188**	**.95**	**.94**	**.77**	**.90**	**1336.48**	**1344.54**	**5.20**

Model A = a correlated three-factor solution; Model B = a single-factor solution; Model C = a hierarchical three-factor solution with a single-factor solution as a second-order latent variable; df = degrees of freedom; GFI = Goodness-of-Fit Index; AGFI = Adjusted Goodness-of-Fit Index; PGFI = Parsimony Goodness-of-Fit Index; PRATIO = Parsimony Ratio; AIC = Akaike Information Criterion; BCC = Browne–Cudeck Criterion; ECVI = Expected Cross-Validation Index. Model C (bold font) can be considered the best fitting model.

favorable to Model C. As shown in Fig. 1, the standardized factor loadings of Model C were all statistically significant ($p < .01$). Seven items, however, showed loadings below .40 (i.e., items 4, 5, 8, 9, 10, 12, and 13). Therefore, we also reran all analyses without these items. This new Model C did not exhibit better parsimony-based fit indices than any previously tested models (GFI = .95; AGFI = .94; PGFI = .73; PRATIO = .86). In order to be consistent with the initial scale, we did not exclude these items.

3.3. Descriptive statistics and internal consistency reliability

Table 2 displays the descriptive statistics and scale score reliability indices of the French version of the ERS (total score and its three factors). All Cronbach's alpha coefficients were higher than .75 [27], thereby indicating good scale and subscale score reliabilities. Within each of the factors, Cronbach's alpha coefficients decreased if any of the items were deleted.

3.4. Centiles and item-total correlations

Table 3 displays the centiles of the overall and subscale scores of the ERS. The results suggested that these score distributions are relatively symmetrical and bell-shaped, supporting the idea that these scores correctly discriminate individuals. In the same vein, we also computed Pearson's correlation coefficient between each item and the overall scale score. Results showed that all coefficients were significantly positive, suggesting that a higher value in each item is significantly associated with a higher overall scale score.

3.5. Correlations between ERS and socio-demographic variables

According to our analyses, there was no significant relationship between ER and age. In these analyses, all of correlation's coefficients were between −.003 and −.099 and all p-values were between .961 and .114. Furthermore, a non-parametric test of mean comparison (Mann–Whitney U test) displayed significant differences with sex. Indeed, women have higher ER (total score), emotional sensitivity, and
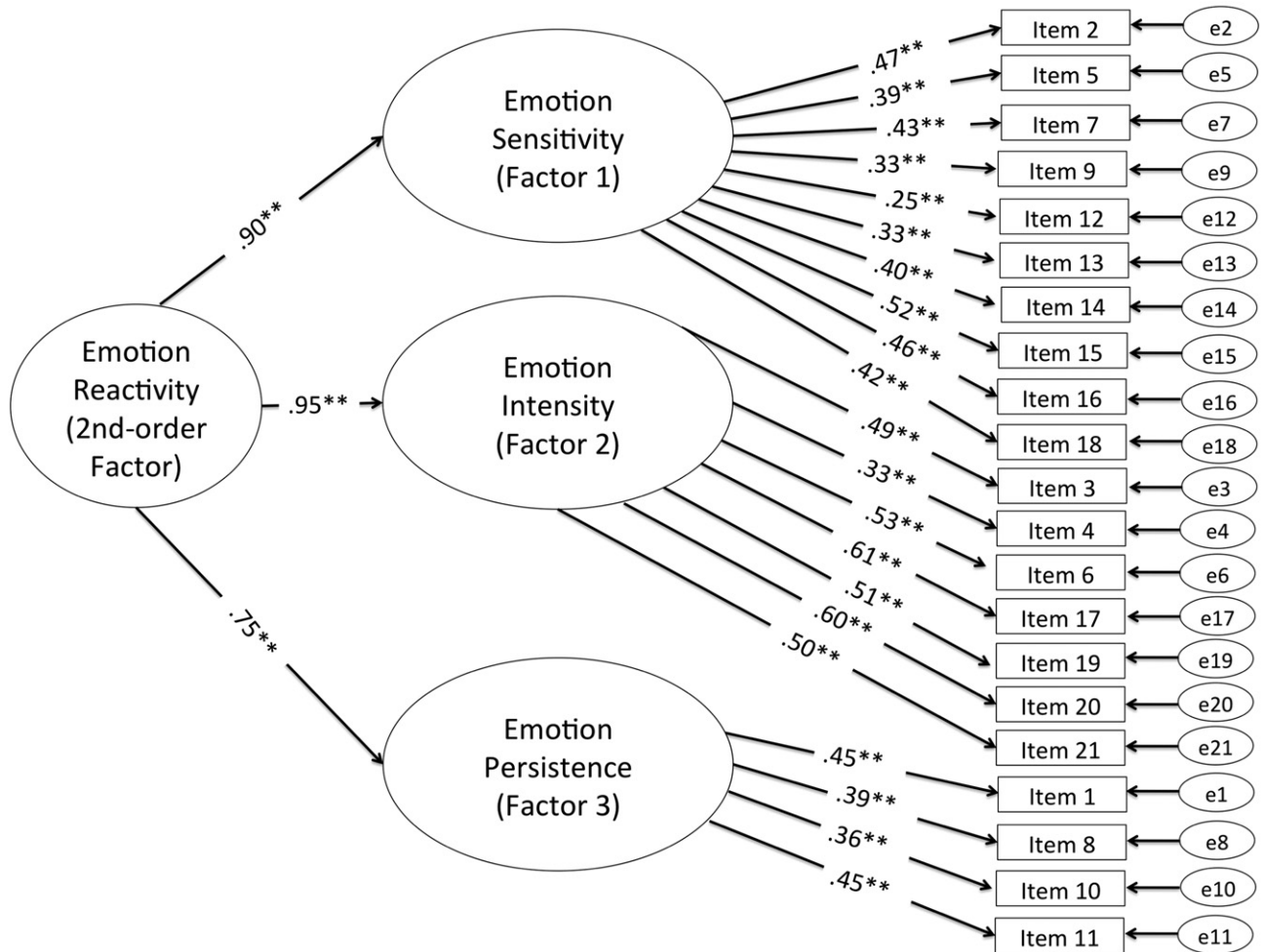
Fig. 1. Path diagram depicting the hierarchical model (Model C) of the French version of the Emotion Reactivity Scale. Note. **p < .01.

emotional intensity scores than men do. There was no difference for the persistence scale.

3.6. Correlations between ERS and other constructs

Given the non-normality of the data, we used Spearman correlation for these analyses. Results showed several correlations between ERS and other constructs. We used the Benjamini–Hochberg procedure [28] to hold the false discovery rate at 5% for the 84 correlations. Tables 4 and 5

show the correlations between the ERS and depression, impulsivity, and emotional regulation. All ERS factors were significantly positively related to depression, and for impulsivity, all ERS factors were significantly correlated with the positive and negative urgency facets (see Table 4).

Regarding emotional regulation, we calculated two global scores, one for adaptive and one for maladaptive strategies, and also analyzed each strategy separately. As shown in

Table 2
Descriptive statistics and Cronbach's alpha (N = 258).

	Items	Minimum	Maximum	M	SD	α
ERS	21	2	82	35.02	17.14	.94
ERS-Persist	4	0	16	7.11	3.47	.75
ERS-Intens	7	0	28	11.48	6.33	.88
ERS-Sens	10	0	40	16.43	8.37	.87

M = mean; SD = standard deviation; α = Cronbach's alphas internal reliability coefficient; ERS = Emotion Reactivity Scale; Persist = Persistence subscale of the ERS; Intens = Intensity subscale of the ERS; Sens = Sensitivity subscale of the ERS.

Table 3
Centiles of the overall ERS scale and subscale score distribution (N = 258).

ERS	Centiles						
	5th	10th	25th	50th	75th	90th	95th
Overall score	9.95	15.00	21.75	33	45.25	58.10	69.05
Sensitivity	4	6	10	15.50	22	29.10	33
Persistence	2	2	4	7	9	12	13
Intensity	3	4	6	10	15	21	24

ERS = Emotion Reactivity Scale. A centile (or percentile) is the value of a variable below which a certain percentage of observations fall. For example, the 25th centile is the value (or score) below which 25% of observations may be found. The 25th centile is also known as the first quartile, the 50th centile as the median or second quartile, and the 75th centile as the third quartile.

Table 4
Spearman correlations between ERS and depression and impulsivity ($N = 258$).

	ERS	Sensitivity	Intensity	Persistence
CES-D	.40∗	.43∗	.35∗	.35∗
NU	.29∗	.27∗	.31∗	.19∗
PU	.37∗	.37∗	.35∗	.31∗
Pers	.03	.04	.02	.01
Prem	.10	.12	.11	.01
SS	.01	.02	.01	-.02

ERS = Emotion Reactivity Scale (total score); CES-D = Center for Epidemiologic Studies Depression scale (total score). For the UPPS-P Impulsive Behavior scale: NU = negative urgency; PU = positive urgency; Pers = lack of perseverance; Prem = lack of premeditation; SS = sensation seeking.

  * Correlations significant at $p < .05$, corrected for multiple correlations using the false discovery procedure (Benjamini–Hochberg procedure).

Table 5, results indicated negative relationships between adaptive strategies and emotional persistence. Maladaptive strategies were positively correlated with all factors of ER. More precisely, the total ERS score was positively related to self-blame, rumination, and catastrophizing and negatively correlated with positive reappraisal. Emotional sensitivity was positively linked with self-blame, rumination, and catastrophizing and negatively linked with positive reappraisal. Emotional intensity was positively correlated with self-blame, rumination, and catastrophizing. Finally, emotional persistence was positively related to self-blame, rumination, catastrophizing, and blaming others and negatively related to positive reappraisal.

4. Discussion

Our goals in this study were (a) to test whether the ERS fits a hierarchical three-factor solution with a single-factor solution as a second-order latent variable for a generic construct of ER in a French-speaking community sample; and (b) to investigate whether the psychometric properties of the English version of the ERS would be replicated in a French-speaking sample.

Table 5
Spearman correlations Between ERS and emotional regulation ($N = 258$).

	ERS	Sensitivity	Intensity	Persistence
Adaptive strategies	−.11	−.12	−.07	−.15∗
Acceptance	.02	.02	.01	.01
Positive refocusing	−.08	−.08	−.04	−.11
Refocus on planning	−.10	−.12	−.07	−.12
Positive reappraisal	−.15∗	−.17∗	−.10	−.18∗
Putting perspective	−.10	−.11	−.07	−.13
Maladaptive strategies	.46∗	.43∗	.40∗	.50∗
Catastrophizing	.32∗	.32∗	.27∗	.33∗
Rumination	.43∗	.41∗	.40∗	.45∗
Self-blame	.32∗	.30∗	.28∗	.35∗
Blaming others	.13	.11	.10	.16∗

ERS = Emotion Reactivity Scale (total score).

  * Correlations significant at $p < .05$, corrected for multiple correlations using the false discovery procedure (Benjamini–Hochberg procedure).

Regarding the factor structure of the ERS, CFA revealed that both *a hierarchical three-factor solution model with a single-factor solution as a second-order latent variable* and *a model with a sole latent factor* best fit the data for a generic construct of ER. In accordance with our predictions, these findings suggest that ER can be considered as an overarching single construct that includes subdimensions. The present results corroborated previous EFA and CFA studies suggesting that a single-factor model best characterizes the data [1] and is more parsimonious [2]. For instance, in the Dutch validation, both the single- and the three-factor models best fit the data, but Claes and her colleagues preferred the more parsimonious model. In the present study, we confirmed and extended these findings by emphasizing a hierarchical model that includes both the overarching construct and its three factors, including emotional sensitivity, emotional intensity, and emotional persistence. The main consequence of this result is that either the global score or the three factors of the ERS can be used. Moreover, the present study also ensures the generalization of these findings among a more representative sample of French-speaking individuals from different European countries and of different ages. This finding provides evidence that researchers and practitioners can generalize from this measure to the concept it purports to measure, even if the language in which the instrument is administered is different.

The psychometric properties of the French version were also assessed. First, although the Cronbach's alpha coefficients tended to be moderate rather than high, good scale and subscale score reliabilities were observed. Second, discrimination analysis suggested that the overall scale score correctly discriminates individuals with a relatively symmetrical and bell-shaped distribution. Third, with respect to convergent validity, we corroborated previous findings [1,2] and found correlations between the ERS and negative affect and between the ERS and both functional and dysfunctional emotion regulation strategies. This study thus confirmed and extended previous findings regarding meaningful links between ER and emotion regulation [1–3]. At the global level, and bearing in mind that our cross-sectional design hindered us from considering causality [29], our results suggest that high ER is associated with increased use of maladaptive cognitive emotion regulation strategies (especially rumination). In contrast, ER was generally unrelated to the use of more adaptive emotion regulation strategies. Indeed, the only adaptive cognitive emotion regulation strategy that was negatively correlated with proneness to ER is positive reappraisal, and the size of this relationship is small.

We also showed that ER is related to some facets of impulsive behaviors, namely, the tendency to act rashly when faced with intense emotional context (positive and negative urgency). This result warrants further discussion and is meaningful for two main reasons. First, it has been proposed that urgency is (at least partly) underlain by a reduced ability to suppress prepotent or automatic behaviors

[30,31]. Second, emotional arousal was shown to interfere with the efficacy of executive control, including prepotent response inhibition [7]. The correlation found between ER and urgency in the current study thus supports the view that the urgency trait may be promoted by a combination of ER and executive deficits [10].

At a fundamental level, the results of the structural modeling are consistent with the predictions of Nock and colleagues [1] regarding the existence of an overarching construct of ER that gauges the way in which an individual experiences emotions. Previous works suggested that individuals with high scores on this construct are more likely to engage in several maladaptive cognitive and behavioral processes, such as self-injurious thoughts and behaviors that prevent habituation to emotion [32]. As a consequence of these maladaptive cognitive and behavioral processes, ER persists, and individuals with emotional dysregulation continue to experience negative affect [32]. Such a functional perspective is important, as it also clearly sheds light on the clinical implications of this construct. Future research should thus examine how this overarching construct interacts with the other components of Barlow's model [32]. Najmi and colleagues [3] have already provided preliminary findings on this issue by studying self-injurious thoughts and behaviors and thought suppression [1–3].

The present study has several limitations. First, CFA confirmed the existence of ER factors (Models A and C). However, we failed to emphasize differential relationships between these factors and other psychological constructs (e.g. cognitive emotion regulation strategies, impulsivity facets). Indeed, we used the Meng coefficient [33] to compare correlations and results showed that there was no significant difference in the correlations' analyses. To our view, this could be due to the nature of the external measures selected. It would be thus important to consider in future studies the relationships between ERS factors and others questionnaires such as the BIS/BAS scale [34], Affect Intensity Measure [35], Trait Meta-Mood Scale [36]. Second, in this study, participants were recruited in a community sample and not in a clinical sample. A validation of the French ERS in a clinical population would be important in future studies and could allow to observe a larger effect size. For instance, ERS could be tested in people who have emotional disorders (anxiety, depression) or who have addictive behaviors (in link with the constructs of emotional regulation and impulsivity). Third, it would have been interesting to have data of factorial invariance across sex, but the distribution of the present sample did not allow us to test it (202 women for 56 men). This would have permitted the examination of equivalence between scores on each subsample in order to improve the degree of generalization. Future studies should further explore this issue. Fourth, seven items showed loadings below .40 (items 4, 5, 8, 9, 10, 12, and 13). Although our complementary analyses suggested that the removal of these items did not change the fit indices of the factor solution, future studies are

needed to ensure that these items do not weaken the psychometric properties of the scale. Fifth, the sample of participants in this study is self-selected, which can prevent the generalization of the study's results to the entire population. Indeed, some studies [37,38] showed a self-selection bias in this kind of procedure. Finally, we assessed construct validity only with self-report measures. Future studies could examine the associations between responses on the ERS and non-self-report indices, for examples by multimodal assessment as it was done in recent studies of emotional assessment [39,40].

5. Conclusions

The French version of the ERS provides a valid measure of emotional reactivity. CFA replicated the model implied by Nock and colleagues [1]. Good scale reliability and concurrent validity were also observed.

Acknowledgment

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