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Psychometric Properties and Factorial Validity of the Dyadic Coping Inventory –the Persian Version

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Abstract This study seeks to investigate the factor structure, convergent validity, and reliability of the Persian version of the Dyadic Coping Inventory in an Iranian sample. The sample consisted of 816 participants were involved in a questionnaire study. Factor analysis was used to evaluate the psychometric properties of the Dyadic Coping Inventory. Results showed that internal consistency of this scale by using Cronbach's Alpha was 0.84, and the internal consistency the subscales ranged from .64 to .81.The findings support the hypothesized five-factor structure (stress communication; emotion-focused dyadic coping; problem-focused dyadic coping; delegated dyadic coping; and negative dyadic coping) for the DCI and self- and other-perception. The psychometric properties of the DCI and its criterion validity with The Relationship Assessment Scale (RAS) were good. This study indicated satisfactory reliability and factor structure for the Persian version of the Dyadic Coping Inventory (DCI). Furthermore, DCI can be utilized for research and therapeutic purposes and it can inspire cross-cultural studies.

Keywords Confirmatory factor analysis · Dyadic coping · Dyadic coping inventory · Iranian couples · Scale factorial structure

Stress is a concept that has increasingly received attention in marital research over the past two decades, indicating that stress plays a significant role in the understanding of marital quality, marital satisfaction and stability of close relationships (Bodenmann 2005; Neff and Karney 2004).

Couple Stress

Couples can have a mutual effect on one another's thoughts, emotions, and behaviors due to the fact that marriage is a dyadic relationship (Kenny et al. 2006). As a result, stress in couples is always a dual phenomenon that affects both partners (Bodenmann 2005); when one partner is not able to cope with his/her stress, the stress of him/her can influence the other partner of the couple (Story and Bradbury 2004). Couple stress is a multifactorial process that includes family, personal experiences, coping strategies and a set of neuro-endocrine response, automatic and regular cardiovascular system, and other physiological responses) Holmes et al. 2006). This stress can be classified in three dimensions: first, the ways that both partners are affected by stressful event (directly or indirectly), second, source of stress (whether originates from inside or outside of couples) and third, chronological order (at what moment in the coping process each couple gets involved (Randall and Bodenmann 2009).

Bodenmann (2005) classified couple stress into two categories: internal (e.g., negative patterns of communication and dyadic conflict, the health issues of one couple) and external stress (e.g., work stress, financial stress, family stress and the stress of poverty). Several studies in Western societies have been conducted on these internal and external stressors such as transition to parenthood (Lawrence et al. 2008), conflict in interpersonal relationships (Tyssen et al. 2001), deficiency or lack of problem solving skills (Cohan and Bradbury 1997), financial problems (Kahn and Pearlin 2006), unemployment,

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loss of a job, illness or death of a family member (Story and Bradbury 2004).

Dyadic Coping

Stress and coping processes in couples have received increased attention by several researchers in Western countries during the past two decades and theoretical and correlational studies in these areas have recognizably increased (e.g. Bodenmann 2005; Falconier et al. 2015, 2016). In light of the research it was found that many psychological factors affect the quality of the relationship between the partners, among those, dyadic coping viewed as one of the determinant factors influencing the quality of the relationship (Falconier et al. 2015; Wunderer and Schneewind 2008). Dyadic coping is a process of common response to dyadic stress based on the interdependence of the partners in a collaborative social context (Bodenmann 2005). Dyadic coping is defined as an interpersonal process involving both spouses, and as the interactions between stress symptoms of one couple and coping reactions of the other spouse, as well as the original action of common coping (Revenson et al. 2005). Goals of couple coping in an intimate relationship are both the maintenance of the relationship and the support of partners (Cutrona and Gardner 2006).

Bodenmann first classified coping responses into three categories (Bodenmann 1995a), including three types of positive dyadic coping: common dyadic coping, supportive dyadic coping, and delegated dyadic coping. Bodenmann's second theoretical classification of stress and coping in couples (Bodenmann 1997, 2005) recognized and theorized the likelihood of negative dyadic coping responses. He specified his model; three negative forms of dyadic coping were added to his classification: hostile, ambivalent, and superficial dyadic coping. These three forms of negative dyadic coping can be viewed as supportive responses to the couple's expression of stress, but with a negative connotation.

The construct of dyadic coping and its relationship with the marital quality have been examined in many studies (e.g., Badr 2004; Bodenmann 2000; Bodenmann et al. 2004, 2006; Graham and Conoley 2006; Schilling et al. 2003). For example, the results of Bodenmann and colleagues' research in Switzerland (Bodenmann et al. 2006) has revealed that the use of dyadic coping is associated with marital quality due to shielding marriage from the negative effects of stress, and framing relationship appraisals of marriage as a trusted, intimate and supportive partnership . Also, some studies have reported the relationship between dyadic coping and relationship satisfaction (e.g., Bodenmann 1995b; Bodenmann and Cina 2005; Gmelch and Bodenmann 2007; Papp and Witt 2010). For example, Bodenmann (1995b) in his study showed that the emotional-focused supportive dyadic coping, common dyadic coping, and delegated dyadic coping are the main predictors of marital satisfaction. Moreover, many studies have viewed dyadic coping as the most important predictors of well-being (Bodenmann 2005; Bodenmann et al. 2004; Feldman and Broussard 2006), and relationship satisfaction (Bertoni et al. 2007; Falconier et al. 2016, 2015; Hilpert et al. 2016).

The Psychometric Properties of the Inventory

In order to assess the construct of dyadic coping, Bodenmann (1997) has presented different ways, such as systematic observation, interviews and elaborated questionnaires, of which questionnaires is the most widely used access to dyadic coping, compared to other methods due to the advantage of being economical and easy to administer (Donato et al. 2009; Falconier et al. 2015). Furthermore, the questionnaire can identify different aspects of dyadic coping ranging from stressor-specific coping responses to more general trends to react to stress in specific case to the different positions (Donato et al. 2009). To measure the couple tendency to use dyadic coping and stress communication, Bodenmann (1997, 2000) developed a self-report instrument based on his systemic-transactional model (STM) to dyadic coping – the Dyadic Coping Inventory (DCI; Bodenmann 2008). Several studies on the psychometric properties of the German version of the scale or the original version (Bodenmann 1997, 2000, 2008), the Italian version (Donato et al. 2009), the French version (Ledermann et al. 2010), the Portuguese version (Vedes et al. 2013), the English version (Levesque et al. 2014; Randall et al. 2015), the Romanian version (Rusu et al. 2016) as well as the Chinese version (Xu et al. 2016) have been conducted and the results of these studies indicated acceptable reliability and validity of the scale.

The Purpose of the Current Study

According to research conducted on the direct and indirect effects of stress and dyadic coping processes on relationship quality and satisfaction, psychological well-being of couples and their relationship with couple functioning, it is needed to conduct studies in other countries, especially those that are culturally and socially different. Doing research on this field requires a valid and reliable instrument with desirable research background for assessing the construct of dyadic coping processes. Given the absence of studies on the psychometric properties of the Iranian version of Bodenmann's Dyadic Coping Inventory, the purpose of this study was to evaluate the psychometric properties and factor structure of Dyadic Coping Inventory designed by Bodenmann (1997, 2000, 2008) on an Iranian sample in order to create the conditions

for conducting research in Iran and other Persian-speaking countries.

On the other hand, to make an instrument usable, the necessity of reaffirm its utility through construct validity of the questionnaire is considerable due to the likelihood of changing the terms in the process of translating key words from the original questionnaire into another language. Moreover, it is probable that some subscales in the scale will not be an accurate reflection of some of the cultural features in the community. One the other hand, reliability is an important requirement and assumption for psychometric properties concerning stability and consistency of scores multiple times at different situations; for these reasons, it is essential to evaluate the reliability and internal consistency of any questionnaire, when the instrument is administered in a different population.

Method

Factor analysis was used to evaluate the psychometric properties of the Dyadic Coping Inventory. Covariance matrix in the factor analysis is analyzed with two main methods, exploratory and confirmatory factor analysis (Sarmad et al. 2008). In this study, the factor structure of the questionnaire was extracted by performing both exploratory (EFA) and confirmatory factor analyses (CFA). The important matter in the factor analysis is to determine the minimum sample size. The minimum sample size of factor analysis is 200. Kline (2010) believes that a sample of 10 or 20 is required for each item in the exploratory factor analysis, but a minimum sample size of 200 is defensible (Kline 2010).

Participants and Procedure

Eight hundred and sixteen participants (408 married men and 408 married women) living in the South of Iran, in Shiraz and Ahwaz, participated in this study. Participants were recruited by distributing flyers in universities, schools, civil institutions, and companies. The authorization to conduct the research was obtained from those places and the institution of researchers. The paper-and-pencil self-administered technique was utilized in this study. The researchers were talking to employees who worked at civil institutions, companies, and universities, schools or students who studied at universities and asking them to participate, after explaining the purpose of the study. If they agreed, the researchers handed paper questionnaires to them and asked them to complete them by hand and return them; it took each participants about 20 to 30 min to complete the questionnaire. Other techniques such as the online or mail were not used. The researchers themselves monitored the process of completing the questionnaires. Approximately 98% of participants filled out the questionnaires completely less than 2% of participants did not respond to all questions in the questionnaire, so they were excluded from the analysis. The participation in the study was voluntary and no payment for participation was needed. The mean age of all participants was 31.3 (SD = 8. 68) years, (for women M = 29.22, SD = 8.33, for men M = 32.33, SD = 8.13). Partners' average length of marriage was 9.50 years (SD = 9.18). In terms of vocation, 67.4% of participants were employed, 14.4% were unemployed, and 18.2% were university students. In terms of educational levels, 44% of participants had B.A degrees, 22% had M.A and Ph.D. degrees, 26% had high school diplomas and 8% had not completed high school. Twenty-two percent of couples had on average 1 child (*Range* 1–4). Therefore, according to demographic data, in terms of age, income level, percent employed, educational level, number of children, it can be concluded that the sample represented the middle class in Iran.

Measures

Socio-Demographic Characteristics The Socio-Demographic Characteristics Form is a semi-structured form designed to assess age, gender, duration of the relationship, job, number of children, and educational characteristics of the sample.

The Dyadic Coping Inventory (DCI) The Dyadic Coping Inventory (DCI: Bodenmann 2008) is a 37-item self-report instrument with 4 main subscales including: stress communication, supportive dyadic coping, delegated dyadic coping, and negative dyadic coping. The inventory also contains 10 subscales that are rated on a five-point Likert scale from 1 to 5; ranging from 1 (never) to 5 (always). The subscales are as follows: Stress Communication by Oneself, Stress Communication by Partner, Emotion-Focused Supportive Dyadic Copping by Oneself, Emotion-Focused Supportive Dyadic Copping by Partner, Problem-Focused supportive Dyadic Coping by Oneself, Problem-Focused supportive Dyadic Coping by Partner, Delegated Dyadic coping by Oneself, Delegated Dyadic Coping by Partner, Emotion-Focused Common Dyadic Coping, and Problem-Focused Common Dyadic Coping. These subscales can be added in two scales called Aggregated Scales, Dyadic Coping by Oneself, and Dyadic Coping by Partner. There is another factor entitled "Evaluation of Dyadic Coping" which is an assessment of the whole inventory, but it is not considered as a subscale (Bodenmann 2008). In addition, the inventory obtains a total score called the total score of dyadic coping. Higher scores in total score indicate more dyadic coping in couples (Bodenmann et al. 2006). Bodenmann and colleagues (2007a, b) reported that Cronbach's α for the total scale of men sample was 0.92, and was 0.93 for the total scale of women, and Cronbach's α was ranged from 0.73 to 0.92 for the subscales of it. Bodenmann (2008) in a validation study on a sample of 2399 (Women = 1327 and men = 1072) examined

psychometric properties of the Swiss-German version of the inventory. Results showed that reliability coefficients of these versions were 0.90, 0.88 and 0.91, respectively, reliability coefficients were reported between 0.71 and 0.92 for the subscales (Bodenmann 2008). Ledermann et al. (2010) examined psychometric properties of the Swiss-German, Italian, and French versions of the inventory on three separate samples of 792 participants from Switzerland, Italy and France, who spoke German, Italian, and French. The results indicated that the reliability coefficients of the inventory were 0.91, 0.90, and 0.90, respectively. Moreover, the reliability coefficients for the subscales of the inventory ranged from 0.61 to 0.89. Donato et al. (2009) examined the factor structure of the inventory in an Italian sample. The studied population included 389 couples. The results revealed that the four-factor in this sample had moderate fit but the five-factor (stress communication; emotion-focused dyadic coping; problem-focused dyadic coping; delegated dyadic coping; and negative dyadic coping) indicated good fit.

In Iran, the inventory has never been factor analyzed and the psychometric properties of the scales are unexamined. In the three studies utilized the inventory, the reliability coefficients were studied. Ozouni et al. (2012) reported that Cronbach's α for the total scale of men sample was 0.92 and 0.93 in women (Khojaste-Mehr et al. 2013). Khojaste-Mehr et al. (2013) reported that Cronbach's α was 0.91 for the total scale in men, and was 0.91 in women sample. Also, in Mohammadi, Khosh konesh and Zade Mohammadi's research (2014) reported that Cronbach's α was 0.91 for the total scale sample of men, and was 0.92 in women.

Approval was obtained from the author of original scale for translation of the Dyadic Coping Inventory (DCI) to Persian and for studying it. After having translated the text to Persian, scale items were reverse-translated to English and then evaluated by seven local psychologists who were trained and practiced on couple therapy, currently working in this field and have advanced knowledge of English. The psychologists were requested to recommend the most appropriate translation and forward their recommendations when needed. After the evaluation, most appropriate translation was decided to be administered according to views of reviewers. Persian translated text was re-translated to English by qualified experts and its consistency was controlled. Approved text was administered to seven psychologists by a pilot study and final version of scale was prepared.

Relationship Satisfaction The Relationship Assessment Scale (RAS) is a seven-item measure of relationship satisfaction (Hendrick et al. 1998). The RAS contains seven items in a self-report format rated on a five-point Likert scale (A = 1 to E = 5). The higher scores indicate more satisfaction of the participant from their relationship (Hendrick et al. 1998). Many studies reported that the RAS had adequate validity (Doohan and Manusov 2004; Hendrick et al. 1998; Shi 2003). The reliability of the RAS is supported by researchers. The results of Vaughn and Matyastik Baier's study (1999) indicated that Cronbach's alpha was 0.91 for RAS total scores, and Graham et al. (2011) reported an average Cronbach's alpha of 0.87 in a recent meta-analysis. The scale was translated, standardized and adopted into Persian by Gheysari and Karimian (2013). They examined psychometric properties of the Persian versions of the RAS. The results indicated that the reliability coefficient of RAS was 0.81 (Gheysari and Karimian 2013). We found the reliability coefficients of the Persian versions of the RAS in the present sample was excellent (α = 0.87).

Procedure

Each couple was asked to complete a series of questionnaires regarding demographic information, the Dyadic Coping Inventory (DCI) and Relationship Assessment Scale. All participants were informed that the survey information was completely confidential and that they would be identified only by subject number to maintain anonymity.

Results

Content Validity

Quantitative and qualitative methods were utilized to determine the content validity. In order to examine the content validity in quantitative method, Content Validity Ratio and Content Validity Index were used. Because determining the Content Validity Ratio of this study was based on the judgment of experts, the translated Inventory was provided to seven psychology experts and they were asked to assess each item on a three-point Likert scale consisting of: 1 = necessary, 2 = useful, but unnecessary, 3 = unnecessary. Then, based on the Table of Lawshe (1975) items whose CVR equals 0.56 or higher should be selected (Hajizadeh and Asghari 2011). Next, examining the CVI based on Content Validity Ratio of Waltz and Bausell (1983) began. For this reason, the experts were asked to measure the levels of relevancy, simplicity, and clarity of each statement in the inventory according to Content Validity Ratio of Waltz and Bausell (1983). Thus, three criteria, simplicity, relevancy and clarity were separately examined on a four-point Likert scale for each of the items by experts. Then, based on the average scores of Content Validity Index of all items in Inventory, Scale-level Content Validity Index/ Averaging Calculation Method (S-CVI/Ave) was calculated. Polit and Beck (2007) recommended 0.90 and higher for the acceptable lower limit for the S-CVI/Ave. The results indicated that the CVR value of the all

items were higher than 0.56 and the CVI/Ave values of all of them were 0.90 or higher.

Exploratory Factor Analysis

Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett's tests also were calculated because the researchers wanted to test the sampling adequacy to perform a satisfactory factor analysis. The calculated KMO was 0.86 and the Bartlett's test of sphericity (χ^2 = 13,809.95) was significant ($p < 0.001$) indicating the adequacy of sample size for the analysis. Results revealed that ten factors exist, and the items accounted for 64.21% of the total variance.

In order to identify the latent variables or factors of priority for a set of variables, exploratory factor analysis is utilized. When testing the fit of a model obtained from exploratory factor analysis is wished, confirmatory factor analysis is used (Harrington 2009).

In this study, the factor loading for each questionnaire was performed. If the factor loading of an item had been lower than 0.32, it would have been deleted from the inventory (Tabachnick and Fidell 2007). According to the results, there was no need to eliminate any items from the inventory. A factor analysis (Varimax rotation) was performed to investigate the theoretical structure proposed by Bodenmann (2008) and Ledermann et al. (2010). Factors were extracted using principal components analysis.

To measure items of one's own coping behavior, and the couple's coping behavior, separate analyses were performed because the perspective of the rater, which is different for one's own, the partner's, and the joint dyadic coping can be obtained through separate analyses. As shown in the Table 1, there was evidence from the data for the postulated structure with the factors stress communication, emotion-focused dyadic coping; problem-focused dyadic Coping, negative dyadic coping, and delegated dyadic coping for both one's own and the partner's dyadic coping.

Confirmatory Factor Analysis

In structural equation modeling and confirmatory factor analysis, goodness of fit statistics compared the theorized factor structure with the data. For the purposes of this study, a confirmatory factor analysis (CFA) was calculated using a maximum likelihood method through Amos 22. In order to assessing the adequacy of the model's fit six statistics including: The chi-square (χ^2), Goodness of Fit Index (GFI), Comparative Fit index (CFI), Incremental Fit Index (IFI), Tucker-Lewis Index (TLI) and the Root Mean Square Error of Approximation (RMSEA) were used to determine model fit. Because the chi-square (χ^2/df) is sensitive to the sample size; the normed chi-square statistic was estimated to measure overall fit of the model. Schreiber (2006) recommended that normed chi-square values that are less than 2 or 3 are considered acceptable for model fit. The other fit index often used to assess model fit for a CFA is the CFI. It is similar to R^2 in multiple regression analyses and indicates the amount of the total covariance in observed variables (Kyle 1999). CFI, IFI and TLI values greater than 0.90 indicate good model fit (Kenny et al. 2006, p. 87). RMSEA values less than 0.05 (Kyle 1999) or 0.06 (MacCallum et al. 1996) show good model fit. GFI is a measure of the amount of variance and covariance which is jointly explained by the model (Kinnear and Gray 2004). Stapleton (1997) suggested that acceptable values of GFI for model fit are 0.90 to 0.95.

In order to evaluate the adequacy of the factorial structure of the DCI, a series of confirmatory factor analyses on self-and other-perceptions were conducted, separately for men, women and total participants. The original four-factor model indicated that stress communication, supportive, delegated, and negative dyadic coping can be distinguished. The model fit and the range of the standardized factor loadings of the dyadic coping subscales and the scales that measure evaluation of dyadic coping are summarized in Table 2.

As can be seen in Table 2, the outcomes of factorial structure through a confirmatory factor analysis on self-perceptions for the four-factor model revealed that this model is marginally acceptable for both men and women while the model has a good fit for total participants. In line with Bodenmann's theorization of supportive dyadic coping as comprising both problem-focused and emotion-focused responses, and also based on the findings of Donato et al. (2009) and Vedes et al. (2013), the five-factor model was analyzed (stress communication; emotion-focused dyadic coping; problem-focused dyadic coping; delegated dyadic coping; and negative dyadic coping). The results of factorial structure through a confirmatory factor analysis on self-perceptions for five-model indicated a good overall fit for men, women and total participants.

As shown in Table 2, the results of factorial structure through a confirmatory factor analysis on perceptions of the other for the four-factor model showed that this model is marginally acceptable for both men and women but it has a good fit for total participants. According to Bodenmann's theorization of supportive dyadic coping and based on the findings of Donato et al. (2009) and Vedes et al. (2013), the five-factor model was analyzed. The factorial structure indicated a good overall fit for a five-factor model for perceptions of the other.

Reliabilities

Cronbach's alpha was utilized to determine internal consistency between DCI subscales. Values equal or greater than 0.70 were considered acceptable level of reliability (Ledermann et al. 2010; Nunnally and Bernstein 1994). Based on results, the coefficient alpha with a value of .84 was estimated for the

Table 1 Item loadings for subscales of DCI

Factors	Stress communication	Emotion-focused supportive DC	Problem-focused supportive DC	Negative DC	Delegated DC
One's own dyadic coping					
1	**.753**	.276	.039	.050	.216
2	**.734**	.139	−.147	−.054	.160
3	**.534**	.078	.051	−.086	.071
4	**.512**	.188	.167	.302	.109
20	.086	**.780**	−.237	.036	.060
21	.172	**.711**	−.304	.049	.097
24	.133	**.531**	.009	.192	−.072
23	.108	.062	**.817**	−.132	−.076
29	−.089	.118	**.791**	.118	.130
22	.155	−.009	.120	**.503**	−.141
25	.335	−.037	−.082	**.686**	−.122
26	.212	.043	.071	**.763**	.131
27	.094	.068	−.029	**.733**	.005
28	.179	−.107	.119	.087	**.505**
30	.107	−.101	.100	.092	**.545**
Partner's dyadic coping					
16	**.735**	−.084	−.017	−.053	.093
17	**.659**	−.042	−.047	.102	.129
18	**.645**	.243	.110	−.011	.061
19	**.651**	−.032	.329	.216	−.029
5	.198	**.767**	.007	−.007	−.110
6	.242	**.684**	.306	−.032	.101
9	.046	**.662**	.080	−.089	−.137
8	.028	.208	**.637**	.056	.109
13	.168	.287	**.721**	.101	−.009
7	.094	−.028	−.032	**.552**	044
10	.167	.021	.208	**.732**	−.117
11	.257	.087	.287	**.786**	−.079
15	.189	.038	.350	**.642**	−.036
12	.080	.025	−.123	−.196	**.715**
14	.169	−.157	−.288	−.179	**.864**

Factor loadings above .32 are bolded

entire scale and the internal consistency the subscales ranged from .64 to .81. Reasonable reliabilities in the participants for all subscales were found but there were two exceptions: The negative dyadic coping scales had a borderline reliability of .64, and .66. The reasonable reliabilities obtained for the three composite scales ranged from .74 to .77. The results indicated reasonable reliability for evaluation of dyadic coping with a value of .71.

Means and Standard Deviations and Intercorrelations among Subscales

The mean and standard deviation of DCI subscales according to sex and all participants were calculated. Results indicated that DCI subscales scores of women participants in more than half of the subscales were somewhat higher than the men participants'.Intercorrelations among the scales and subscales are shown in Table 3. As can be seen in Table 3, all DCI subscales were correlated, and the correlation were significant at the $p < 0.01$ level. The subscales were positively correlated with each other, varied from .137 to .831, but Negative DC by Oneself and Negative DC by Partner had a negative relationship with the other subscales ranged from −.222 to −.407.

Correlations with Other Construct

The aspects of construct validity were established by examining correlation between the dyadic coping inventory and the

Table 2 Fit indices of the models tested (self-perceptions and perceptions of the other)

Models			χ^2	*df*	$\frac{\chi^2}{df}$	GFI	CFI	IFI	RMSEA	TLI
men	4-factor model	self-perceptions	489.177	84	3.824 (p = .00)	0.899	0.895	0.897	0.059	0.896
		perceptions of the other	593.863	84	7.070 (p = .00)	0.900	0.901	0.900	0.058	0.900
	5-factor model	self-perceptions	335.038	80	2.188 (p = .00)	0.904	.904	.903	.049	.903
		perceptions of the other	500.084	80	6.251 (p = .00)	0.907	0.908	0.901	0.054	0.908
women	4-factor model	self-perceptions	549.634	84	4.543 (p = .00)	0.898	0.899	0.898	0.057	0.897
		perceptions of the other	515.610	84	6.138 (p = .00)	0.901	0.901	0.903	0.059	0.903
	5-factor model	self-perceptions	285.418	80	1.568 (p = .00)	0.907	0.907	0.908	0.047	0.908
		perceptions of the other	481.384	80	6.017 (p = .00)	.912	.908	.912	.051	.911
Total	4-factor model	self-perceptions	747.833	84	6.903 (p = .00)	0.904	0.905	0.906	0.056	0.904
		perceptions of the other	780.109	84	9.287 (p = .00)	0.908	0.906	0.907	0.051	0.908
	5-factor model	self-perceptions	351.083	80	2.389 (p = .00)	0.947	0.933	0.933	0.046	0.912
		perceptions of the other	677.704	80	8.471 (p = .00)	0.923	0.928	0.919	0.049	0.927

relationship assessment scale. Results demonstrated that all DCI subscales were positively (except Negative DC by oneself and Negative DC by Partner were negatively) correlated with RAS, and the correlation were significant at the $p < 0.01$ level. As can be seen in Table 4, DC total by the partner, DC total by oneself, Joint DC, Problem-Focused supportive DC by Partner, Emotion-Focused Supportive DC by Partner and Delegated DC by Partner were most moderately related to marital relationship, ranged from .172 to .532. Among the dyadic coping subscales, Delegated DC by Oneself was less correlated with relationship assessment scale than the other subscales ($r = -.250$, $p < 0.1$). Moreover, the three composite scales and evaluation of dyadic coping were moderately correlated with relationship satisfaction.

Discussion

The effects of stress and coping processes on relationship quality and satisfaction, and psychological well-being of couples as well as the relationship between stress and coping processes and couple functioning have led clinicians and researchers pay special attention to this construct, and this in turn has increased the theoretical and experimental studies in these areas. Doing research on these fields requires a valid and reliable instrument with desirable research background, due to the fact that Bodenmann (2008) designed the Dyadic Coping Inventory (DCI) for assessing the construct of dyadic coping, which has the mentioned criteria, as a result it was needed to translate and to evaluate the psychometric properties and factor structure of the DCI for Iranian researchers and experts. Because of the absence of studies on the psychometric properties of the Iranian version of Bodenmann's Dyadic Coping Inventory, the purpose of this study was to investigate the factor structure, convergent validity, and the reliability of the Dyadic Coping Inventory (Bodenmann 2008) in an Iranian sample.

In an effort to find a structure that would have both self-perceptions and perceptions of the other for women and men, both the original four-factor model and the five-factor model were evaluated. Results of fit indices χ2 / df, GFI, CFI, IFI, RMSEA and TLI based on original four-factor model indicated that all of them were marginally acceptable for the four-factor model. In other words, in regard to self- and other perceptions, it was found that in our sample the original four-factor model had good fit in the total participants but for men and women had the acceptable level of fitness. This finding was consistent with Donato and colleagues' research (2009). In the next step, according to Bodenmann's theorization of supportive dyadic coping and the outcomes of Donato et al. (2009) and Vedes et al. (2013), the five-factor model (Including: stress communication, emotion-focused dyadic coping, problem-focused dyadic coping, delegated dyadic coping, and negative dyadic coping) were analyzed. Results of fit indices χ2 / df, GFI, CFI, IFI, RMSEA and TLI according to the pattern of the five-factor model in regard to self-perceptions and perceptions of the other indicated a very good fit in men, women, and the entire sample group. This finding was consistent with the results of Donato and colleagues' study (2009) and Vedes and colleagues' research (2013).

George and Mallery (2003) indicate that a Cronbach's coefficient alpha (α), a test of inter-items correlations, above .7 is considered acceptable, an above .8 is considered good, and an α above .9 is considered excellent. Results revealed that α = .84 for the DCI items. Also results of examining the internal consistency of DCI inventory indicated that the internal consistency was 0.85 for women participants and 0.83 for men participants; and for its subscales ranged from 0.64 to 0.81 by using Cronbach's alpha. These findings confirmed that the instrument had propitious internal consistency.

Table 3 Intercorrelations among the dyadic coping subscales

Variable Subscales	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1)Stress Communication by Oneself	1														
2)Stress Communication by Partner	.355**	1													
3)Emotion-Focused Supportive DC by Oneself	.334**	.391**	1												
4)Emotion-Focused Supportive DC by Partner	.213**	.338**	.317**	1											
5)Problem-Focused supportive DC by Oneself	.225**	.327**	.459**	.246**	1										
6)Problem-Focused supportive DC by Partner	.306**	.291**	.385**	.504**	.178**	1									
7)Delegated DC by Oneself	.260**	.338**	.341**	.317**	.449**	.295**	1								
8)Delegated DC by Partner	.299**	.360**	.269**	.413**	.165**	.409**	.137**	1							
9)Negative DC by Oneself	−.313**	−.318**	−.437**	−.359**	−.329**	−.355**	−.284**	−.222**	1						
10)Negative DC by Partner	−.330**	−.361**	−.407**	−.403**	−.326**	−.385**	−.272**	−.326**	−.311**	1					
Evaluation															
Evaluation of DC	.345**	.382**	.368**	.479**	.218**	.498**	.182**	.448**	−.423**	−.372**	1				
Composite scales															
DC total by oneself	.642**	.394**	.540**	.197**	.505**	.243**	.537**	.249**	−.305**	−.220**	.252**	1			
DC total by the partner	.356**	.639**	.362**	.673**	.211**	.624**	.253**	.543**	−.377**	−.342**	.486**	.380**	1		
Joint DC	.405**	.390**	.509**	.419**	.407**	.509**	.394**	.454**	−.331**	−.385**	.628**	.413**	.460**	1	
DC total	.589**	.627**	.606**	.595**	.464**	.611**	.472**	.554**	−.416**	−.466**	.666**	.751**	.831**	.750**	1

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

Table 4 Correlations of the dyadic coping scales with relationship satisfaction

	Stress communication by oneself	Stress communication by partner	Emotion-focused supportive DC by oneself	Emotion-focused supportive DC by partner	Problem-focused supportive DC by oneself	Problem-focused supportive DC by partner	Negative DC by oneself	Negative DC by partner	Delegated DC by oneself	Delegated DC by partner	Joint DC	DC total by oneself	DC total by the partner	Joint DC	Evaluation of DC
Relationship Satisfaction	.316	.321	.377	.413	.230	.429	−.250	−.0319	.172	.401	.432	.451	.519	.532	.552
sig	.001	.001	.001	.001	.001	.001	.001	.001	.01	.001	.001	.001	.001	.001	.001

Furthermore, the findings were consistent with Ledermann et al. (2010), Bodenmann et al. (2007a, b), Bodenmann 2008), Ozouni Davaji et al. (2012), Khojaste- mehr and colleagues (2013) and Mohammadi and colleagues (2014).

Further evaluation of the German, (n = 216) Italian (n = 378), and French (n = 198) translations indicated that there was favorable evidence of internal consistency for the overall scale (German α = .91; Italian α = .90; French α = .90) and the individual subscales (in the German version α ranged from .61 to .86, in the Italian .62 to .90, and .50 to .92 for the French version) (Bodenmann 2008; Ledermann et al. 2010).

To study the factor structure of the DCI, confirmatory factor analysis was performed. The reported values of Fit index values $\chi 2$/df, CFI, GFI, and RMSEA indicated that the three-factor model of the marital scales has good fit. This finding was consistent with the result of Donato and colleagues' study in an Italian sample (2009), Ledermann and colleagues' study Switzerland, Italy and France (2010), Vedes and colleagues' research in a Portuguese sample (2013), Levesque and colleagues' study on English couples (2014), Randall and colleagues' research in the U.S. (2015), Xu and colleagues' research on Chinese couples (Xu et al. 2016), and Rusu and colleagues' study in a Romanian sample (2016).

Another finding of this study showed that the DCI was moderately but acceptably correlated with relationship satisfaction scale. This finding was consistent with the results of. Falconier, Nussbeck, and Bodenmann 's research in Latin American immigrant sample (2012); Falconier and colleagues' study on European middle- class couples (2015),, García-López, Sarriá, Pozo, and Recio' s research in Spain (2016), Ruffieux, Nussbeck, and Bodenmann 's study on Swiss couples (2014), and Vedes and colleagues' research in Portugal Vedes et al. (2013)). In explaining this findings, it can be mention that couples require to deal effectively with the marital stresses in order to sustain the relationship and have relationship satisfaction (Bodenmann 2005) because dyadic coping has a great impact on relationship satisfaction among couples (Bodenmann 2008), so that dyadic coping has been considered as the most powerful predictor of relationship satisfaction (Falconier et al. 2015). Moreover, the finding increases criterion validity of DCI and supported the predictive validity of the DCI. In sum, the results of psychometric properties and validity of DCI indicated that the findings of the current study were in line with those of reported in the DCI Spanish validation study (Falconier et al. 2013), French, Italian, Spanish, Portuguese (Falconier et al. 2013; Ledermann et al. 2010; Vedes et al. 2013), Chinese (Xu et al. 2016) and Romanian (Rusu et al.,).

Conclusion

This study showed satisfactory reliability and factor structure for the Iranian version of the Dyadic Coping Inventory (DCI). The results revealed that the Dyadic Coping Inventory (DCI) is a valuable instrument for assessing one's own rating as well as the partner's rating which can be used in the field of couples and family research. Moreover, this measure is appropriate to conduct cross-cultural research between Western and Eastern cultures. And it can inspire more research on the impacts of stress on couples' coping behaviors in cross-cultural contexts.

Given the unique role of dyadic coping in intimate relationships and communication processes, it seems that achieving a better understanding of couple coping behaviors is of great importance, in particular, in research on marital relationships due to the capability of DCI to measure dyadic coping in couples. One of the most important implications for future research is that the Persian version of the DCI can be utilized to examine such stress-coping processes in Persian couples. Moreover, it can help clinicians acquire a new insight in therapeutic interventions and counseling sessions for Persian couples.

Limitations and Future Research

This study showed satisfactory reliability and factor structure for the Persian version of DCI. The current study was conducted in Iran thus using this scale in other Persian-speaking countries should be made with caution due to the differences in socioeconomic status between the sample of current study and those countries. Furthermore, the present study is limited by the lack of test–retest reliability. To reduce this limitation, future research should evaluate the test–retest reliability.

Compliance with Ethical Standards

Funding This study was not funded by a specific project grant.

Conflict of Interest All authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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