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A REVISED VERSION OF KREMEN AND BLOCK'S EGO RESILIENCY SCALE IN AN ITALIAN SAMPLE

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The revision of the Ego Resiliency Scale (ER89) is described based on the self-reports of 754 Italian young adults. The dimensionality of the original instrument was explored through EFA and CFA; different factor structures across both gender and two random half-samples were investigated. Results provide evidence for a second-order model, based on two first-order factors (Optimal regulation and Openness to life experiences) and for invariance across gender. Internal consistency and longitudinal measurement stability was also adequate. Initial evidence for correspondence between Ego Resiliency and the higher- order factors of the Big Five (De Young, 2005; De Young, Peterson, & Higgins, 2002) was also provided.

Key words: Ego Resiliency, Big Five, Confirmatory Analysis, Factorial Invariance, Second-order Big Five factors.

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INTRODUCTION[1]

The Ego Resiliency (ER) construct was developed by Block and Block (1980) and has played a prominent role in research on individuals characterized by successful adaptation. Within Block's framework, Ego Resiliency refers "to the dynamic capacity of an individual to modify a characteristic level of ego control (EC), as a function of the demand characteristics of the environmental context, to preserve or enhance system equilibration" (J. Block & Kremen, 1996, p. 351; Klohnen, 1996). The purpose of the current research was to examine the assessment of Ego Resiliency using the ER89 scale (J. Block & Kremen, 1996) and to test its psychometric properties including dimensionality, longitudinal stability, and cross-gender invariance. Relations be-

tween Ego Resiliency and a consensual method to map personality differences, the Big Five model (Digman, 1990; McCrae & Costa, 1997), was also investigated.

THEORETICAL BACKGROUND

Block and Block's (1980) personality model represents the two constructs of Ego Resiliency and ego control as abstractions intended to encompass the observable phenomena of motivational control and resourceful adaptation as relatively enduring, structural aspects of personality (J. Block & Kremen, 1996). Specifically, ego control ranges from ego undercontrol (low threshold for impulse expression) to ego overcontrol (high threshold for expression of urges) and refers to the degree to which individuals express their impulses. Where high ego overcontrol is associated with behavioral inhibition and internalizing problems, such as depression, anxiety, and social problems (Block & Block, 1980; Huey & Weisz, 1997), ego undercontrol is associated with impulsivity and a range of externalizing behaviors including aggression, delinquency, and hyperactivity (Block & Block, 1980; Huey & Weisz, 1997). Huey and Weisz called into question whether this dimension could be considered a distinct dimension of psychopathology due to the large empirical and theoretical overlap with several other types of psychopathology. Conversely, Ego Resiliency refers, on the broadest level, to the general capacity for flexible and resourceful adaptation to external and internal stressors (Klohnen, 1996). Accordingly, one would expect Ego Resiliency to encompass (and to be related to) aspects of personality that tap adjustment, effective coping, intellectual functioning, flexibility, and an engaging and active approach to the world. Consequently, over the years, research has showed that at the low end of Ego Resiliency, individuals adapt poorly to new situations and are slow to recover from stress throughout the diverse phases of development (Arend, Gove, & Sroufe, 1979; Block & Block, 1980; Eisenberg, Fabes, Guthrie, & Reiser, 2000; Eisenberg et al., 2002; Fredrickson, Tugade, Waugh, & Larkin, 2003; Klohnen, Vandewater, & Young, 1996; Mischel, Shoda, & Peake, 1988; Strayer & Roberts, 1989). Huey and Weisz (1997) also pointed out that highly resilient children are less likely to express impulses in externalizing or internalizing directions. Thus, in reviewing the literature on Ego Resiliency, J. Block and Kremen (1996) recently suggested the resemblance of the modern usage of the term resilience to the theoretically based construct of Ego Resiliency (but see also Luthar, Cicchetti, & Becker, 2000, for a more detailed discussion).

ASSESSMENT OF EGO RESILIENCY

The procedure of Q sorting and of *prototype matching* was, in past research, the elective procedure for the assessment of ego control and Ego Resiliency. The starting point of this procedure is to obtain a personality description with Block's Q sort (1978) that comprises 100 personality descriptors. These items are sorted by a judge according to their judged salience in a particular individual on a fixed 9-point distribution, ranging from *extremely uncharacteristic* to *extremely characteristic*. In a second step, to obtain the ER prototype, the researcher has to calculate the correlation between a personality description and a *prototypical description* of an exemplar of the Ego Resilient individual (Letzring, Block, & Funder, 2005). Recently, according to the

increasing emphasis on self-report measures in social research, J. Block and Kremen, (1996) introduced a brief self-report scale (ER89) that allows the measurement of Ego Resiliency by subjective ratings exclusively. The availability of a non-timed and non-laborious procedure would be a substantial step forward in Ego Resiliency research.

The ER89 is a self-report scale developed by Jack Block over many years and reflects "individuating inventory items reflecting ER suitable for usage in non-psychiatric contexts" (Block & Kremen, 1996, p. 352). Letzring et al. (2005, p. 399) noted that the items of the scale were drawn from the MMPI, the CPI, were written by J. Block, or came from other sources that are not traceable. The validity of the ER89 was established by Letzring et al. (2005). In particular, the ER89 was shown to be significantly associated with a host of constructs measuring personal well-being, ego undercontrol, the Big Five traits, and many MMPI scales measuring psychological adjustment. Recently, Fredrickson and colleagues (Fredrickson et al., 2003; Tugade & Fredrickson, 2004) found that high-resilient individuals, assessed with the ER89, exhibited faster psychological and emotional recovery from stress. In its Italian version, the ER89 showed positive associations with prosocial behavior, sociability, self-esteem and negative correlations with internalizing and externalizing problems (M. G. Caprara, Steca, & De Leo, 2003). Research has also suggested that individual's ER89 scores can be useful in distinguishing between the three personality prototypes of Resilients, Overcontrollers, and Undercontrollers (Steca, Alessandri, Vecchio, & Caprara, 2007).

Despite the large amount of research on Ego Resiliency and the widespread use of ER89, some of the scale's psychometric properties are questionable. For instance, the *dimensionality* of the scale is unclear. J. Block and Kremen (1996) claimed the unidimensionality of the ER89 on the basis of a "relatively high alpha coefficient" (p. 352). Similarly, based on an exploratory factor analysis, Letzring et al. (2005) claimed that the scree test and high alpha coefficient suggest that the ER89 items "tap a single factor" (p. 404). While the use of the scree test is, despite its subjective nature, much more accurate than other methods (Henson & Roberts, 2006), it cannot be considered a formal and definitive criterion to establish the dimensionality of a scale. In addition, Hattie (1985, pp. 143-144) has evidenced many insufficiencies of the coefficient alpha in indexing unidimensionality. In particular, alpha tends to increase as the number of items increases. In addition, the type and size of the sample (188 undergraduate students) used in Letzring et al.'s (2005) study was inadequate to ensure the generalizability of the results. Nonetheless, the Italian study conducted by M. G. Caprara et al. (2003), which used a large sample of 494 adolescents, also confirmed the unidimensionality of the ER89 through an exploratory factor analysis (EFA). However, recently, Fonzi and Menesini (2005) questioned the unidimensionality of the scale and suggested a two-factor structure including a Resiliency-Self Regulation factor, which reflects items denoting agreeableness and self-regulatory abilities and a Resiliency-Openness factor, which groups items denoting openness and curiosity. However, they did not report the criteria used for choosing the most appropriate factor solution. That ER89 includes more than one factor, seems to be further suggested by the heterogeneous item content, and by past factorial investigations on Q-Sort items, defined as most characteristic and most uncharacteristic of the California Adult Q-Set (CAQ) Ego-Resiliency Prototype. For example, Klohnen (1996) performed an exploratory and a confirmatory analysis and found four first-order factors (namely Confident Optimism, Productive Activity, Insight and Warm, and Skilled Expressiveness) subsumed by a higher-order factor of Ego Resiliency. Kwok, Hughes, and Luo (2007), who also derived a meas-

ure of Ego Resiliency from a 15-item scale of ego control and Ego Resiliency adapted from the California Child Q-Set (Caspi, Block, Block, & Klopp, 1992) with exploratory and confirmatory factor analysis, obtained four factors (namely Pro-Social, Anti-Social, Ego Resiliency, and Ego Brittle); these factors were subsumed by a higher-order factor of Ego Resiliency. All of these studies are very important from a theoretical point of view, because they present a reconceptualization of Ego Resiliency as a unitary yet broad construct that combines several more specific, lower level components.

Ultimately, together with previous considerations, it is reasonable to conclude that there is no definitive evidence regarding the dimensionality of the ER89 scale. This point is much more important to be considered, as we address another key point in research on Ego Resiliency: gender differences. The Block and Block's (1980) longitudinal study, and Chuang, Lamb, and Hwang's (2006) recent investigation have clearly showed the presence of different pathways of Resiliency development due to gender. The use of ER89 for investigating gender differences requires the assumption of measurement equivalence across groups, a point that has also been neglected in the literature. Prior research on ER based on the ER89 assumed that different groups (i.e., men, women) interpret ER89 items similarly and respond in the same way. However, empirical support on this issue has been completely lacking, despite the fact that in most research and practical settings it is important to conduct adequate comparisons between males and females (Vodanovich, Wallace, & Kass, 2005). Thus, testing measurement equivalence of ER89 would further support the scale's psychometric validity and reliability, but requires taking into account the ER89 dimensionality.

AIMS OF THE PAPER

The aims of this study were threefold. First, we investigated the dimensionality of the ER89, and assessed its internal consistency and its longitudinal measurement stability across two years. Second, we examined the measurement equivalence of the ER89, across males and females. Finally, beyond simply measuring Ego Resiliency as a theoretical construct, we further investigated its relationship with the Big Five in order to develop a more general definition of the construct and its components, within the domain of personality. The reliability and validity of the Big Five have been reasonably established (McCrae & Costa, 1997). Recently, however, an increasing body of research has questioned the notion that the Big Five constitutes the simplest and broadest possible level of personality description (Carroll, 2002; De Young, 2005; De Young, Peterson, & Higgins, 2002; Digman, 1997). These authors demonstrated the stability of a higher-order structure, composed of two relatively orthogonal factors. The first factor, defined by the variance shared by Neuroticism, Agreeableness, and Conscientiousness, was named *Alpha* by Digman (1997) and *Stability* by De Young (2005; De Young et al., 2002). The second factor, defined by the shared variance between Energy and Openness, was named *Beta* by Digman (1997) and *Plasticity* by De Young (2005; De Young et al., 2002). Carroll (2002), using the Schmid-Leiman factor analytic procedure, discovered two higher-order factors of the Big Five: *General Social Competence*, defined by terms such as socially confident, adaptableness, perceptiveness, sensible, verbalness, and originality; *General Goodness of Personality*, defined by adjectives such as not impulsive, not restless, not rude, fidgetful, not spiteful, and not outspoken. Interest-

ingly, J. Block (2001, p. 103) recently suggested the resemblance between Carroll's third-order Big Five factor, General Social Competence, and the theoretical definition of ER. The variables defining this factor "would appear to connote something much like the dynamic construct of ER (as compared to ego brittleness), of being adaptively tuned to the surrounding world" (J. Block, 2001, p. 103). We hypothesized that some resemblance is also remarkable between De Young et al.'s (2002; De Young, 2005) conceptualization of Plasticity and the concept of ER. De Young et al. (2002) described plasticity as "flexibility in behavior" (p. 535), "the tendency to explore" (p. 535), "the opposite of instability" (p. 537), and "the opposite of conformity as a capacity for exploration and re-conceptualization in order to adapt to novel situations" (p. 548). This terminology is very similar to J. Block's ER conceptualization (e.g., Block & Block, 1980; J. Block & Kremen, 1996). However, the methods used to discover the Plasticity and General Social Competence factors are different. Thus it is unclear if the meaning of these two factors are substantively different or not. In addition, the exact degree to which ER and General Social Competence or ER and Plasticity are similar remains an empirical matter.

Following these considerations, in this study we examined the degree of correspondence between the ER89, the Big Five model (McCrae & Costa, 1997), and the two higher-order factors of Plasticity and Stability (De Young, 2005; De Young et al., 2002).

Participants and Procedure

Participants were 754 young adults (365 males, 389 females) with a mean age of 19.65 years (*SD* = 1.5) at the time of the initial assessment. We examined the participants at two different time points separated by two years. At the time of the second assessment, only 564 young adults from the initial group participated (243 males, 321 females). The mean age was 21.68 years (*SD* = 1.6). The participants in the present study were contacted via phone by an investigator who explained both the aims of the research and the procedure. They were invited to complete the scales at home following instructions stating the sequence and the interval of time between the various measures, to avoid as far as possible, overloading, habituation and other response-set biases. Individuals returned the set of scales after 10 days and received 15 Euros for their participation.

Measures

Participants filled in the Italian version of the Ego Resiliency scale (ER89; M. G. Caprara et al., 2003), that consists of 14 items answered using a 7-point scale, from 1 (*never*) to 7 (*always*). Items are presented in Table 1.

Personality traits were measured by the Big Five Questionnaire (BFQ; G. V. Caprara, Barbaranelli, & Borgogni, 1996), containing scales of five domains: energy/extraversion, friendliness, conscientiousness, emotional stability (vs. neuroticism), and openness, as well as 10 facet scales, two for each domain scale. For each of the questionnaire 132 items, respondents indicated the extent to which they assigned the item personal relevance on a 5-point scale ranging from 1 (*very false for me*) to 5 (*very true for me*). The psychometric properties of the BFQ were vali-

dated on large samples of Italian respondents as well as in cross-cultural comparisons (Barbaranelli & Caprara, 2000; G. V. Caprara, Barbaranelli, Bermudez, Maslach, & Ruch, 2000). Construct validity of the BFQ scales was demonstrated by the high correlations with analogous scales in the NEO Personality Inventory (NEO- PI; Costa & McCrae, 1985) on both Italian and American samples (Barbaranelli & Caprara, 2000; G. V. Caprara et al., 1996). "I am an active and vigorous person" is a an example of item for the energy/extraversion scale; "If necessary, I don't refrain from giving help to a stranger" is a an example of item for the friendliness scale; "Before completing a job I spend a lot of time revising it" is a an example of item for the conscientiousness scale; "I'm subject to frequent mood changes" is a an example of item for the emotional stability scale; and "I'm always informed about what's happening in the world" is a an example of item for the openness scale. The alpha coefficients were .74, .80, .88, .76 and .75 at Time 1, and .77 .83, .89, .80, .76 at Time 2, respectively, for energy/extraversion, friendliness, conscientiousness, emotional stability (vs. neuroticism), and openness.

Statistical Analysis

The factor structure of the Ego Resiliency Scale was tested in a sequential fashion entailing increasingly restrictive solutions: exploratory factor analysis (EFA) and analysis of covariances, within the framework of confirmatory factor analysis (CFA). For purposes of cross-validation, we constructed two random samples of 391 and 363 respondents each, drawn from the original sample, balanced by sex and age to form a "calibration" and "validation sample." This approach minimizes the risk of capitalizing on sample peculiarity (Bagozzi & Baumgartner, 1994; Byrne, 1994). In order to test cross-gender invariance, male and female samples were separated and analyses were then conduced in two stages. First, based on the calibration sample, all ER89 items were examined by EFA (M*plus* 2.12; Muthén & Muthén, 1998). Then, we replicated the results obtained by EFA with CFA using LISREL 8.71 (Jöreskog & Sörbom, 2004) on the "validation sample" (the second random half of our sample), using maximum likelihood (ML) minimization functions. Goodness-of-fit was evaluated using the root-mean-square error of approximation (RMSEA; Hu & Bentler, 1998) and its 90% confidence interval (90% CI), *p* value for test of closeness of fit (CI), standardized root-mean-square residual (SRMR), Akaikes Information Index (AIC), Non Normed Fit Index (NNFI), and Comparative Fit Index (CFI). Multiple indices were selected as they provide different information for evaluating the model fit (i.e., absolute fit, fit adjusting for model parsimony, fit relative to a null model). Used together, these indices provide a more conservative and reliable evaluation of the model's fit (Hu & Bentler, 1998). In instances where competing models were nested, the chi-square difference test was used ($\Delta\chi^2$; see Bollen, 1989). Hu and Bentler (1998) suggest the following cut off values for the preceding indexes: RMSEA $\leq$ .06, TLI $\geq$ .95, and CFI $\geq$ .95; the minimum value of AIC suggests the best model. Finally, we tested the cross-gender invariance following the guidelines suggested by Chen, Sousa, and West (2005).

To test the correspondence between ER and the Big Five personality factors (McRae & Costa, 1997), we performed a multiple regression analysis considering the two first-order dimensions of the ER89 as criteria and the Big Five as independent variables. Thus, to further investigate the relations between ER and the Stability and Plasticity factors (De Young, 2005; De

Young et al., 2002), we computed the "theoretical" mean score of Agreeableness, Conscientiousness and Neuroticism for the Stability factor and of Energy and Openness for the Plasticity factor. Because the correlation between them was very high (.53), we computed the semi-partial correlation between the mean scores of the second-order factors of the 10 items, "revised" version of the ER89 scale and the mean score on the two higher-order Big Five factors. This procedure refers to the "geometrical approach" devised by Wiggins (1979; Wiggins & Broughton, 1991) for the analysis of personality constructs. In adopting these procedures, we considered the two higher-order factors of Big Five and the Ego Resiliency components: the latter are determined by a general ER level, the first (Stability and Plasticity) are factors corresponding to a very general level of the architecture of personality. In particular, we considered Plasticity and Stability factors as "structural variables" that generated the space where the indicators of Ego Resiliency were projected as "supplementary variables."

RESULTS

First, we examined the data for univariate and multivariate variable distributions using the procedure devised by Tabachnik and Fidell (1989). No outlier participants were detected. Table 1 presents the means, standard deviations, skewness and kurtosis parameters for the ER89 items. The Keiser Meyer Olking test of sampling adequacy was .87 and .82, for the calibration and validation samples, and .89 and .87 for the male and female samples, respectively. Bartlett's Test of Sphericity was also largely significant for all samples.

The initial eigenvalues for the first five factors were 5.04 (36%), 1.30 (9%), 0.98 (7%), 0.95 (7%), and 0.80 (6%), revealing a steep decline between the first and second factor and a slight decline between the second and third factor.

First, the unifactorial model was tested. The range of factor loadings varied from .31 to .72 with a mean of .55 (*SD* = .14). The chi-square test was large and significant, $\chi^2(77) = 236.403$, $p \cong .00$, and RMSEA yielded a result of .075 (90% CI = .06-.09; test of closeness of fit $p \cong .00$), which was consistent with the chi-square in suggesting that the one-factor model did not fit the data adequately. Thus, to examine the presence of further factors, we considered a two-factor solution with an oblique (promax) rotation. We used promax rotation because we expected the factors were correlated and not orthogonal. The range of factor loadings varied from .45 to .60 for the first factor with a mean of .53 (*SD* = .07) and from .30 to .84 with a mean of .49 (*SD* = .18) for the second factor. The factors also appeared to be strongly correlated (.56). This solution fitted significantly better than the preceding solution ($\Delta\chi^2(13) = 98{,}83 \cong .00$), and the results indicated that the model showed a good fit, RMSEA = .054 (90% CI = .04-.07; test of closeness of fit = .16). The associated χ^2 likelihood test was significant ($\chi^2(64) = 137{,}57 \cong .00$), likely due to the large sample size.

In order to improve the solution and generate factors that measure distinct aspects of ER, four items were dropped from the analysis (items 3, 4, 6, 13): the first item did not have salient loadings on any factors and the last three items resulted in weak loadings (< .40) on the first factor and strong cross-loadings (> .30) on the second factor.

A second factor analysis with promax rotation was performed on the remaining 10 items. The resulting two-factor solution accounted for 45% of variance and demonstrated a good fit to

data: $\chi^2(26) = 53.30 = .001$, RMSEA = .056 (90% CI = .03-.07; test of closeness of fit < .36). Table 2 displays the final two-factor solution.

TABLE 1
Descriptive statistics of the ER89 items

		Sub-sample 1				Sub-sample 2			
English Item	Italian Item	*M*	*SD*	Kurt	Skew	*M*	*SD*	Kurt	Skew
1. I am generous with my friends	1. Sono generoso con i miei amici	5.51	1.15	–.18	–.48	5.45	1.18	–.51	–.37
2. I quickly get over and recover from being startled	2. Rapidamente supero l'imbarazzo e mi riprendo dagli stati che generano agitazione e tensione	4.65	1.18	.26	–.25	4.79	1.20	.04	–.22
3. I enjoy dealing with new and unusual situations	3. Mi piace affrontare situazioni nuove ed insolite	5.10	1.21	–.08	–.61	5.14	1.23	–.20	–.49
4. I usually succeed in making a favorable impression on people	4. In genere riesco a suscitare negli altri una buona impressione	5.46	0.99	–.18	–.45	5.50	0.99	–.34	–.21
5. I enjoy trying new foods I have never tasted before	5. Mi piace provare cibi che non ho mai assaggiato prima	5.10	1.21	–.61	–.08	5.14	1.23	–.49	–.20
6. I am regarded as a very energetic person	6. Mi si considera una persona piena di energia	5.31	1.19	–.23	–.59	5.38	1.21	–.31	–.74
7. I like to take different paths to familiar places	7. Mi piace prendere strade diverse per raggiungere gli stessi luoghi	5.46	0.99	–.45	–.18	5.50	0.99	–.21	–.34
8. I am more curious than most people	8. Sono più curioso della maggior parte delle persone	4.83	1.51	–.50	–.33	4.84	1.55	–.45	–.39
9. Most of the people I meet are likeable	9. La maggior parte delle persone che incontro sono gradevoli	5.31	1.19	–.59	–.22	5.38	1.21	–.74	–.31
10. I usually think carefully about something before acting	10. In genere rifletto accuratamente prima di agire	4.52	1.44	–.42	–.09	4.43	1.51	–.48	–.06
11. I like to do new and different things	11. Amo fare cose nuove e diverse	4.48	1.30	–.20	.00	4.55	1.27	.09	–.15
12. My daily life is full of things that keep me interested	12. La mia vita di ogni giorno è piena di cose che mi interessano	4.95	1.09	–.17	–.19	4.86	1.09	–.22	–.07
13. I would be willing to describe myself as a pretty "strong" personality	13. Mi piacerebbe potermi descrivere come una "forte personalità"	5.19	1.29	–.28	–.60	5.19	1.32	–.17	–.83
14. I get over my anger at someone reasonably quickly	14. Supero la mia irritazione nei confronti di un'altra persona abbastanza rapidamente	4.66	1.36	–.33	–.20	4.83	1.28	–.06	–.26

Note. *M* = mean; *SD* = standard deviation; Kurt- = kurtosis; Skew = skewness.

TABLE 2
Two-factor solution for the Ego Resiliency revised version after oblique (promax) rotation

	Factor 1	Factor 2	r_{ti}
Item 9	**.66**	.02	.47
Item 1	**.61**	–.04	.48
Item 10	**.52**	–.10	.41
Item 12	**.47**	.24	.53
Item 14	**.46**	–.08	.39
Item 2	**.42**	.11	.41
Item 8	–.16	**.73**	.40
Item 7	–.08	**.64**	.47
Item 11	.17	**.62**	.50
Item 5	.10	**.41**	.41
R	.67		

Note. R = correlation between factors; r_{ti} = corrected item-total correlation.

Factor loadings ranged from .66 to .42 for the first factor with a mean of .52 (*SD* = .09) and from .73 to.41 with a mean of .60 (*SD* = .13) for the second factor. The items that loaded on the first factor denoted a general *optimal regulation*. In comparison, the second factor items denoted a general *openness to life experiences*. Thus, we named the first factor Optimal regulation (OR), and the second factor Openness to life experiences (OL).

CONFIRMATORY ANALYSIS OF ER89 SCALE REVISED FORM

For the validation sample, the two-factor analytic structures identified by CFA were analyzed using structural equation modelling, based on the variance covariance matrix. To test all models, in order to set the scale for the latent variables, we fixed at 1.0 the λ for each item with the strongest loading on the respective factor, while the remaining items were allowed to vary freely.

As shown in Table 3, the one- and two-factor CFA solutions based on the 14 items from the ER89 resulted in a poor fit. Only the two correlated-factor solutions, based on the 10 items selected (i.e., ER89-R), fitted the data very well. All parameters were significant, $p < .05$, and all were > .40. As the correlation between factors was very high (.76), on the basis of J. Block's theory (Block & Block, 1980; J. Block & Kremen, 1996), we considered, similar to Hattie (1985), a second-order component, and noted that the ER98-R achieved unidimensionality at level two. For identification purposes, we constrained as equal the error variances for the first-order factors ($\psi_{1,1} = \psi_{2,2}$; see Bollen, 1989), fixed the first loading on the second-order factor (i.e., $\gamma_{1,1} = 1$), and estimated the second-order model that presents an identical fit and degrees of freedom as the previous two-factor model (Bollen, 1989). Because our goal was to propose a validated version of the

TABLE 3
Confirmatory factor analysis and fit indices of the complete and the reduced ER89 scale

Hypothesized model	χ^2	*df*	AIC	NNFI	CFI	RMSEA	SRMR
ER89 monofactorial	401.99	77	457.99	.90	.91	.11	.07
ER89 two correlated factors	338.82	76	396.82	.91	.92	.10	.06
ER89-R two correlated factors	83.57	34	125.57	.94	.96	.06	.05

Note. AIC = Akaikes Information Index; NNFI = Non Normed Fit Index; RMSEA= Root mean square error of approximation; SRMR = Standardized Root Mean Square Residuals.

ER89 scale, we also explored the overlap between the total score of the original ER89 and the new ER89-R by calculating the correlation between the mean score on each scale. Smith, McCarthy, and Anderson (2000) noted that this is a conservative procedure which likely underestimates the correspondence between measures. The *r* was .97 on the first and .98 on the second random half of our sample. The deletion of four items did not influence the construct measured by the ER89. Thus, the ER89-R reveals the same construct as does J. Block's original scale.

INTERNAL CONSISTENCY AND LONGITUDINAL STABILITY

Reliabilities computed using the formula reported by Bagozzi (1994, p. 324) were: .85 for the Optimal regulation factor and .79 for the Openness to life experiences factor. The alpha for the overall scale was .75. Finally, the test-retest coefficient of measurement stability after two years was .49 for Optimal regulation, .54 for Openness to life experiences, and .56 for the total scale.[2] All coefficients were significant, $p < .01$.

THE FACTOR INVARIANCE OF THE ER89-R ACROSS GENDER

In order to test cross-gender measurement invariance, as a preliminary step, we examined the fit of the ER89-R base model (i.e., two first-order factors expressing a second-order factor) separately for males and females. The base model showed a good fit in each of the two groups. Thus, to test invariance across gender, we performed a multi-sample analysis, following the guidelines suggested by Chen et al. (2005). This level of invariance is an application of Thurstone's principle of simple structure to factorial invariance, and states that items should exhibit the same configuration of salient and nonsalient loadings across groups (Steelkamp & Baumgartner, 1998). Second, we tested the metric invariance, by maintaining the restrictions of Step 1 and imposing an additional constraint of equal first-order structure coefficient (in LISREL notations, we assume equal λs). Factor loading represents the strength of the linear relation between each factor and its associated items (Bollen, 1989). For this reason, the equivalence of loading of each item on the underlying factor is important. In fact, this level of invariance suggests that the observed score differences on an item can be meaningfully considered indicative of cross-group difference

in the underlying construct (Chen et al. 2005; Steelkamp & Baumgartner, 1998). Third, we maintained the restrictions of Step 2 and imposed an additional constraint of equal second-order structure coefficients (i.e., equal γs). This level of invariance extends the equivalence at the second-order level. Fourth, we maintained the restrictions of Step 3 and imposed an additional constraint of equal first-order intercept invariance (i.e., equal τs). This level of invariance is required for comparing latent means across groups (Widaman & Reise, 1997), and refers to equality of scale's origin between groups. Fifth, we maintained the restrictions of Step 4 and imposed an additional constraint of equal second-order intercept (i.e., equal α). In order to compare the second-order factor means across groups, the intercept of the first-order latent factor must also be equal across groups (Chen et al., 2005). Sixth, we maintained the restrictions of Step 5 and imposed an additional constraint of equal first-order residual variances (i.e., equal ψs). If this form of invariance is held, all group differences on the selected items can be ascribed to group differences on the common factors (Widaman & Reise, 1997). Seventh, we maintained the restrictions of Step 6 and imposed an additional constraint of equal item uniqueness (i.e., equal ε). If items error variances are cross-group invariant (and also metrically, and in factor variances), the items are equally reliable across groups.

All models within the invariance routine represented a good model-data fit (see Table 4).

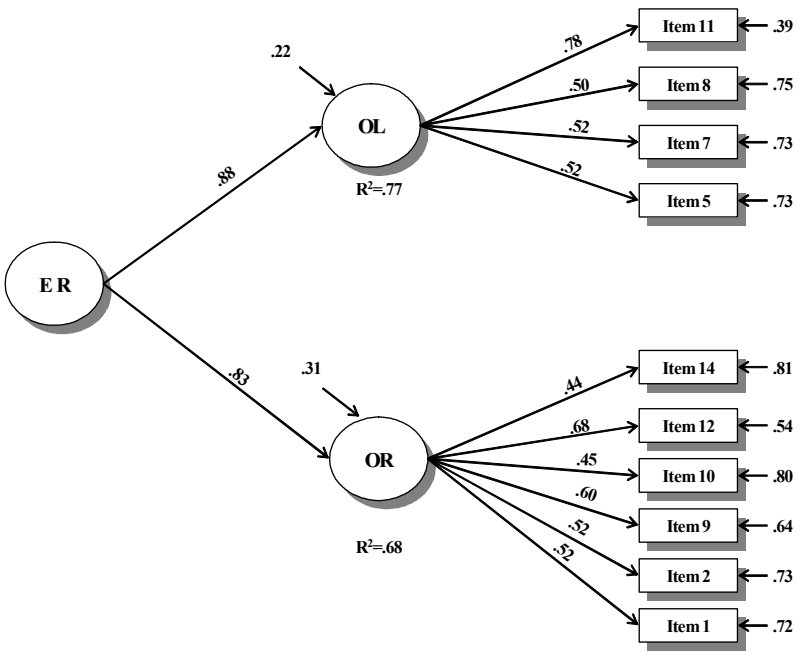
TABLE 4
Fit indices from the analyses testing cross-gender invariance of the ER89-R

Baseline	χ^2	*df*	NNFI	CFI	RMSEA	SRMR	
Group 1 – Females[a]	69.41	34	.96	.97	.05	.04	
Group 2 – Males[b]	84.58	34	.95	.96	.06	.05	
						SRMR	
Hypotesized model[c]	χ^2	*df*	NNFI	CFI	RMSEA	Females	Males
1 – configural invariance	154.00	68	.95	.96	.06	.04	.05
2 – equal λ	176.42	76	.95	.96	.06	.05	.06
3 – equal λ, equal γ	178.09	77	.95	.96	.06	.05	.06
4 – equal λ, equal γ, equal τ,	209.46	85	.95	.95	.06	.05	.06
5 – equal λ, equal γ, equal τ, equal α	223.69	87	.94	.95	.06	.05	.06
6 – equal λ, equal γ, equal τ, equal α, equal ψ	223.92	88	.94	.95	.06	.05	.06
7 – equal λ, equal γ, equal τ, equal α, equal ψ, equal ε	248.20	98	.94	.94	.06	.06	.06
Model comparison		$\Delta\chi^2$			Δdf	$p <$	
Model 2 vs. Model 1		22.42			8	.001	
Model 3 vs. Model 2		1.67			1	*n.s*	
Model 4 vs. Model 3		31.37			8	.001	
Model 5 vs. Model 4		14.23			2	.001	
Model 6 vs. Model 5		0.23			1	*n.s*	
Model 7 vs. Model 6		24.28			10	.001	

Note. [a]N = 389; [b]N = 356; [c]N = 754.
NNFI = Non Normed Fit Index; RMSEA= root mean square error of approximation; SRMR= standardized root mean square residuals; *ns* = not significant; equal = invariant; λ = first-order factor loadings; γ = second-order factor loadings; τ = intercepts of measured variables; α = intercepts of first-order factors; ψ = disturbances of first-order factors; ε = residual variances of measured variables.

Whereas chi-squares were significant, due to the large sample size, all of the subjective fit indices satisfied the above mentioned criteria suggesting a good model-data fit. For example, even the most restrictive model of invariant uniqueness (i.e., Model 7) showed NNFI and CFI values equal to .94, RMSEA was equal to .06., and SRMR equal to .06.

Finally, we compared the fit of six nested models within the invariance routine. There was evidence for configural invariance (Model 1), first-order structure coefficients (Model 2), second-order structure coefficients (Model 3), item intercepts (Model 4), first-order factor intercepts (Model 5), first-order factor variances (Model 6), and item uniqueness (Model 7). All except two of the chi-square difference tests reported in Table 4 were significant. Yet, the subjective fit indices were practically identical across all seven nested models. The RMSEA point estimates and the SRMR values were quite stable across models. In addition, the NNFI and CFI were quite similar across the six models. Moreover, the values of NNFI changed by only .01, and the values of CFI did not change by more than .01 across Model 3 and Model 4 or across Model 4 and Model 5 (i.e., ΔCFI = CFI constrained model – CFI unconstrained model), in line with Cheung and Rensvold (2002) who reported a criterion of .01 to be robust for testing the multigroup invariance of confirmatory factor analysis models. This criterion was well suited in several research studies (Chen et al., 2005; Mantzicopoulos, French, & Maller, 2004; Motl, Dishman, Birnbaum, & Lytle, 2005; Motl & Di Stefano, 2002; Vodanovich et al., 2005). Hence, on the basis of subjective fit indices that suggested all models fitted the data very well (Steelkamp & Baumgartner, 1998), and in reliance on the ΔCFI criterion (Cheung & Rensvold, 2002). The cross-gender invariance of all parameters across the two samples of males and females was demonstrated (Figure 1).



Note. ER = Ego Resiliency total score; OR = Optimal regulation; OL = Openness to life experiences. Loadings (Model 7, Table 4) are drawn from the common metric standardized solution, with the constraint of equality for all parameters across gender.

FIGURE 1
The ER89-R hierarchical structure.

Gender Differences in ER Mean Scores

As the ER89-R was demonstrated to be scalar invariant for men and women (Model 4 and Model 5), latent means can be meaningfully compared across groups. To obtain an estimate of the difference in the second-order factor's means, the female group was chosen as a reference group. Invariance of first- and second-order factor loadings, and intercepts of first-order factors and observed variables was imposed on both groups (Chen et al., 2005). The significance of the Wald z test (–14; z = –2.9) suggested that males had a lower score on the global latent second-order factor of ER than did females.

Correspondence Between Ego Resiliency and the Big Five Personality Factors

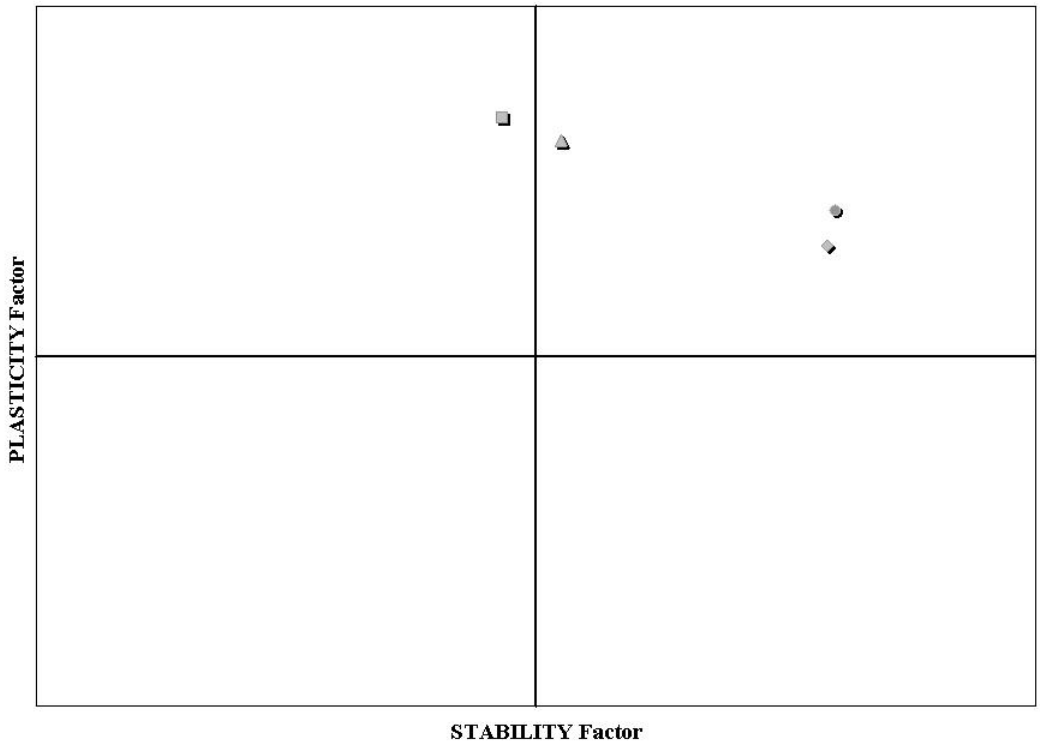
Table 5 shows the strong correspondence between ER89-R total scores and the markers of Plasticity (Neuroticism, Conscientiousness, and Agreeableness) and Conformity (Energy, Openness) for both females and males. In particular, OR was strongly associated with Stability markers (but also with Energy for males), while the OL factor was associated with Plasticity. As also demonstrated by partial correlations, OR was primarily correlated with the Stability factor (sr = .35 for males and .36 for females) and less correlated with the Plasticity factor (sr = .19; .25).

Table 5
Regression results of OR and OL on the Big Five, separately for females and males

	Females				Males			
	OR		OL		OR		OL	
	β	*sr*	β	*sr*	β	*sr*	β	*sr*
E	.06	.06	.22**	.18	.17**	.18	.28**	.25
C	.14**	.14	.02	–.08	.17**	.18	–.10	–.09
N	–.25**	.27	.06	.06	–.35**	.40	–.11	–.11
A	.32**	.34	.03	.03	.25**	.27	.04	.04
O	.07	.07	.23**	.19	.03	.03	.25**	.24
	R^2 = .37		R^2 = .14		R^2 = .42		R^2 = .17	
	F(5, 389) = 43.80**		F(5, 389) = 12.73**		F(5, 356) = 8.41**		F(5, 356) = 16.37**	

Note. OR = Optimal regulation; OL = Openness to life experiences. E = Energy/Extraversion; C= Conscientiousness; N = Neuroticism (vs. Emotional Stability); A= Agreeableness/Friendliness; O= Openness to experiences. **p < .001. sr = Semi-partial correlation.

Conversely, OL was primarily correlated with Plasticity (sr = .37; .41) and uncorrelated with Stability (.03; –.04). Figure 2 displays the graphical representations of these observed relations.



Note. For OR (Optimal regulation factor) ♦ = Males; ● = Females; for OL (Openness to life experiences factor) ▲ = Males; ■ = Females.

FIGURE 2
Partial correlations between Stability and Plasticity and the two first-order factors of the Big Five.

DISCUSSION

The major aims of the present study were to investigate the dimensionality of the ER89 scale recently proposed by J. Block and Kremen (1996) and Letzring et al. (2005) on a sample of Italian adolescents and to investigate its cross-gender invariance, longitudinal stability and relationship with the Big Five. Exploratory and confirmatory factor analyses did not display sufficient empirical evidence to sustain the unidimensionality of the scale. Thus, in accordance with the study of Klohnen (1996) and Kwok et al. (2007), our results show that Ego Resiliency, as assessed by the ER89 scale, cannot be considered a unitary construct. Based on empirical fit indices, a two-factorial structure appeared most plausible. The results of EFA indicated that the two-factor structure was substantially improved by removing four items with an inadequate ratio between principal and secondary loadings. Thus, in order to improve the internal validity of the instrument, we proposed a revised version composed of the 10 items with the strongest factor loadings and best fit indices. In our proposed model, ER is a second-order factor, defined by two first-order components. These components were identical to those identified in the Italian study conducted by Menesini and Fonzi (2005) and named Resiliency-Self Regulation and Resiliency-

Openness. The items defining the two factors were also quite similar to the two dimensions of Emotion Regulation and Autonomy identified by Shields and Cicchetti (1997) in a study on school age children's emotional regulation. Additionally, some resemblance was recognized between items defining our first factor, and the Confident Optimism and the Insight and Warmth factors of Klohnen (1996), and items defining our second-factor, and the Productive Activity and Skilled Expressiveness factors founded by the same author for the CAQ (California Adult Q- Set; J. Block, 1978). Thus, based on these similarities and theoretical considerations (namely, the consideration of Block and Block's theory of Ego Resiliency correlates), we named the two factors: Optimal regulation (OR) and Openness to life experiences (OL). The significant relationship between the total score of the original ER89 and the ER89-R also suggested that both scales were identical measures of a general ER dimension.

With regards to gender invariance, our results varied according to the criteria adopted. On the basis of the chi-square difference test, only configural invariance was achieved. However, this test has substantial power in large samples and assumes that a less restricted model is properly specified (Brown & Cudeck, 1993; Chen et al., 2005). Following this line of reasoning, Cheung and Rensvold (2002) argued that "it makes no sense to argue against the usefulness of the chi-square and rely on various goodness-of-fit indices (GFI) to evaluate the overall model fit, and then argue for the usefulness of the chi-square instead of various GFIs to test for measurement invariance" (p. 252). Thus, since fit indexes suggested that the most stringent model fit the data very well (Steelkamp & Baumgartner, 1998), and differences in CFI were sufficiently small (less than –.01, according to ΔCFI criterion; Cheung & Rensvold, 2002), we consider the conclusion of cross-gender invariance of all parameters of ER89-R sufficiently justified.

With respect to observed gender differences on latent means, our findings were similar to those of M. G. Caprara et al. (2003) showing higher ER89 scores in females than in males. With respect to internal consistency, the reliability-coefficient was high for both the total score and the two first-order dimensions, indicating that the ER89-R and its dimensions are internally consistent. The alpha coefficient was also similar to those reported by Letzring et al. (2005, p. 404). Similarly, a high test-retest coefficient revealed that scores on the ER89-R may be considered stable over time. In addition, this finding closely resembles those of Chuang et al. (2006) and J. Block (1993), who reported stability of ER scores between near phases of development.

Finally, the two first-order dimensions of ER appear, particularly for the female group, to be very similar to the Plasticity and Stability second-order Big Five factors (De Young, 2005; De Young et al., 2002). Thus, it is most likely that in contrast to J. Block's and our own proposal, ER is a broad personality trait that captures characteristics of both Stability and Plasticity. However, it is still difficult to precisely answer the question about "what" is this component. Indeed, its two first-order components, namely, Optimal regulation and Openness to life experiences, are significantly associated with markers of Stability and Plasticity. This evidence is largely implicative, for several reasons. First of all, from an empirical point of view, these components are important for psychological research. In fact, the correspondence between Ego Resiliency first-order components and De Young et al.'s (2002) higher-order model of Big Five, suggests that there are important connections between ER and common definitions of psychological health. For example, note that extraversion has been interpreted as positive emotionality and neuroticism as negative emotionality (e.g., Costa & McCrae, 1980; Tellegen et al., 1988; Watson, Clark, & Tellegen, 1988).

Positive emotionality encompasses behavioral and temperamental characteristics conducive to joy, excitement, and vigor and to states of positive engagement, whereas negative emotionality is associated with anxiety, anger, and related states of negative engagement. Thus, within both the Big Three (Tellegen, 1985) and the Big Five (Digman, 1990; McCrae & Costa, 1997) frameworks, Openness to life experiences reflects high positive emotionality, and Optimal regulation reflects low negative emotionality, along with appropriate conscientiousness to perform effectively in the interpersonal domain. From a theoretical point of view, our study is completely in accordance with Block and Block's (1980) theory of personality that defines Ego Resiliency as a higher-order system. The definition of attributes of the two first-order components (Optimal regulation and Positive orientation toward life), that we empirically derived by inspecting their links with the Big Five model, is consistent with some of the theoretical implications the Blocks associated with ER: resourcefulness, and integrated performance under stress; adaptive flexibility; active engagement with the world; and an available repertoire of problem-solving strategies within the social, personal, and cognitive domains.

In order to usefully benefit from these findings, further investigations will have to confirm these results which also have broad implications for the conceptualization of ER within the domain of personality.

Conclusions

This study is important as it is the first to support the dimensionality of the ER89 by evaluating EFA and CFA solutions. It is also the first to report and support the invariance of the factor structure of the ER89-R across gender, and to show the nature of relations between ER and the Big Five. However, one limitation of our investigations is noteworthy. The findings of the current research are restricted to the Italian translation of the ER89. Thus, these findings need to be replicated in other languages and cultural contexts. Nonetheless, our research has broad implications for the measurement of ER, and also provides insight into the psychometric characteristics of the ER89. From a theoretical perspective, results suggest that ER is better conceptualized as a higher-order dimension that subsumes general Optimal regulation and a general Openness to life experiences. From a practical point of view, the ER89-R represents an important, parsimonious, reliable, and valid instrument that can be suitable in several research contexts.

Notes

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2. Attrition where low and unsystematic. After two years we have only the 19.4 % of attrition rate. The correlation was calculated on 564 participants. The attrition was mainly due to relocation from the area or absence from school at the time of the second assessment. In ANOVA, the latter young adults did not differ significantly from their counterparts on any of the variables in the initial assessment, nor did the groups differ in the covariance matrices as tested by the Box M test for homogeneity of covariance matrices.

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