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Development and Validation of the Dyadic Coping Based Gratitude Questionnaire (DC-GQ)

*** Sultan Shujja, PhD**

University of Sargodha, Sargodha, Pakistan.

Guy Bodenmann, PhD

University of Zurich, Zurich, Switzerland.

Ashley K Randall, PhD

Arizona State University, United States of America

Adnan Adil, PhD

University of Sargodha, Sargodha, Pakistan.

Farah Malik, PhD

Institute of Applied Psychology, University of the Punjab, Lahore, Pakistan.

The present study aimed to assess interpersonal gratitude within the context of the Systemic Transactional Model (STM) which viewed stress and coping as a dyadic process. This model posited that the impacts of individuals' stress crossover to the partner causing him/her stress too. Both partners use various positive and negative coping strategies collectively called dyadic coping (DC). Based on the STM, a new form of gratitude i.e., Dyadic Coping Based Gratitude (DC-G) has been defined as an expression of gratitude on the part of the stressed partner in response to the problem-focused and emotion-focused positive DC behaviors of the non-stressed partner in the times of stress. To

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*Correspondence concerning this article should be addressed to Sultan Shujja, Ph.D., University of Sargodha, Sargodha, Pakistan. Email: sultanshujja@gmail.com, Guy Bodenmann, PhD, University of Zurich, Zurich, Switzerland, Ashley K Randall, PhD, Arizona State University, United States of America, Adnan Adil, PhD, University of Sargodha, Sargodha, Pakistan, Farah Malik, PhD, Institute of Applied Psychology, University of the Punjab, Lahore, Pakistan.

operationally define the DC-G, Dyadic Coping Based Gratitude Questionnaire (DC-GQ) has been developed that contains 12 items covering two subscales; emotion-focused DC-based gratitude (six items) and problem-focused DC-based gratitude (six items). For the empirical evaluation of DC-GQ, data were collected from the purposively drawn 600 Pakistani married adults (300 men & 300 women) with the men's age (M = 41.59, SD = 10.96) and women's age (M = 37.16, SD = 9.55) who had been in the marital relationship for at least two years. Results demonstrated the factor structure of the DC-GQ to be consistent with the theoretical framework of the STM and DC-GQ is a reliable and valid measure for use with Pakistani married adults. Implications of the study have been discussed within the cultural context of Pakistan.
Keywords: gratitude; dyadic coping; intimate relationship; Pakistan

Development and Validation of the Dyadic Coping Based Gratitude Questionnaire (DC-GQ)

Gratitude researchers in Pakistan have focused on the intrapersonal benefits of gratitude such as an individual's subjective well-being and psychological health (Hermaen & Bhutto, 2020; Khan et al., 2015; Ramzan & Rana, 2014), however, interpersonal advantages of gratitude were largely ignored. Western research on gratitude also seemingly over-emphasized intrapersonal outcomes such as relationship satisfaction (Vollmann et al., 2019), commitment (Joel et al., 2013), pro-social behavior (Bono et al. 2004; Mikulincer & Shaver, 2010) until Algoe (2012) redefined gratitude in the context of interpersonal relationships by proposing the *find-remind-and-bind* theory. This theory posits that expressed gratitude paves the way to finding a reliable, trustworthy, and caring partner, reminding oneself to have such a partner, and helping to bind with the partner and the relationship more closely. Studies conducted within the *find-remind-and-bind theory* framework affirm that individuals respond with greater responsiveness to the partners' help in terms of expressed gratitude and, in turn, their relationship with the partner and commitment to the relationship increase particularly in the situation where the partners' help is the most needed (Algoe et al., 2016; Algoe & Zhaoyang, 2016).

Situational factors such as stressful life events tend to increase the likelihood of gratitude expressed in the stressed partner in response to the received help from the non-stressed partner. For example, researchers argued that individuals who expressed gratitude on daily basis in response to their partners' help were likely to receive greater help from their non-stressed partners (Kindt et al., 2017). In general, gratitude significantly acts as a source of reducing stress within an intimate relationship (Cassidy et al., 2009; Feeney & Van Vleet, 2010). As such, the expression of gratitude may be an important aspect of the stress and coping processes between romantic partners. It seems that non-stressed partners' practical or emotional help may follow the expression of gratitude on the part of the recipient/stressed partner. Regarding this, no effort has been made to investigate gratitude in response to the partners' emotion-focused and problem-focused help and its subsequent outcomes. The present study aimed to investigate gratitude within the Systemic Transactional Model (STM; Bodenmann, 1997) and defined dyadic coping-based gratitude as an individual's expression of thankfulness towards the non-stressed partner in response to their practical or emotional help in times of stress.

Pakistan is a country with a collectivistic cultural orientation in which individuals have strong emotional bonds with their familial and non-familial members, prefer shared goals, and join hands to meet day-to-day social challenges such as daily life stress (Hermaen & Bhutto, 2020). Specifically, married couples in Pakistan show a higher level of interdependence on each other, and dyadic stress is handled not only the joint couple effort but also with plenty of social support from outside the intimate relationship (Qadir et al., 2013). Besides, Pakistan is predominantly a Muslim country where gratitude is practiced as a religious ritual. Muslims believe that paying gratitude to *Allah* for the uncountable blessings would bring goodness to their lives. Based on cultural and religious obligations, people try to exchange expressions of gratitude towards partners, family members, and society (Ali et al., 2020). Taken together, marriage in Pakistan is a legal contract between two opposite-sex partners that guides them to internalize societal norms

and religious obligations and practice gratitude for every act of kindness on the part of the partner to maintain an intimate relationship.

Systematic Transactional Model (STM; Bodenmann, 1997)

According to the systemic transactional model (STM; Bodenmann, 1997), intimate partners' experiences of stress and coping are interdependent. The stress-coping process begins with the communication of the stressful experience to the non-stressed partner who then appraises the intensity and nature of the stressor. Following this appraisal, the non-stressed partner can either respond positively or negatively depending on the situation, general and specific motivation, type of stress, and personal as well as dyadic resources.

The STM proposes three different types of positive DC: (1) emotion-focused supportive DC, (2) problem-focused supportive DC, and (3) delegated DC. Negative DC behaviors include humiliating and criticizing the partners for sharing stressful situations. Particularly, positive DC behaviors such as supportive DC (ensuring emotional presence to the partner [emotion focused] and providing practical help [problem focused] to the partner in times of stress) and delegated DC (taking partners' responsibilities on one's shoulder to help the stressed partner) positively associated with relationship satisfaction and quality (Berryhill et al., 2016; Falconier et al., 2015; Randall & Bodenmann, 2017). Positive dyadic coping (DC) behaviors aim to enhance stressed partners' resilience by supporting him/her in their coping efforts and contributing to the relationship satisfaction as well as both partners' well-being (Bodenmann, 1995, 1997; Hilpert et al., 2018), whereas negative DC behaviors (such as hostile, ambivalent or superficial DC) lead to demotivation in the stressed partner, deception and low self-esteem and reduced relationship satisfaction.

Integrating Gratitude into Stress and Coping Literature

Gratitude and STM-based literature share common features. For example, both constructs address the dyadic nature (Algoe, 2012; Bodenmann, 1997; 2005) and emphasize interdependence as a core

aspect of close relationship targeting to improve relationship functioning (Algoe et al., 2010; Gordon et al., 2011; Gordon et al., 2012; Rusu et al., 2020; Vollmann et al, 2019). Furthermore, both constructs are "activated" during times of distress; typically the DC process is activated during times of distress (Bodenmann, 1997; 2005) as is gratitude which is a consequence of experienced partners' support in times of special needs (Algoe, 2012),. Despite the similarities between both concepts, they have not been explicitly studied in conjunction so far. DC-based gratitude (DC-G) might be expressed as a reaction of appreciation and thankfulness in response to received problem-focused and emotion-focused positive DC behaviors by the partner. This form of gratitude (in addition to general gratitude in the context of close relationships by acknowledging mutual affection, shared time, and other benefits from living together) may contribute significantly to the current stress and coping literature in couples.

Existing Measures of Gratitude

General gratitude is commonly measured by the *Appreciation in Relationship Scale* (AIRS; Gordon et al., 2012), which is a 16-item measure designed to measure the levels of appreciation within an intimate relationship. This measure covers two components; being appreciative and feeling appreciated. In the first subscale, respondents rate the extent to which they appreciate their partners and in the second subscale, respondents rate the extent to which they feel appreciated by their partners. Sample items *My partner often expresses her/his thanks when I do something nice, even if it's really small* and *I often tell my partner how much I appreciate her/him*. Another popular gratitude measure is the Gratitude Questionnaire (GQ-6; McCullough et al., 2002), designed to assess an individual's level of gratitude. This is a single-factor-scale with 6 items and is widely used in gratitude-related research studies (e.g., Leong et al., 2020; Unanue et al., 2019; Vollmann et al., 2019; Yildirim & Alanazi, 2018).

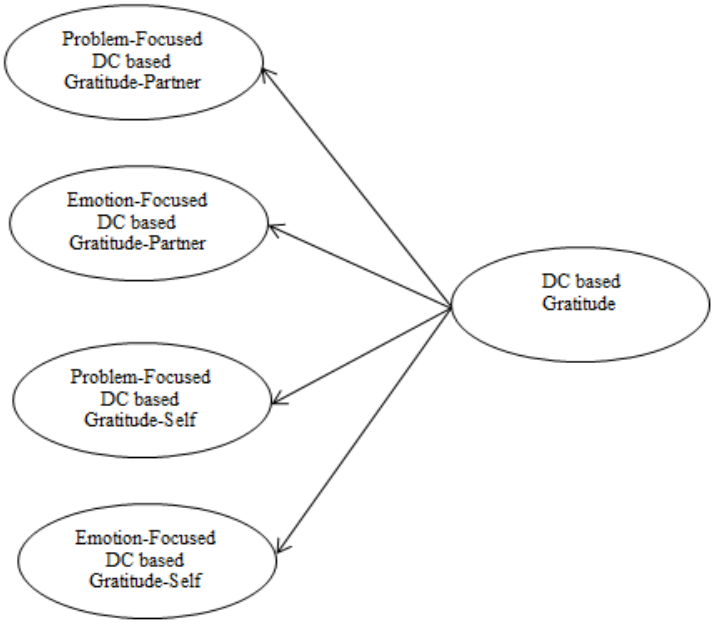
Importantly, the currently available instruments (e.g., Gratitude Questionnaire, McCullough et al., 2002) measure general gratitude at an individual level and have predominantly been developed within

American culture. Pakistan is culturally and religiously different from American and European countries with demographically a different population and the current study aimed at the special focus of measuring DC-G. We are primarily including married adults in Pakistan to measure DC-G because the interaction between partners, family members, and non-familial adults is guided by religious thoughts and our religion stresses the exchange of gratitude expressions rigorously (Ali et al., 2020). Religious bases for laying the foundations of DC-G tend to strengthen its potential role in stress and coping within the interpersonal relationship.

Given the importance of gratitude in sustaining an intimate relationship (Algoe, 2012; Algoe et al., 2016; Algoe & Zhaoyang, 2016; Gordon et al., 2011; Leong et al., 2020; Visserman et al., 2018), and DC-based gratitude within STM perspective, gratitude-based literature supports that gratitude acts as a protective factor against relationship adversities, stress, and conflicts within close relationships (see Cassidy et al., 2009; Feeney & Van Vleet, 2010). Gratitude operates at the dyadic level (Algoe, 2012) as does DC within the close relationship (e.g., Lau et al., 2019).

The aims of this study were two-fold. First, following the theoretical underpinnings of STM, we developed the DC-based Gratitude Questionnaire (DC-GQ). Second, we tested the proposed factor structure and psychometric properties of the scale for use with Pakistani married adults. Based on existing literature, we hypothesized that the data would support the STM-based proposed factorial structure of the DC-GQ (see Figure 1) and DC-GQ would be positively and significantly correlated with the supportive and delegated DC subscales and non-significantly correlated with the negative DC subscale of the DCI-Urdu (Shujja et al., 2020), yielding evidence for the convergent and discriminant validity for the DC-GQ, respectively. Additionally, the present study tested for measurement invariance across genders to examine whether DC-GQ would differ as a function of gender for Pakistani individuals.

Figure 1
Hypothetical Model of DC-GQ



Method

Development of DC-based Gratitude Questionnaire (DC-GQ)

To operationally define DC-based gratitude, we followed the structure of the DCI (Bodenmann, 2008) wherein perceptions of self and partner behavior are assessed. Based on the review of the DCI, we initially generated 20 items. Ten of these items reflected perceptions of self-behavior, and 10 items reflected perceptions of partner behavior. As a next step, two researchers working within the STM framework independently reviewed the items assessing conceptual integrity with the STM.

Following the review of the initial 20 items, eight items were removed due to a conceptual overlap i.e., "*I am thankful to my partner for providing practical help and advice during times when I am feeling stressed"* and *"I am thankful to my partner for practically being with me in times when I am stressed*". Final DC-GQ contains 12 items with two

subscales (problem-focused DC-G and emotion-focused DC-G) for the partner and the same two subscales for the self (see Appendix A).

Recruiting Participants and Procedure

Participants were purposively recruited by going door-to-door from October 2020 – December 2020 (the time during which the government relaxed the lockdown due to < 3% spread of COVID-19 in Pakistan) with the help of 4 research assistants from the lowest COVID-19 affected four districts of Punjab, Pakistan (Bhakkar, Khushab, Mianwali, Sargodha). It was difficult to recruit participants from other districts of Punjab owing to the lockdown. Participants, who were married to their current partner for at least two years were eligible to participate. The restriction of two years was placed to avoid the *honeymoon effect,* which predicts relationship functioning within two years of marital life (Lorber et al., 2015).

The sample size was determined through an online power tool developed by Preacher and Coffman (2006). This power tool has been specifically designed for the computation of the sample size/power in confirmatory factor analysis/structured equation modeling. For an alpha level of .001 and a power of .95, the appropriate sample size was 500 with a *df* of 114 for testing the null RMSEA of 0.00 against the alternate RMSEA = .04. To be more cautious, a sample of 600 participants (n = 300 men and n = 300 women) was purposively recruited in the present study. The men's age ranged from 20-79 years (M = 41.59, SD = 10.96) and women's age ranged from 20-65 years (M = 37.16, SD = 9.55) including 51% (n = 153) men from urban area compared to 50% (n = 150) women and 49% (n = 147) men from the countryside compared 50% (n = 150) women. A majority of men (77%; n = 231) and women (76%; n = 228) reported being in arranged marriages. Additionally, majority of men (57.8%; n = 174) and women (66.7%; (n = 200) completed formal education up to 8th grade whereas 11.7% (n = 35) men compared to 16.7% (n = 50) women completed formal education up to graduation level.

Interested and eligible participants were first given a written informed consent containing information about the purpose and nature of

the study, rights of the participants regarding withdrawal from the study, legal and ethical concerns about confidentiality and privacy, and potential risks. Following the paper-pencil survey method, self-report measures (see Measures section) were administered and each participant took on average 25 minutes to fill out the survey questionnaire along with the demographic form. Research assistants, who willingly helped us in data collection, were given extra credit in their BS research projects, and free online psychological health-related consultancy was offered to the research participants instead of providing them monetary compensation.

Measures

Dyadic Coping-based Gratitude Questionnaire (DC-GQ). The DC-GQ is a 12-items self-report measure designed to measure DC-based gratitude. Participants respond to the 12 items using the following scale *never* (1) to *very often* (5). It comprised six statements for assessing participants' perception of their partners' expression of gratitude upon providing practical solutions (three items for problem-focused DC-based gratitude) and emotional support (three items for emotion-focused DC-based gratitude) that collectively constitute partners' expression of gratitude upon receiving practical or emotional help from the other partner (DC-G_Partner). Similarly, six statements represented respondents' expression of gratitude towards their partners upon receiving practical help (three items for problem-focused DC-based gratitude) and emotional support (three items for emotion-focused DC-based gratitude) that collectively constitute respondents' expression of DC-based gratitude towards the partner upon receiving practical or emotional help (DC-G_Self). Participants' responses are mean scored, wherein higher averages reflect a higher level of gratitude and vice versa.

Dyadic Coping Inventory (DCI-Urdu; Shujja et al., 2020, translation of DCI by Bodenmann, 2008)**.** The supportive DC and negative DC subscales of the DCI-Urdu have been used to assess convergent and discriminant validity of the DC-GQ respectively. The DCI-Urdu is a 33-item measure that is used to assess stress communication and individual DC behavior exhibited by individuals

and their partners. It measures positive DC (supportive DC; delegated DC) and negative DC along with common DC and the response format ranged from *very rare* (1) to *very often* (5). Sample items are "I let my partner know that I appreciate his/her practical support, advice, or help" *(stress communication-self);* "My partner lets me know that he/she appreciates my practical support, advice, or help" *(stress communication-partner);* "I show empathy and understanding to my partner" *(emotion-focused supportive DC-self)*; "My partner shows empathy and understanding to me" *(emotion-focused supportive DC-partner)*; "I tell my partner that his/her stress is not that bad and help him/her to see the situation in a different light." *(problem-focused supportive DC-self)*; "My partner helps me to see stressful situations in a different light" *(problem-focused supportive DC-partner)*; "I take on things that my partner would normally do in order to help him/her out" *(delegated DC-self)*; "My partner takes on things that I normally do in order to help me out" *(delegated DC-partner)*; "I blame my partner for not coping well enough with stress" *(negative DC-self)*; "My partner blames me for not coping well enough with stress" *(negative DC-partner)*; "We are affectionate to each other, make love and try that way to cope with stress" *(emotion-focused common DC)*; "We try to cope with the problem together and search for ascertained solutions" *(problem-focused common DC).*

Results

Before the statistical analysis for psychometric properties of the DC-GQ, the data were analyzed for missing values and no missing values were found. Further, descriptive statistics i.e., mean, standard deviation reliability estimates, and gender differences in the study variables were assessed to see the initial picture of the data set. To test the data normalcy, skewness and kurtosis were computed.

Table 1

Gender-wise Mean Differences and Alpha Coefficients for DC-GQ, DCI for Partners, and Self

Source	Men	Women						
	M(SD)	*M(SD)*	*t(598)*	*P*	Skewness	Kurtosis	α_{Men}	α_{Women}
Problem-focused DC-G_partner	3.37(1.02)	3.35(.97)	1.53	.12	-.20	-.62	.76	.73
Emotion-focused DC-G_partner	3.33(1.01)	3.36(1.03)	1.01	.31	-.34	-.49	.78	.76
Problem-focused DC-G_self	3.32(.98)	3.20(1.0)	.25	.79	-.27	-.60	.74	.76
Emotion-focused DC-G_self	3.33(1.04)	3.25(1.04)	-.35	.72	-.40	-.50	.80	.75
DC-G_partner	3.33(.94)	3.22(.95)	1.36	.17	-.29	-.42	.85	.85
DC-G_self	3.35(.95)	3.35(.93)	-.05	.95	-.33	-.36	.86	.85
Overall DC-G	3.34(.87)	3.29(.86)	.71	.47	-.20	-.35	.90	.92
Positive DC_partner	3.07(.73)	3.04(.79)	.41	.68	-.09	-.56	.83	.84
Positive DC_self	3.22(.70)	3.11(.73)	1.81	.07	-.06	-.60	.79	.81
Negative DC_partner	3.69(.91)	3.73(.95)	.44	.65	-.49	-.47	.71	.70
Negative DC_self	3.73(.95)	3.74(.95)	-.04	.96	-.29	-1.01	.72	.70
Common DC	3.33(.86)	3.37(.82)	-.59	.55	-.25	-.48	.78	.76
DC_partner	3.27(.54)	3.24(.55)	.62	.53	.28	-.02	.70	.71
DC_self	3.38(.56)	3.30(.53)	1.62	.10	.65	.11	.71	.70
Overall DC	3.32(.	3.29(.5	.84	.4	.49	.20	.87	.85

			52)	1)		0	

Note. DC = Dyadic Coping; DC-G = dyadic coping based gratitude

Table 1 indicated that data were normally distributed as values of skewness and kurtosis for DC-GQ, and DCI-Urdu, and the subscales were within an acceptable range (-1 to +1). Further, mean differences in overall DC-GQ, DCI-Urdu, and the subscales remained non-significant suggesting that both men and women operate similarly in exhibiting DC behaviors and DC-based gratitude for their partners' reaction to the stress (self) and partners' expression of gratitude upon reception of the practical or emotional help (partner). The reliability estimates reflected consistency among scores on the overall DC-GQ, DCI, and the subscales as all the alpha coefficients for men (.70-.90) and women (.70-.92) were within the acceptable range.

To substantiate the association between overall DC-GQ and its subscales, we examined the correlations among study variables for men and women separately.

Table 2

Gender-wise Intercorrelations among DC-GQ Sub-scales for the Partner and the Self

Variables	*1*	*2*	*3*	*4*	*5*	*6*	*7*
1. Problem-focused DC-G_partner	-	.72*	.57*	.53*	.92*	.59*	.82*
2. Emotion-focused DC-G_partner	.72*	-	.62*	.65*	.93*	.68*	.88*
3. Problem-focused DC-G_self	.55*	.57*	-	.73*	.64*	.93*	.86*
4. Emotion-focused DC-G_self	.55*	.64*	.73*	-	.63*	.93*	.85*
5.DC-G_Partner	.92*	.93*	.60*	.64*	-	.69*	.92*
6. DC-G_Self	.59*	.65*	.92*	.93*	.67*	-	.92*
7. Overall DC-G	.83*	.87*	.84*	.86*	.91*	.91*	-

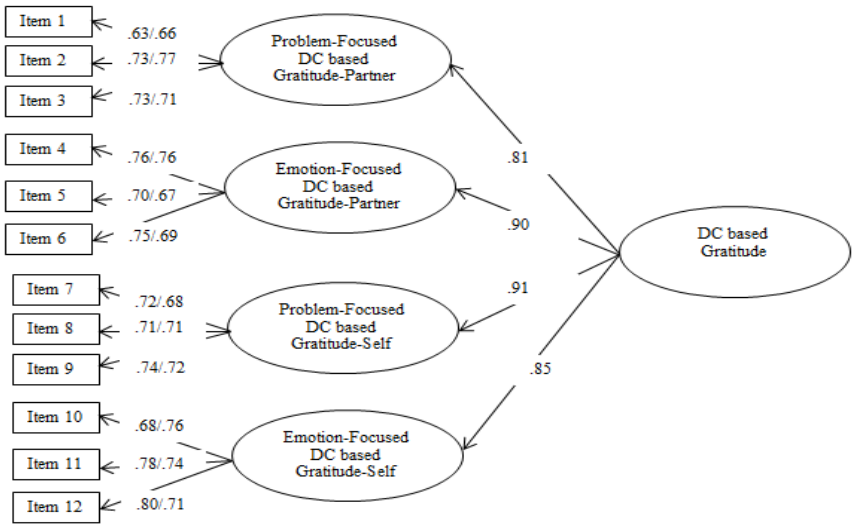
Note. Correlation coefficients above the diagonal pertain to the men and below the women pertain to women. DC-G = dyadic coping-based gratitude
* p<.001.

Inter-correlations indicated that all the subscales were positively correlated (see Table 2). It implies that sub-constructs of the DC-GQ co-varied with each other and the overall DC-GQ showed a common variance.

Factor Structure

To test the proposed measurement model for DC-GQ (see Figure 1), we used confirmatory factor analysis (CFA) and the usual model fit indices i.e., comparative fit index (CFI > .95), the root mean square error of approximation (RMSEA < .06), the standardized root mean square residual (SRMR< .08), and the chi-square (χ^2) test of exact fit (Hu & Bentler 1998; Kline 2013; Schermelleh-Engel et al. 2003). For testing the specified measurement model, CFA is an effective statistical analysis assessing the extent to which specified items are consistently loaded on a particular factor (Gallagher & Brown, 2013).

Figure 2
Factor Structure of the DC-GQ



Note. The values in the numerator pertain to the men and the values in the denominator pertain to the women. Model fit indices are χ^2 /df = 2.96, GFI = .95, CFI = .96, SRMR = .05, RMSEA= .057

The model fit indices indicated that data supported the measurement model well and factor loadings for both men and women ranged between medium to high loadings according to the criterion set for the factor loadings in CFA i.e., *r* = .3 (low); *r* = .5 (medium); *r* = .7 (high) (Shevlin & Miles, 1998). Confirmatory factor analysis reported factor loadings within acceptable range for men (λ = .63 – λ = .80), and women (λ = .67 – λ = .76) suggesting that items (observed variables) strongly correlate with the latent factors specified within measurement model. The model fit indices endorsed the best fit of the data to the model as the fit indices met the criteria (CFI ≥ .95; GFI > .90; RMSEA ≤ .06; SRMR < .08; TLI > .90) reported by Hu and Bentler (1998).

Construct Validity

To test the convergent and discriminant validity of DC-GQ, the supportive DC subscale and negative DC subscale from the DCI-Urdu (Shujja et al., 2020) were used respectively.

Table 3

Correlation Coefficients showing Convergent and Discriminant Validity for the DC-GQ

			Gratitude-based Dyadic Coping Questionnaire (DC-GQ)			
			Problem-focused DC-G		Emotion-focused DC-G	
			Partner	*Self*	*Partner*	*Self*
Dyadic Coping Inventory	Problem-focused Supportive DC	*Partner*	.36** (.39**)	.38**(.25*)	.41**(.41**)	.40**(.33**)
		Self	.36**(.32**)	.33**(.20*)	.45**(.25*)	.33**(.25*)
	Emotion-focused Supportive DC	*Partner*	.33**(.32**)	.24* (.21*)	.41**(.35**)	.22* (.20*)
		Self	.21*(.41**)	.40**(.36**)	.50**(.43**)	.38**(.21*)

Negative DC	*Partner*	.009(-.33)	.10(.11)	-.03(-.12)	.16(.07)
	Self	.04 (-.24)	.10(.11)	.09(-.02)	.15(.07)

Note. The correlation coefficients within the parentheses pertain to women. DC = dyadic coping; DC-G = dyadic coping based gratitude
* $p < .01$, ** $p < .001$.

Results showed a significant positive association between DC-GQ and supportive DC subscales of DCI-Urdu (Shujja et al., 2020). It suggested that respondents' increased perception of supportive DC was associated with an increased perception of DC-based gratitude. This common variance indicated co-variation of the two constructs in the same (increase/decrease) direction and the data fit in the definition of convergent validity i.e., the extent to which different measures of the same construct (positive DC in this case) converge or strongly correlate with one another (Engellant et al., 2016).

Contrarily, the subscales of DC-GQ did not significantly correlate with the negative DC subscale of the DCI-Urdu (Shujja et al., 2020) suggesting that negative DC did not reduce DC-GQ but was uncorrelated. This could mean that one appreciates being supported and reacts with gratitude; however, experiencing negative DC does not systematically lead to less gratitude. The data provided strong support for the definition of discriminant validity i.e., the extent to which measures of different constructs diverge or minimally correlate with each other (Engellant et al., 2016).

Measurement Invariance across Gender

In a recent validation study of DCI-Urdu (Shujja et al., 2020), the measurement model for DCI-Urdu was found to be equally applicable for men and women in Pakistan. As the measurement model for DC-GQ was derived from STM-based DCI factor structure (Bodenmann, 2008), measurement invariance (MI) across gender was conducted to ensure whether the measurement model for DC-GQ was equally fit for men and women in Pakistan. To assess variance in the factor structure of DC-GQ

between men and women, configural invariance, metric invariance, and scalar invariance were examined.

Table 4
Gender-wise Measurement Invariance on the DC-GQ (N = 600)

Model	χ^2	*Df*	CFI	RMSEA	Model Comparison	$\Delta\chi^2$	Δdf	ΔCFI	ΔRMSEA
1. M1	270.54	91	.95	.057					
2. M2	279.73	102	.95	.054	2 vs. 1	9.19	11	.000	.003
3. M3	290.69	114	.95	.051	3 vs. 1	20.15	23	.000	.003

Note. M1 = invariant form model (configural invariance); M2 = invariant loading model (metric invariance); M3 = invariant intercept model (scalar invariance).

Chen (2007) defined *configural invariance* test as a baseline model that confirms the similarity of the conceptual framework across men and women, *metric invariance* of a scale as two groups have similar responses on the indicators of the scale, and *scalar invariance* as the most stringent invariance test that indicates that the measurement model has the same scale scores across men and women.

For the configural invariance, the factor structure of the DC-GQ was kept constant for men and women, and freely estimated factor loadings, residuals, and intercepts across men and women. Results revealed that the data fit both genders well supporting the configural invariance in DC-GQ across men and women (CFI = .95, RMSEA = .057). Further, we constrained the factor loading of the indicators of the DC-GQ to be equal across gender for assessing the metric invariance. Findings indicated that the data again fit the model well (CFI = .95; RMSEA = .054), suggesting the evidence for metric invariance in DC-

GQ across men and women. Moreover, the comparison between the metric invariance model and configural invariance model indicated the chi-square difference tests to be non-significant ($\Delta\chi^2$ (11) = 9.19, p >.05)· Finally, for the assessment of the scalar invariance, we constrained the intercepts and the factor loadings to be equal across gender. This scalar invariance model also demonstrated an excellent fit to the data. Moreover, the comparison of the scalar invariance model with the configural invariance model indicated a non-significant chi-square difference test ($\Delta\chi2$ (23) = 20.15, p > .05) with no differences in CFI and RMSEA values. The full scalar invariance of DC-GQ across men and women suggested the men and women's scores on the DC-GQ to be invariant. All changes in the CFI and RMSEA for the scalar invariant models were below the critical value of chi-square suggesting the full scalar invariance across men and women for all three models (see Table 4).

Discussion

The current study adds to previous studies on individual stress psychology (Lazarus, 1985) and particularly within the dyadic stress and coping paradigm (STM; Bodenmann, 1997). Despite the dyadic orientation of gratitude elaborated by the *find-remind-and-bind* theory (Algoe, 2012), gratitude has not been linked to DC so far, which has been done in this study where DC-based gratitude is investigated as a reaction of received DC. We organized this manuscript on the following lines a) construing DC-based gratitude as a positive state expressed by the recipient in response to the partners' DC behaviors in times of stress and b) establishing empirical evidence for the theoretical underpinnings of DC-based gratitude. The existing literature supports the positive impact of general gratitude within close relationships (see Cassidy et al., 2009; Feeney & Van Vleet, 2010), however, the way gratitude operates in response to the partners' DC behaviors in times of stress was studied for the first time in this study within close relationships.

The theoretical relevance of DC-based gratitude within STM leads us to specify problem-focused and emotion-focused dimensions in correspondence to the DCI: a) problem-focused/emotion-focused are

evidence-based and frequently-used dimensions of coping within the stress and coping research (for review Bodenmann, 1997; Ogden, 2012; Tennen et al., 2000); b) the STM used problem-focused and emotion-focused dimensions of coping to conceptualize positive DC strategies (supportive DC and common DC; Bodenmann, 1997).

The current study provides empirical support for the factor structure of the DC-GQ showing that stressed partners express gratitude in response to the practical or emotional support from the non-stressed partner in times of stress. The existence of DC-based gratitude tends to be beneficial in reducing dyadic stress by strengthening the partners' positive DC behaviors. The data provide support for the convergent and discriminant validity (see Table 3) suggesting that the factor structure of the DC-GQ adheres to the theoretical ground on which it is based (Bodenmann, 1997).

Conclusion

In summary, DC-based gratitude has been empirically supported as a new form of gratitude following the integration of the theoretical framework of STM and research on dyadic gratitude. This manuscript opens up a new discussion within the stress and coping paradigm that DC-based gratitude may have an additive effect along with the positive DC behaviors or may work as a mechanism in strengthening the effect of positive DC behaviors. To operationally define DC-based gratitude, a 12-item self-report measure (DC-GQ) has been developed for assessing a stressed partner's gratitude towards a non-stressed partner for the problem-focused and emotion-focused help in times of stress. It covers respondents' expression of gratitude towards their partner for providing practical and emotional help in times of stress (self) and partners' expression of gratitude towards respondent for the practical and emotional help in times of stress (partner). It is a reliable and valid measure for use in Pakistan.

Limitations and Suggestions of the Present Study

This study has some limitations. The empirical evidence for the factor structure of the DC-GQ was based on the data collected from

married Pakistani adults who had been in a marital relationship for at least two years, whereas the interdependent data from the couples might vary as a function of couples' interaction (see Iida et al., 2018). Thus, the data of the current study limit the external validity of the DC-GQ. Although the data supported the measurement model for DC-GQ, the data from diverse samples such as dating couples, engaged couples, and co-hebetating couples would add to the understanding of the functioning of DC-based gratitude. Initially, we used DCI-Urdu (Shujja et al., 2020) for establishing the convergent and discriminant validity of the DC-GQ, however, additional measures could be used to enhance the internal validity of the DC-GQ. Further, a cross-sectional dataset did not allow us to estimate test-retest reliability, and predictive validity which restricted us to establish the temporal validity of the DC-GQ.

Directions for the Future Research

Future research should prospect the DC-based gratitude across four dimensions. First, researchers may incorporate cultural and religious variations in the expression of DC-based gratitude within the STM framework. The role of culture has been highlighted as a contextual factor in shaping the way couples communicate the stress to each other and the way they prefer some of the DC behaviors beyond others (Falconier et al., 2016b). Second, to enhance the external validity of DC-GQ, a multi-sample, multi-method approach may be used e.g., collecting evidence for the DC-based gratitude in newlywed couples, dating couples, co-habituating couples, same-sex couples, engaged couples using a longitudinal design, experimental methods, case study method, or qualitative method. Third, researchers may extend the validation of the DC-GQ across the cultures to enhance the implications of DC-based gratitude. Fourth, DC-based gratitude-based intervention may be devised within the clinical setting. Previously, brief gratitude-based interventions have been effectively used to maintain and enhance relationship satisfaction (see Kanter & Schramm, 2018). However, couple counselors and clinicians can devise interventions based on DC-based gratitude within the STM framework like the Couples Coping Enhancement Training Program (CCET; Bodenmann & Shantinath, 2004).

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Appendix X

Items of Dyadic Coping Based Gratitude Questionnaire (DC-GQ)

	Items
	DC-G_Partner
	Problem-focused DC-G
1	My partner expresses gratitude for my practical help and advice in times when he/she has been feeling stressed.
2	My partner shows gratitude towards me, by telling me, writing me a note, or giving me a gift when I have instrumentally supported him/her when he/she has been stressed.
3	My partner tells me that he/she values my practical guidance and advice when he/she has been stressed.
	Emotion-focused DC-G
4	My partner expresses gratitude for my emotional support (e.g., listening, empathy, understanding, and helping to regulate his /her emotions) during times when he/she has been stressed.
5	My partner expresses gratitude towards me by telling me, writing me a note, or by giving me a gift for my emotional presence in times when he/she has been stressed.
6	My partner tells me that he/she values my emotional assistance (empathy, understanding, listening) when he/she has been stressed.
	DC-G_Self
	Problem-focused DC-G
7	I express gratitude to my partner for practical help and advice in times when I have been feeling stressed.
8	I show gratitude towards my partner, by telling him/her, writing him/her a note, or giving him/her a gift when he/she has instrumentally supported me when I have been stressed.
9	I tell my partner that I value his/her practical guidance and advice when I have been stressed.
	Emotion-focused DC-G
10	I express gratitude towards my partner for his/her emotional support (e.g., listening, empathy, understanding, helping in regulating my emotions) during times when I have been stressed.

11 I express gratitude towards my partner by telling him/her, writing him/her a note, or by giving him/her a gift for his/her emotional presence in times when I have been stressed.
12 I tell my partner that I value his/her emotional assistance (empathy, understanding, listening) when I have been stressed.