



Validation of the Italian Version of the Chronic and Acute Stress Index (CASI): A Self-Report Measure Designed to Assess Stress for Individuals in a Romantic Relationship

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Abstract

According to the Italian Health Ministry in 2017, more than 850,000 individuals in Italy have requested mental health services for various symptoms associated with psychological distress. Moreover, stress can affect not only individuals, but also their romantic relationships. To date, there is a lack of empirically validated measures that assess individuals' perceptions of chronic and acute stressors. As such, the goal of the present study was to develop and evaluate the psychometric properties of the Chronic and Acute Stress Index (CASI), a multi-item self-report measure designed to assess perceptions of chronic and acute stressors that originate from individuals and affect their romantic relationships. Utilizing self-report data from 849 individuals from Italy collected before June 2019, the CASI was found to have good reliability and showed appropriate convergent validity with stress and negative affect, and discriminant validity with relationship satisfaction and positive affect. Limitations and future directions as they pertain to research, practice, and consultation are discussed.

Keywords

chronic stress, acute stress, measurement, validation



Stress is a central construct in many contemporary mental and physical health models (Slavich & Auerbach, 2018). Indeed, if not appropriately dealt with, stress can be the etiology of many symptoms of psychological distress, including depression and anxiety (Aldwin, 2007; Conway et al., 2016; Donato, 2014; Karney et al., 2005). According to the Italian Health Ministry, in 2017, more than 850,000 individuals have requested access to mental health services for various symptoms associated with psychological distress. Notably, the experience of stress can be long-term, lasting across months (chronic), or short-term, lasting just a few days (acute). However, researchers are limited in their ability to assess stress using a measure that considers the stressors that have been shown to be most harmful to individual and relational well-being.

The Conceptualization of Stress

According to McEwen and Stellar (1993), stress can be defined as a threat to an individual's homeostasis. Stressful events cause a perturbation on individuals' physiologic system, causing a psychophysiological response determined by social context, genetic characteristics and individuals' perception of it as a threat or not. Therefore, people can deal with pleasant kinds of stress (e.g., due to promotions, weddings, births, etc.), or with unpleasant kinds of stress (e.g., due to a discussion with a friend, bills, economic questions, etc.). So, both positive and negative events can cause stress in people, but it is critical to focus on negative stress from the perspective of researching people's well-being.

More recently, grounded in systemic approaches to understanding stress and associated coping responses between romantic partners, Randall and Bodenmann (2009), conceptualized stress by: *locus* – originating from outside (external) or inside (internal) the relationship; *intensity* – critical life events (major stressors) or daily hassles (minor stressors); *duration* – lasting several months (chronic stressors) or temporary and only lasting a few days (acute stressors). But what do these categories of stressors include? External stressors can be considered as being stuck in traffic or a discussion with a friend, while internal stressors are, for example, a conflict between partners. In this regard, it is essential to note that according to this theoretical model, issues concerning children are considered external stressors since they do not strictly belong to the dyad. Regarding the intensity, major stressors can be identified as a severe illness or the death of a loved one, while minor stressors miss an appointment or lose an object.

Research based on everyday minor stressors (*daily hassles*) has shown that it can negatively contribute to emotional well-being and health (Peralta-Ramirez et al., 2004; Tessner et al., 2011) and that it is associated with negative affect (Atanes et al., 2015; Horiuchi et al., 2018), and to decreased health and positive mood (DeLongis et al., 1988). Moreover, research has shown that stress could affect not only individuals but also partners' behavior and emotions about their romantic relationship (Falconier et al., 2016;

Randall & Bodenmann, 2017). In particular, it is known to be associated with a decrease of relationship satisfaction (Buck & Neff, 2012; Falconier et al., 2016).

Present Study

Stress can not only affect individuals. According to Bodenmann's (1995) Systemic Transactional Model (STM), the interdependence between partners' coping and stress processes lead daily stress experienced by one partner to have a strong and frequent impact on other partner's experiences in a mutual way. Given the extensive research that has been conducted on the role of stress in close relationships (e.g., Donato et al., 2018; Randall & Bodenmann, 2017), there is a need for relationship researchers and clinicians working with individuals in a romantic relationship to have a validated self-report measure to assess for different types of stress individuals' experiences; however, to date, empirically validated measures assess for chronic and acute stressors does not exist. Therefore, the goal of the present study is to address this gap in the literature.

The present study aimed to evaluate the psychometric properties of the Chronic and Acute Stress Index (CASI), a measure designed to assess individual's perception of chronic (last 12 months) and acute (last seven days) minor stressors within their romantic relationships. While we recognize that much literature examining partners' stress, and associated outcomes, have utilized the Multidimensional Stress Scale (Bodenmann, 2007), this measure has not been validated. Moreover, we aim to provide a shorter instrument than other already existing. In addition, CASI focuses on a particular type of stressors, minor stressors, which in research have been shown to be those that most affect the well-being of couples (Randall & Bodenmann, 2017). Moreover, this scale has been studied to analyze both internal and external stressors, considering them both chronically and acutely.

Method

Participants

Participants were recruited from direct contact, flyers, and social network sites targeted at individuals living in Italy. Participants had to meet the following criteria in order to participate: (1) be at least 18 years old, (2) cohabitating with their current partner for at least two years, and (3) live in Italy. A total of 849 individuals (47.2% females, $n = 401$) participated in the study. Most participants reported being Italian (98.3%, $n = 827$).

Men reported being in their current romantic relationship for an average of 17.01 years ($SD = 12.48$), while women for an average of 16.60 years ($SD = 12.24$). Note the differences in relationship length given this was individual (not dyadic) data. Approximately 59.8% of men ($n = 269$) and 62.8% of women ($n = 251$) reported to be married

with their partner, and 57.6% ($n = 489$) of participants reported to had at least one child. Demographics and descriptive statistics are reported in Table 1.

Table 1

Descriptive Statistics

Variable	Total Participants		Men		Women	
	N	%	N	%	N	%
Age	849	100	448	52.80	401	47.20
18 – 29	161	18.96	71	15.85	90	22.44
30 – 49	404	47.59	210	46.88	194	48.38
50 +	284	33.45	167	37.28	117	29.18
Income						
0 – 5.000 €	143	16.84	43	9.35	100	25.19
5.001 – 15.000 €	217	25.56	106	23.68	111	27.43
15.001 – 28.000 €	302	35.57	163	36.47	139	34.91
28.001 – 55.000 €	138	16.25	96	21.64	42	10.22
55.001 – 75.000 €	26	3.06	21	4.63	5	1.25
+75.000 €	23	2.71	19	4.24	4	1.00
Education						
Elementary School	14	1.65	13	2.90	1	.25
Middle school	34	4.00	21	4.91	13	2.99
High School	93	10.95	52	11.61	41	10.22
Undergraduated School	305	35.92	172	38.39	133	33.17
Graduated School	403	47.47	190	42.19	213	53.37
Children						
0	360	42.40	197	43.97	163	40.65
1	172	20.26	81	18.08	91	22.69
2	259	30.51	133	29.69	126	31.42
3 +	58	6.83	37	8.26	21	5.24
Relationship						
Cohabiting	329	38.75	179	40.18	150	37.16
Married	520	61.25	269	59.82	251	62.84

Note. Age was divided into these three age ranges, as these are considered “passing through” between different evolutionary eras in Italy (Scabini & Cigoli, 2012).

Procedure

Interested participants were directed to an online questionnaire that contained the informed consent and screening questions to determine participants’ eligibility described

above. If eligible, participants were directed to the study questionnaire. Participants completed all study measures, detailed below, online via Qualtrics, which took approximately 20 minutes to complete. Participants were not compensated for their participation. The Ethics Commission of the Department of Dynamic and Clinical Psychology, and Health Studies, Faculty of Medicine and Psychology, Sapienza University of Rome reviewed and approved the research protocol.

Measures

Chronic and Acute Stress Index (CASI)

The Italian version of the CASI (Chiarolanza et al., 2019) is a 14-items measure designed to evaluate the perception of chronic and acute stressors for individuals in a romantic relationship (see Appendix). Participants were instructed to indicate how much the specific stressor presented in items have been the subject of discussion with their partner on a 5-point Likert scale, ranging from 0 (*Not applicable, the event never happened*) to 4 (*many times*). Participants were instructed to answer each item twice, first referring to the last seven days (acute) and then to the previous 12 months (chronic). The Cronbach's coefficient alphas were between .62 and .80 (Table 2).

Table 2

CASI Cronbach's Alphas

Variable	Number of items	Men	Women
Chronic			
Relationship	4	.76	.71
Self	5	.74	.63
Communication	3	.74	.80
Environment	2	.67	.66
Acute			
Relationship	4	.76	.73
Self	5	.72	.63
Communication	2	.72	.68
Environment	2	.66	.62

Development of the CASI — Before developing the initial item pool, the authors reviewed the existing literature on stress in romantic relationships (e.g., Bodenmann et al., 2007; Caspi et al., 1987; Lazarus & Folkman, 1984). Then, the authors discussed their ideas regarding the construct definition of what would constitute “common” chronic and acute stressors individuals in Italy may experience. From this discussion, an initial set of 17 chronic and acute stressors was developed. These items were shared with

research team members for feedback. Since we decided to only use more representative stressors that individuals in couples could face, it was determined that one item (“Pet management”) should be deleted from the final item pool due to its response frequency because almost all participants have responded with 0 (*Not applicable, the event never happened*).

Stress

An Italian version of the 30-item Multidimensional Stress Scale for Couples (MSF-P; Bodenmann, 2007) was utilized. This scale was developed in the context of Switzerland and has not been validated. Participants are instructed to rate each item twice, first responding to how much stress it caused in the last seven days (acute) and then in the previous 12 months (chronic) using a 5-point scale ranging from 1 (*rarely*) to 5 (*very often*). The MSF-P also assesses internal stressors (e.g., “Difference of opinion with your partner [conflicts, disputations]”) and external stressors (e.g., “Social contacts [conflicts with neighbors, colleagues, acquaintances, social commitments, gossip, etc.]”). For the purpose of our study, only the total chronic and acute (both internal and external) stressor scales were used. The Cronbach’s coefficient alphas were between .72 and .91.

Positive and Negative Affect

Positive and negative affect were measured using an Italian version of the Positive Affect and Negative Affect Schedule (PANAS; Terracciano, McCrae, & Costa, 2003), a 20-items measure that consists of two 10-item scales developed to provide brief measures of positive affect (PA; e.g., “interested” or “proud”) and negative affect (NA; e.g., “distressed” or “hostile”) which participants rate using a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*very much*). For the purpose of our study, participants were instructed to respond to their assessment for each item twice: thinking about their feelings for the last seven days (acute) and in the previous 12 months (chronic). The Cronbach’s coefficient alphas were between .87 and .89.

Relationship Satisfaction

Relationship satisfaction was measured with an Italian version of the Quality Marital Index (QMI; Donato, n.d.), a 6-item scale that measures the perception of romantic relationship satisfaction (e.g., “We have a good relationship” and “I really feel like part of a team with my partner”). Participants rate the first five items on a 7-point scale ranging from 1 (*very disagree*) to 7 (*very agree*), and the last item on a 10-point scale ranging from 1 (*very unhappy*) to 10 (*very happy*). The Cronbach’s coefficient alphas were .95 for men and .96 for women.

Data Analytic Plan

The total sample was randomly split into two sub-samples (Sample 1 $n = 423$; Sample 2 $n = 426$) using the SPSS random split routine to select approximately 50% of study participants for each group. One-way ANOVAs were conducted on the two sub-samples in order to test for significant differences in participants' demographic characteristics. Results showed no significant differences regarding gender, $F(1, 847) = 1.81, p = .17$; age, $F(1, 847) = .82, p = .36$; education, $F(1, 847) = 1.75, p = .18$; income, $F(1, 847) = .02, p = .88$; relationship length, $F(1, 847) = .07, p = .78$; and number of children, $F(1, 847) = .22, p = .63$.

Sample 1 was used for the exploratory factor analysis (EFA), and Sample 2 was used for the confirmatory factor analysis (CFA). Before running the EFAs and CFAs, skewness and kurtosis were calculated for each of the items of CASI to ascertain the normality of the distribution. The data resulted to be normally distributed for both Sample 1 and 2. In Sample 1, kurtosis was high. However, values were still within the acceptable range (< 7 ; West et al., 1995). Sample 2 did not show out-of-range values of skewness and kurtosis.

Following the check for skewness and kurtosis, an EFA was conducted on Sample 1 on the 16 items to explore the dimensional structure of the CASI. The method of extraction was principal axis factoring, with varimax rotation. Following the EFA, a CFA was conducted on Sample 2 to cross-validate the number of factors that emerged from the EFA. CFA models were tested using the robust maximum likelihood estimator (Kim & Yoon, 2011). Data fit was evaluated through standard fit indices including χ^2 , comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean squared residual (SRMR; Hu & Bentler, 1999; McDonald & Ho, 2002).

Measurement Invariance (MI)

To test for configural, metric, and scalar invariance, we used the factorial structure derived from CFA to examine Measurement Invariance (MI) for both participants' age and gender. *Configural invariance* establishes that the CASI presents the same factorial structure across groups (e.g., Kim & Yoon, 2011). To examine this, we tested the factorial structure to be invariant across groups with no equality constrains. *Metric invariance* establishes whether items' loadings are equivalent, and each item contributes to the latent factor. To examine this, the items' factor loadings were constrained to be equal across groups. Finally, *scalar invariance* establishes whether intercepts are equivalent across groups. To examine this, the intercepts were constrained to be equal across groups.

Because of the large sample size, we followed Chen's (2007) guidelines to consider Δ CFI and Δ RMSEA to inspect changes in model fit between nested models. A difference smaller than .010 for Δ CFI and .015 for Δ RMSEA indicated that the additional constrains were tenable and that MI was supported. In case of significant difference in the fit indices, we relied on the highest MIs to identify which parameter needed to be freely estimated in order to test for partial invariance (Brown, 2015). Finally, once full or partial

scalar MI was established, we tested whether latent means were significantly different between groups. One group was chosen as a reference group with its latent means fixed to zero, whereas factor means of the other group were freely estimated (Schwartz et al., 2014).

Bivariate correlations were run to test for convergent and divergent validity. To this aim, convergent validity was tested analyzing correlation with stress and negative affect, while divergent validity was assessed with couple satisfaction and positive affect. SPSS version 25 (2017) was used to run descriptive statistics and the EFA. Mplus 7.0 (Muthén & Muthén, 2012) was used to test all structural equation models (i.e., CFA and multigroup CFA).

Results

Exploratory Factor Analysis (EFA)

An EFA with oblique rotation with the Varimax procedure (Ford et al., 1986) was conducted to test the dimensionality of the CASI. Two EFAs were conducted separately for the CASI chronic and acute scales. After rotation, four factors collectively accounted for approximately 54% of the variance for *Chronic* factors (Factor 1 eigenvalue = 2.68, 16.77%; Factor 2 eigenvalue = 2.36, 14.76%; Factor 3 eigenvalue = 2.05, 12.82%; Factor 4 eigenvalue = 1.62, 10.10%). After rotation, four factors collectively accounted for approximately 56% of the variance for *Acute* factors (Factor 1 eigenvalue = 2.53, 15.80%; Factor 2 eigenvalue = 2.49, 15.56%; Factor 3 eigenvalue = 2.44, 15.25%; Factor 4 eigenvalue = 1.49, 9.33%).

To help refine item-factor associations, only those items that loaded .55 or higher on one factor were considered as uniquely representative of each factor (Comrey & Lee, 1992). This decision rule resulted in the exclusion of 2 items (“Discussion with friends” and “Deadline for works”) from the scale. The remaining 14 items were reanalyzed, resulting in four factors that accounted for approximately 57% of the interitem variance for chronic (Factor 1 eigenvalue = 2.28, 16.25%; Factor 2 eigenvalue = 2.26, 16.16%; Factor 3 eigenvalue = 1.94, 13.86%; Factor 4 eigenvalue = 1.52, 10.87%), and approximately 59% of the interitem variance for *acute* stress subscale (Factor 1 eigenvalue = 2.38, 17; Factor 2 eigenvalue = 2.32, 16.58%; Factor 3 eigenvalue = 2.13, 15.22%; Factor 4 eigenvalue = 1.47, 10.51%).

For the *chronic* subscale, four items loaded on Factor 1, 5 items loaded on Factor 2, 2 items loaded on Factor 3, 2 items loaded on Factor 4 for chronic factors with no change in item-to-factor matching after removing the two items. For the *acute* subscale, four items loaded on Factor 1, five items loaded on Factor 2, three items loaded on Factor 3, two items loaded on Factor 4. There was minimal change in prior pattern coefficients from the earlier factor analysis for *acute* items, with coefficients for Factor 1 ranging from .67 to .77, from .51 to .76 for Factor 2, from .60 to .87 for Factor 3, and from .73 to

.86 for Factor 4, and with coefficients for the first factor ranging from .64 to .77, for the second factor ranging from .56 to .76, for the third factor .87 for the fourth factor ranging from .72 to .87 for chronic factors.

CASI Themes

Although we present no *a priori* hypotheses for specific factors, upon review of the items in each subscale (chronic and acute), the items in each subscale appeared to share common themes. The first theme, *relationship*, had four items associated with stressors linked to the current relationship, which included “Division of household chores,” “Partner’s eating habits,” “Management of living spaces,” and “Time spent on social network sites.” The second theme, *self*, had five items associated with stressors linked to the behavior of participants themselves, which included, “Missing an appointment with your partner,” “Missing an appointment at work,” “Lost personal objects,” “Stolen personal objects,” and “Delay in paying a bill.” The third theme, *communication*, had three items associated with stressors which included for the *acute* version “Discussion with a work colleague,” “Discussion with a boss,” and “Discussion with friends,” and two items for the *chronic* version (Discussion with friends was not associated for chronic version). The fourth theme, *environment*, had two items associated with stressors linked to the external environment, which included “Delay in the public transportation,” and “Traffic.”

Confirmatory Factor Analysis (CFA)

The CFAs were conducted on Sample 2. For both *chronic* and *acute* subscales, we constrained 14 items to load on four factors based on the item-to-factor findings from the previous EFA conducted Sample 1.

Chronic scale

The original CFA showed an unsatisfactory fit to the data, $\chi^2(71) = 191.68$, $p < .001$, CFI = .90, SRMR = .057, RMSEA = .063; 90% CI [.052, .074]. Therefore, we checked the modification indices that suggested including two residual correlations: one between item 1 (“Discussion with a work colleague”) and item 2 (“Discussion with a boss”) and the second between item 5 (“Missing an appointment, date, or event with your partner”) and item 6 (“Missing an appointment at work”). After including these two residual correlations, the CFA was run again, and the model fit was better, i.e., $\chi^2(69) = 122.16$, $p < .001$, CFI = .96, SRMR = .04, RMSEA = .04; 90% CI [.03, .06]. χ^2 was significant, but this is due to the high number participants, while the other fit indexes were all good, the CFI is .96, higher than the minimum limit of .95; SRMR is .04 and RMSEA is .04, therefore well below the limit recommended in literature (Hu & Bentler, 1999) of, respectively, .08 and .06. Coefficients were all significant and ranged from .43 to .82. The subscales’ internal consistency was calculated across the total sample.

Acute Scale

Similar to the *chronic* scale, the CFA model showed an unsatisfactory fit to the data; comparative Fit Indexes $\chi^2(71) = 186.98$, $p < .001$, CFI = .90, SRMR = .060, RMSEA = .062; 90% CI [.051, .073]. Based on this, we included the same two residual correlations added in the *Chronic* model (i.e., items 1, 2, 5, and 6). The new model provided a good fit to the data, i.e., $\chi^2(69) = 113.23$, $p < .001$, CFI = .96, SRMR = .038, RMSEA = .039; 90% CI [.025, .051]. χ^2 was significant, but this is due to the high number of participants, while the other fit indexes were all good, the CFI is .96, higher than the minimum limit of .95, the SRMR is .038 and RMSEA is .039, therefore well below the limit recommended in the literature (Hu & Bentler, 1999) of, respectively, .08 and .06. Factor loadings were all significant and ranged from .42 (for one item) to .80.

MI Across Age and Gender

Multi-group CFAs models were conducted on Sample 2 to test for MI across age and gender.

Age

MI for age was tested by comparing three different age groups: 1) under 30 years old, 2) 30–50 years old, and 3) over 50 years old. Age groups were decided based on research to suggest these are considered culturally passing through step between evolutionary phases (young adulthood, adulthood, and late adulthood) in Italy (Scabini & Cigoli, 2012). For the *chronic* subscale, partial scalar invariance was achieved by freeing the intercepts of item 15 (“Management of living spaces”), which was significantly higher in the group of participants that were over 30–50 years old. Partial scalar invariance showed that participants responded to each item within each subscale in a similar way across age groups. For the *acute* subscale, results confirmed full configural and metric invariance and partial scalar invariance. To reach partial scalar invariance, Item 3’s intercept (“Discussion with friends”) needed to be freed because, compared to other age groups, it was significantly higher for younger participants (under 30 years old group). See Table 3.

Gender

Findings regarding participant’s gender for both *chronic* and *acute* subscales confirmed full configural, metric, and scalar invariance for relationship, self, communication, and environment factors. See Table 4.

Table 3
Measurement Invariance Across Age

Variable	χ^2	df	CFI	RMSEA	Model Comparison	χ^2_{diff}	Δdf	ΔCFI	$\Delta RMSEA$
Acute Scale									
Under 30 (n = 87)	104.812**	69	.866	.077 (.045, .106)					
30–50 (n = 199)	95.806*	69	.956	.044 (.019, .064)					
Over 50 (n = 140)	98.363*	69	.921	.055 (.027, .079)					
Model 1. Configural Invariance	298.330**	207	.928	.056 (.041, .069)					
Model 2. Metric Invariance	307.602**	227	.936	.050 (.035, .064)	2 vs 1	13.730	20	.008	-.006
Model 3. Scalar Invariance	348.835**	247	.919	.054 (.040, .067)	3 vs 2	42.7723*	20	-.016	.004
Model 4. Partial Scalar Invariance ^a	334.218**	246	.930	.050 (.036, .063)	4 vs 2	26.723	19	.011	-.004
Chronic Scale									
Under 30 (n = 87)	101.095*	69	.904	.073 (.039, .102)					
30–50 (n = 199)	108.672*	69	.935	.054 (.033, .072)					
Over 50 (n = 140)	96.297*	69	.935	.053 (.024, .077)					
Model 1. Configural Invariance	306.215	207	.928	.058 (.044, .071)					
Model 2. Metric Invariance	311.558	227	.939	.054 (.040, .065)	2 vs 1	10.077	20	.011	-.007
Model 3. Scalar Invariance	348.720	247	.926	.054 (.044, .051)	3 vs 2	131.008*	63	-.002	.000
Model 4. Partial Scalar Invariance ^b	338.184**	246	.933	.051 (.037, .064)	4 vs 2	26.677	19	.007	-.003

Note. χ^2 = Chi-square Goodness of Fit; df = degrees of freedom; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation. All the Δ index comparisons are made with respect to the previous model.

* $p \leq .05$; ** $p \leq .01$.

^aFree intercept of Communication: Item 3 (“Discussion with friends.”)

^bFree intercept of Relationship: Item 15 (“Management of living spaces.”)

Table 4
Measurement Invariance Across Gender

Variable	χ^2	df	CFI	RMSEA	Model Comparison	χ^2_{diff}	Δdf	ΔCFI	$\Delta RMSEA$
Acute Scale									
Male (n = 215)	150.277*	82	.904	.062 (.046, .078)					
Female (n = 211)	85.509	82	.994	.014 (.000, .041)					
Model 1. Configural Invariance	235.607*	164	.946	.045 (.032, .058)					
Model 2. Metric Invariance	243.541*	175	.948	.043 (.029, .055)	2 vs 1	8.716	11	.002	-.002
Model 3. Scalar Invariance	256.707*	186	.946	.042 (.029, .054)	3 vs 2	12.783	11	-.002	-.001
Chronic Scale									
Male (n = 341)	85.719*	58	.957	.047 (.023, .067)					
Female (n = 304)	72.817	58	.973	.035 (.000, .058)					
Model 1. Configural Invariance	217.577**	164	.964	.039 (.023, .052)					
Model 2. Metric Invariance	236.495**	175	.959	.041 (.026, .053)	2 vs 1	18.610	11	.005	-.002
Model 3. Scalar Invariance	251.448**	186	.956	.041 (.027, .053)	3 vs 2	20.756*	11	-.003	.000

Note. χ^2 = Chi-square Goodness of Fit; df = degrees of freedom; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation. All the Δ index comparisons are made with respect to the previous model.

* $p \leq .05$; ** $p \leq .01$.

Latent Mean Comparisons

Given that scalar invariance was established, we were able to conduct descriptive statistics and latent mean comparisons across age and gender.

Chronic Stress

Over 50 participants scored lower on *relationship* compared to the under 30 group (z score_{over50-year-old} = -2.07, p = .010) and 30–50 group (z score_{over50-year-old} = -2.04, p = .041). Comparing means across gender, women scored lower than men in the chronic *relationship* subscale (z score_{women} = -2.22, p = .026).

Acute Stress

Participants under 30 years old scored lower on *communication* (z score_{under30-year-old} = -2.58, p = .010) compared to participants in the 30–50 age group. The oldest participants (over 50 years old) scored lower on *relationship* (z score_{over50-year-old} = -3.20, p = .001) compared to participants aging 30–50. No significant differences were found between men and women for the acute subscales.

Convergent Validity

Stress

Chronic Factors — The *relationship* factor showed a good convergent validity with each subscale of MSF-P for both men (r between .31 and .41, p < .01) and women (r between .36 and .50, p < .01). The *self* factor showed a good convergent validity with each subscale of MSF-P for both men (r between .31 and .38, p < .01) and women (r between .27 and .33, p < .01). The *communication* factor showed a good convergent validity with each MSF-P subscales for men (r between .19 and .31, p < .01) and only with external chronic stressor (r = .28, p < .01) and external acute stressor (r = .18, p < .01) for women. The *environment* factor showed a good convergent validity with each subscale of MSF-P for women (r between .11 and .23), whereas only with external chronic stressor (r = .19, p < .01), internal acute stressor (r = .13, p < .01) and external acute stressor (r = .16, p < .01) for men. See [Table 5](#).

Acute Factors — The *relationship* factor showed a good convergent validity with each subscale of MSF-P for both men (r between .27 and .42, p < .01) and women (r between .34 and .52, p < .01). The *self* factor showed a good convergent validity with each subscale of MSF-P for both men (r between .21 and .31, p < .01) and women (r between .15 and .32, p < .01). The *communication* factor showed a good convergent validity with each subscale of MSF-P subscales for both men (r between .20 and .34, p < .01) and women (r between .11 and .22). The *environment* factor showed a good convergent validity with external chronic stressor (r = .13, p < .01), internal chronic stressor (r = .15, p < .01) and external

acute stressor ($r = .18, p < .01$) in men and with external acute stressor ($r = .16, p < .01$) and internal chronic stressor ($r = .17, p < .01$) in women. See Table 5.

Table 5

Convergent Validity Correlations

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Relationship chronic		.44**	.17**	.31**	.83**	.26**	.17**	.19**	.50**	.46**	.49**	.36**	.33**	.34**
2. Self chronic	.49**		.28**	.37**	.39**	.65**	.23**	.30**	.28**	.33**	.27**	.29**	.16**	.14**
3. Communication chronic	.34**	.39**		.24**	.08	.09	.51**	.17**	.09	.28**	.01	.18**	.15**	.11*
4. Environment chronic	.35**	.40**	.28**		.25**	.16**	.07	.64**	.15**	.30**	.11*	.23**	.13*	.10*
5. Relationship acute	.79**	.45**	.28**	.35**		.42**	.29**	.29**	.47**	.36**	.52**	.34**	.24**	.31**
6. Self acute	.30**	.66**	.23**	.22**	.49**		.45**	.38**	.25**	.15**	.32**	.27**	.09	.19**
7. Communication acute	.34**	.38**	.65**	.26**	.45**	.46**		.33**	.11*	.14**	.14**	.22**	.05	.15**
8. Environment acute	.24**	.34**	.18**	.72**	.37**	.39**	.34**		.09	.16**	.09	.17**	.01	.04
9. Internal chronic stressor	.41**	.31**	.20**	.09	.37**	.25**	.20**	.08		.46**	.87**	.39**	.44**	.47**
10. External chronic stressor	.31**	.35**	.27**	.19**	.27**	.22**	.21**	.13**	.53**		.38**	.77**	.46**	.45**
11. Internal acute stressor	.36**	.29**	.19**	.13**	.42**	.31**	.25**	.15**	.78**	.39**		.40**	.36**	.45**
12. External acute stressor	.36**	.38**	.31**	.16**	.40**	.31**	.34**	.18**	.52**	.77**	.49**		.34**	.44**
13. Negative chronic affect	.19**	.28**	.17**	.09	.18**	.21**	.19**	.10*	.36**	.39**	.33**	.42**		.76**
14. Negative acute affect	.21**	.26**	.17**	.08	.25**	.27**	.26**	.10*	.40**	.39**	.45**	.48**	.82**	

Note. The results for the female sample are shown above the diagonal. The results for the male sample are shown below the diagonal.

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

Negative Affects

Chronic Factors – The *relationship* factor showed a good convergent validity with both chronic and acute negative affect both in men ($r =$ respectively $.19$ and $.21, p < .01$) and in women ($r =$ respectively $.33$ and $.34, p < .01$). The *self* factor showed a good convergent validity with chronic negative affect, and acute negative affect both in men ($r =$ respectively $.28$ and $.26, p < .01$) and in women ($r =$ respectively $.16$ and $.14, p < .01$). The *communication* factor showed a good convergent validity with chronic negative affect and acute negative affect both in men ($r = .17, p < .01$ for both) and in women ($r =$ respectively $.15$ and $.11$). The *environment* factor showed a good convergent validity with both chronic and acute negative affect only in women ($r =$ respectively $.13$ and $.10, p < .05$). See Table 5.

Acute Factors – The *relationship* factor showed a good convergent validity with both chronic and acute NA both in men ($r =$ respectively $.18$ and $.25, p < .01$) and in women ($r =$ respectively $.24$ and $.31, p < .01$). The *self* factor showed a good convergent validity with both chronic and acute NA in men ($r =$ respectively $.21$ and $.27, p < .01$) and only with acute NA for women ($r = .19, p < .01$). The *communication* factor showed a good convergent validity with both chronic and acute NA in men ($r =$ respectively $.19$ and

.26, $p < .01$) and only with acute NA in women ($r = .15$, $p < .01$). The *environment* factor showed a good convergent validity with chronic and acute NA in men ($r = .10$, $p < .05$ for both). See Table 5.

Divergent Validity

Relationship Satisfaction

Chronic Factors — The *relationship* factor showed a good divergent validity with relationship satisfaction both in men ($r = -.22$, $p < .01$) and in women ($r = -.31$, $p < .01$). The *self* factor showed a good divergent validity with relationship satisfaction both in men ($r = -.18$, $p < .01$) and in women ($r = -.17$, $p < .01$). The *communication* factor showed a good divergent validity only in men ($r = -.13$, $p < .01$) and no correlation in women. The *environment* factor showed no correlation with relationship satisfaction both in men and in women. See Table 6.

Table 6

Divergent Validity Correlations

Variables	1	2	3	4	5	6	7	8	12	13	14
1. Relationship chronic		.44**	.17**	.31**	.83**	.26**	.17**	.19**	-.31**	-.17**	-.18**
2. Self chronic	.49**		.28**	.37**	.39**	.65**	.23**	.30**	-.17**	-.09	-.11*
3. Communication chronic	.34**	.39**		.24**	.08	.09	.51**	.17**	-.01	.01	-.05
4. Environment chronic	.35**	.40**	.28**		.25**	.16**	.07	.64**	-.05	-.03	-.03
5. Relationship acute	.79**	.45**	.28**	.35**		.42**	.29**	.29**	-.29**	-.20**	-.15**
6. Self acute	.30**	.66**	.22**	.22**	.49**		.45**	.38**	-.19**	-.12*	-.06
7. Communication acute	.34**	.38**	.65**	.26**	.45**	.46**		.33**	-.07	.03	.05
8. Environment acute	.24**	.34**	.18**	.72**	.37**	.39**	.34**		-.04	-.003	.02
12. Couple satisfaction	-.22**	-.18**	-.13**	.02	-.19**	-.18**	-.12*	.001		.40**	.42**
13. Positive chronic affect	-.17**	-.08	-.10*	-.06	-.13**	-.12*	-.13**	-.07	.32**		.80**
14. Positive acute affect	-.19**	-.07	-.09	-.05	-.13**	-.07	-.08	-.01	.38**	.82**	

Note. The results for the female sample are shown above the diagonal. The results for the male sample are shown below the diagonal.

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

Acute Factors — The *relationship* factor showed a good divergent validity with relationship satisfaction both in men ($r = -.19$, $p < .01$) and in women ($r = -.29$, $p < .01$). The *self* factor showed a good divergent validity with relationship satisfaction both in men ($r = -.18$, $p < .01$) and in women ($r = -.19$, $p < .01$). The *communication* factor showed a good divergent validity only in men ($r = -.12$, $p < .05$) and no correlation in women. The *environment* factor showed no correlation with relationship satisfaction both in men and in women. See Table 6.

Positive Affect

Chronic Factors — The *relationship* factor showed a good divergent validity with both chronic and acute PA both in men (r respectively $-.17$ and $-.19$, $p < .01$) and in women (r respectively $-.17$ and $-.18$, $p < .01$). The *self* factor showed no correlation with chronic PA both in men and women, whereas it showed a good divergent validity with acute PA only in women ($r = -.11$, $p < .05$). The *communication* factor showed a good divergent validity only with chronic PA in men ($r = -.10$, $p < .05$). The *environment* factor showed no correlation with PA. See Table 6.

Acute Factors — The *relationship* factor showed a good divergent validity with both chronic and acute PA both in men (r respectively $-.13$ and $-.13$, $p < .01$) and in women (r respectively $-.20$ and $-.15$, $p < .01$). The *self* factor showed a good divergent validity only with chronic PA, both in men ($r = -.12$, $p < .01$) and in woman ($r = -.12$, $p < .01$). The *communication* factor showed a good divergent validity only with chronic PA in men ($r = -.13$, $p < .01$). The *environment* factor showed no correlation with PA. See Table 6.

Discussion

This study aimed to provide initial validation of the Italian version of the Chronic and Acute Stress Inventory (CASI), a self-report measure designed to assess chronic and acute stressors that individuals in a romantic relationship may experience. Having a valid self-report measure to assess both chronic and acute stressors for individuals in a relationship will be helpful for both relationship researchers and clinicians working with individuals and couples, who have adopted a systemic understanding of the role that stress may have for individuals and their romantic partner (Bodenmann et al., 2016).

The results from the exploratory factor analysis identified four factors within each subscale (*chronic* and *acute*): relationship, self, communication, and environment. The *relationship* theme included stressors linked to the actual relationship, whereas the *self* theme included stressors related to the individual. The third factor, *communication*, included each aspect related to the communicative processes between one individual and a person outside of the relationship. The fourth theme, *environment*, was referred to stressors linked to the external environment. Results showed that the four factors accounted for more than half of the interitem variance for both *chronic* and *acute* factors. In sum, CASI showed a good validity because our four factors solution accounted for more than 50% of the variance.

The results from our tests of measurement invariance suggest that the CASI may be a good measure to assess chronic and acute stressors across gender and across age. The scalar measurement invariance found in the present study showed how CASI scale is equivalent for both men and women and for individuals belonging to different age groups. Given that scalar invariance was established, we were able to conduct descriptive

statistics and latent mean comparisons across age and gender. Results showed that participants over 50 years of age scored lower on *relationship* for the chronic factors than the under 30 group and 30–50 group. Regarding the *Acute* factors, participants under 30 years old scored lower on *communication* than participants in the 30–50 age group. The most aged participants (over 50 years old) scored lower on *relationship* compared to participants aging 30–50. Comparing means across gender, women scored lower than men in the chronic *relationship* subscale, while no significant differences were found between men and women for the acute subscales.

Limitations and Future Directions

The current study has several limitations. First, the initial validation of the CASI was tested with a cross-sectional design, which limits the ability to test predictive validity. Second, data were collected from Italy, which limits the generalizability of the findings to other countries. Third, we acknowledge that the association between the CASI acute and chronic factors may be due to a “halo effect”, in which a state of “activation” could have been induced by some questions and could consequently have influenced subsequent responses. In particular, the most recent discussions (in the last seven days) probably influenced participants’ perceptions of those that occurred in the previous 12 months. In a future study, it may be helpful to present the “acute” and “chronic” part of the CASI at different times of the compilation. Finally, the discriminant power of scale is low. It suggests the need to extend the understanding of its discriminant power using different dimensions in future studies. Future research is encouraged to examine additional translations for the CASI for use with samples outside Italy. Following the example from Falconier et al. (2016), it will be useful to have measures validated in different countries in order to investigate how different cultures deal with stress. The findings of the current study contribute to the discussion of the role of minor stress in romantic relationships. In particular, we focused on the duration of a stressor as the main factor for the development of the scale.

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Appendix

Appendix A

Indica la frequenza con cui hai discusso con il tuo/la tua partner negli ultimi 12 mesi e negli ultimi 7 giorni riguardo gli argomenti riportati. Se l'evento non è applicabile alla tua situazione (es., non utilizzi i mezzi pubblici) indica “non applicabile alla mia situazione”.

0	1	2	3	4
Non applicabile alla mia situazione (l'evento non è mai accaduto)	Per niente (l'evento è accaduto ma non ha influenzato le discussioni)	A volte	Spesso	Molto spesso

	Negli ultimi 7 giorni					Negli ultimi 12 mesi				
Discussione con un collega di lavoro	0	1	2	3	4	0	1	2	3	4
Discussione con il datore di lavoro	0	1	2	3	4	0	1	2	3	4
Discussione con amici	0	1	2	3	4	0	1	2	3	4
Ritardo dei mezzi pubblici	0	1	2	3	4	0	1	2	3	4
Appuntamento con il partner dimenticato	0	1	2	3	4	0	1	2	3	4
Appuntamento di lavoro dimenticato	0	1	2	3	4	0	1	2	3	4
Traffico	0	1	2	3	4	0	1	2	3	4

	Negli ultimi 7 giorni					Negli ultimi 12 mesi				
Oggetti personali smarriti	0	1	2	3	4	0	1	2	3	4
Oggetti personali persi	0	1	2	3	4	0	1	2	3	4
Multe	0	1	2	3	4	0	1	2	3	4
Divisione dei compiti domestici	0	1	2	3	4	0	1	2	3	4
Abitudini alimentari del partner	0	1	2	3	4	0	1	2	3	4
Gestione degli spazi abitativi	0	1	2	3	4	0	1	2	3	4
Tempo trascorso sui social network	0	1	2	3	4	0	1	2	3	4

Appendix B

Indicate how often you have discussed with your partner(s) in the past 12 months and the past 7 days regarding the listed topics. If the event is not applicable to your situation (e.g., you do not use public transportation) indicate “not applicable to my situation”.

0	1	2	3	4
Not applicable, the event never happened	Not at all (the event happened but didn't affect the discussions)	Sometimes	Often	Very often

	In the last 7 days					In the last 12 months				
Discussion with a work colleague	0	1	2	3	4	0	1	2	3	4
Discussion with a boss	0	1	2	3	4	0	1	2	3	4
Discussion with friends	0	1	2	3	4	0	1	2	3	4
Delay in public transportation	0	1	2	3	4	0	1	2	3	4
Missing an appointment with your partner	0	1	2	3	4	0	1	2	3	4
Missing an appointment at work	0	1	2	3	4	0	1	2	3	4
Traffic	0	1	2	3	4	0	1	2	3	4
Lost personal objects	0	1	2	3	4	0	1	2	3	4
Stolen personal objects	0	1	2	3	4	0	1	2	3	4
Fines	0	1	2	3	4	0	1	2	3	4
Division of household chores	0	1	2	3	4	0	1	2	3	4
Partner's eating habits	0	1	2	3	4	0	1	2	3	4
Management of living spaces	0	1	2	3	4	0	1	2	3	4
Time spent on social network sites	0	1	2	3	4	0	1	2	3	4