



Co-rumination and Depression in Women: Psychometric Properties of the Co-Rumination Questionnaire (CRQ)

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Co-rumination is characterized by rehashing the problem or parts of the problem, speculating about the causes and consequences of the problem, focusing on negative affect that results from the problem, and mutual encouragement of problem talk. Co-rumination has been shown to be more common and impactful in female friendships' as compared to males'. The purpose of the present study was to investigate the psychometric properties of the Co-rumination questionnaire in women. In a correlational design, 119 women who referred to health care centers of Mashhad city were selected with the convenience sampling. Data were collected by Co-Rumination Questionnaire (CRQ), and Depression, Anxiety and Stress Scale (DASS 21). Confirmatory factor analysis, convergent validity and internal compatibility with SPSS.25 and SmartPLS.3.3.0 software were evaluated. The results showed that the questionnaire has three factors. This structure has a good fit. Cronbach's alpha coefficients ranged from 0.86 to 0.95 and Spearman-Brown's split-half coefficients ranged from 0.90 to 0.95, indicating good reliability of the questionnaire. Co-rumination had a positive and significant relationship with depression and could predict it. It seems that the Co-Rumination Questionnaire has proper validity and reliability and can be used by researchers to predict depression in women.

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Introduction

Self-disclosure or talking about thoughts and feelings is one of the important elements that improves the quality of dyadic relationships (Tsay-Vogel, Shanahan & Signorielli, 2018). Self-disclosure leads to a high-quality dyadic relationship, cooperation, and helping each other in solving problems. It seems that this dyadic relationship and emotional dependency can result in emotional problems; due to excessive rumination and negative companionship (Rose, 2002). According to the literature, there is a positive relationship between rumination and depression (Constantin, English & Mazmanian, 2018; Chen, Pu, Shi & Zhou, 2020) and stress (Kaiseler, Poolton, Backhouse & Stanger, 2017; Du, Huang, An & Xu, 2018).

Rose (2002) asserted that while co-rumination is conceptualized as the overlap between self-disclosure and rumination, it is a distinct construct. Co-rumination refers to the extensive discussion and speculation about problems that occurs in dyadic relationships, and some of its main features are frequent dialogue, thinking about problems, and focusing on negative emotions (Davidson et al., 2014; Spindelov, Simonds & Avery, 2017). Contrary to rumination, co-rumination has a social aspect. Due to focusing on negative emotions, co-rumination is maladaptive, compared to self-disclosure (Rose, 2002). Studies demonstrated that co-rumination has a positive correlation with rumination (Balsamo, Carlucci, Sergi & Saggino, 2016; Fan, Chu, Wang & Zhou, 2016; Griffiths, 2017), self-disclosure (Rose, 2002), loneliness (Guarneri-White, 2017), anxiety (Balsamo et al., 2016; Fan et al., 2016; Griffiths, 2017), stress (Fan et al., 2016), worry and lack of self-confidence (Davidson et al., 2014), and depression (Davidson et al., 2014; Kroemeke & Gruszczyńska, 2014; Balsamo, Carlucci, Sergi, Murdock & Saggino, 2015; Criss, Houlberg, Cui, Bosler, Morris & Silk, 2016; Miller, Borowski & Zeman, 2020; Bastin, Luyckx, Raes & Bijttebier, 2021). Bastin et al.,

(2021) argued that although relationships between co-rumination and depressive symptoms have often been found, but little research attention has been given to mechanisms underlying this association. They showed that the interpersonal and intrapersonal affect-regulation styles predicting depressive symptoms and suggests that passive and catastrophic problem talk with same-sex friends may get internalized into maladaptive and repetitive thinking patterns. Also, Miller et al., (2020) in their study highlight the potentially adaptive nature of emotional competencies that may ameliorate the negative sequelae of co-rumination as people are afforded the opportunity to discuss problems, better understand their emotions, skills that are then associated with fewer depressive symptoms over time. Accordingly, the relationship between co-rumination and depression seems to be influenced by other variables.

Gender seem to be one of the variables affecting co-rumination. According to previous studies (Rose, Carlson & Waller, 2007; Parr, 2015; Harrington, 2020; Miller et al., 2020), there is a significant difference between men and women in this regard with a higher score observed in women. But Battaglini, Rnic, Tracy, Jopling and LeMoult (2021) examined whether gender moderated the amount of time spent co-ruminating in each modality. They showed that gender did not moderate time spent co-ruminating in person, or over the phone. However, their results indicated that females co-ruminated significantly more than males over text and social media. There seem to be some conflicting results are obtained regarding gender. Rose (2002) indicated that co-rumination is more evident in girls' than boys' friendships and increases with age. Davidson et al., (2014) affirmed that while co-rumination can be more observed in the adolescents, it exists at all ages and is associated with emotional outcomes in individuals. But some studies showed that no associations

between co-rumination with age (Ames-Sikora, Donohue & Tully, 2017).

Rose (2002) designed and developed the Co-rumination Questionnaire (CRQ) for the first time, and applying it on a population of third to ninth-grade students in the United States. This questionnaire had 27-item and was exploited to evaluate and compare the co-rumination of students with their same-gender peers. It should be noted that the items were extracted from the interviews with undergraduate students. In general, nine components are evaluated in this questionnaire, including the frequency of problem discussion, the tendency to talk about problems rather than doing other activities, encouraging friends to discuss problems, being encouraged by friends to discuss problems, the tendency to repeatedly revisit the same problems, the debate about potential causes of problems, estimating the consequences of problems, conjecture about aspects of the problem that are not understood, and the heightened focus on negative emotions. Rose (2002) used exploratory factor analysis and obtained a one-factor structure, Cronbach's alpha of which was estimated at 0.96. In that research, there was a significant and positive relationship between co-rumination with rumination, self-disclosure and self-report of dyadic relationships with friends. The CRQ has been used in other studies; and its Cronbach's alpha has been reported at the range of 0.87-0.97 (Rose et al., 2007; Kroemeke & Gruszczyńska, 2014; Ames-Sikora et al., 2017).

The validity of the questionnaire has been evaluated in other studies as well, resulting in the introduction of different versions of the questionnaire. In this regard, Calmes and Roberts (2008) produced a 16-item scale consisting of two factors, respondent problems and friend problems, based on the original version (Rose, 2002) and reported proper reliability for the scale. This form has been used in other studies, as well (Ames-Sikora et al., 2017). By applying the factor analysis, Hankin, Stone and Wright (2010) prepared a nine-item questionnaire with a one-

factor structure and proper reliability. This form was later exploited by other researchers (Stone, Hankin, Gibb & Abela, 2011). Criss et al., (2016) only used the subscale of reconstruction on a research population consisting of adolescents. In a research and with the goal of evaluating the factor structure, Davidson et al. (2014) implemented a 27-item form of co-rumination questionnaire on university students over three studies, assessing its exploratory, confirmatory, and convergent validity. After the analysis of the main factors, it was concluded that the questionnaire encompassed three factors, including rehashing, mulling, and encouraging problem talk. The confirmatory factor validity was also evaluated, and the results were indicative of fit of the three-factor model and lack of fit of the one-factor structure. It is notable that the validity and reliability of this form have been confirmed in other studies (Parr, 2015; Balsamo et al., 2016; Fan et al., 2016).

Review of research background revealed that the CRQ has not been used on Iranian women and factor structure is not examined. Aghebati, Joekar, Alimoradi and Ataie (2020), used 16-items version of this questionnaire in two versions include Participant's problems and Friend's problem. They showed that co-rumination has a positive correlation with depression symptoms and rumination response style. They indicated that CRQ had acceptable internal consistency reliability. So it seems that, there is no tool to measure Co-rumination in Iranian women. Due to the importance of Co-rumination, the current study aimed at examining the factor structure, convergent validity and reliability and of the CRQ in women.

Methodology

The current cross-sectional and psychometric study was conducted on individuals who referred to the healthcare centers of Mashhad. Five healthcare centers of Mashhad were selected randomly and the questionnaires were distributed among 120 women during a three-week period. Inclusion criteria included personal satisfaction of individuals and being literate (elementary level). Interviewers were

two individuals with M.Sc. in clinical psychology, who received the necessary educations in one session prior to the study. It is noteworthy that participation in the research was voluntary and the questionnaires were filled anonymously. All investigated individuals were informed about the aim of the study and about participation being voluntary. Informed consent was obtained from all participants who took part in the study. In filling the forms, the subjects had to consider one of their close friends and answer the items based on their relationship with the person. In addition, the participants were ensured of the confidentiality terms regarding their personal information.

Data were collected by means of the following scales:

Co-rumination questionnaire (CRQ): The main tool was the 26-item co-rumination questionnaire (Rose, 2002). Each item is rated on a 5-point Likert scale ranging from 1 (not at all) to 5 (really true). Three subscales of rehashing, mulling, and encouraging problem talk and a total score can be estimated by this questionnaire. The reliability and validity of the questionnaire were evaluated and confirmed in various studies (Davidson et al., 2014). In this research, we examined co-rumination in relation to friends.

To prepare the research tool, it was translated into Persian by a clinical psychologist fluent in English after obtaining permission from the developers. Following that, the questionnaire is translated into English by a psychiatric student using the back-translation technique. In the end, both forms were compared and adapted by a psychiatrist who is a faculty member. The Persian version is provided in the appendix.

Depression, anxiety, and stress scale (DASS-21): In order to evaluate the convergent validity, DASS-21 was applied, originally created by Lovibond and Lovibond (1995) and containing 21 items with every seven items allocated to a subscale. The scale is scored based on a four-point Likert from never (0) to always (3). A higher score are indicative of a higher level of depression, anxiety, and stress.

Persian DASS-21 had good internal consistency and validity (Sahebi, Asghari & Salari, 2005). Depression subscale was used in this study (Cronbach's alpha= 0.83; Spearman-Brown's split-half coefficient= 0.85).

After the elimination of incomplete questionnaires, data of 119 women who met the inclusion criteria were analyzed. In this regard confirmatory factor analysis (CFA) was evaluated first. The general validity testing of the model was carried out in the framework of the SEM (structural equation modeling) approach by applying the CFA method of comparing alternative models: A CFA model of order one (measurement model) and a second-order CFA model (model structural). Our scale validation included also a PLS-SEM analysis mainly because of the non-normal distribution of the sample data, as suggested by Afthanorhan (2013). In order to assess the fit of the measurement model, R^2 , R^2_{adjusted} , and Q^2 were applied. The results were analyzed with SmartPLS.3.3.0 software. Then, the convergent validity in relationship with depression was assessed using moderated regression (age \times co-rumination). Data were analyzed with SPSS.25.

Result

The mean age of the participants was 31.55 years (SD=7.60) in the range of 18-58 years. Among the participants, 24.40% were single, whereas 68.10% and 7.60% were married or divorced/widowed, respectively. In terms of education's level, 47.90% had a diploma and below diploma degrees, 45.30% were undergraduate and 6.70% had master degrees.

In order to confirm the factor structures, a second order confirmatory factor analysis (CFA) was performed with Smart PLS. Hence, PLS-SEM was chosen for the confirmatory analysis mainly because it is appropriate for non-normally distributed data and is suitable for small sample size (Hair, Hult, Ringle & Sarstedt, 2017). As depicted in Figure 1, the loading factors' performance comply with Awang, Ahmad and Zin

(2010) recommendation of at least 0.5. In addition, t values (>2.58) and p values are all accepted and significant (P<0.001). PLS-SEM results suggested a good fit of the model (Table1) according to the criteria of acceptance suggested in Hair et.al (2017). The second order analysis was conducted to test whether the three factors belonged to a single broader latent factor of CRQ. Factor Loading represented (Figure1) are significant (P<0.001) and ranged from 0.58 to 0.91.

Additionally, Table 1 depicts that all Cronbach’s alpha (α) and composite reliability (CR) values are above 0.7, indicating internal consistency (Hair et

al., 2000). All average variance extracted (AVE) are above 0.5, indicating convergent reliability (Chin, 2010). Finally, the values Rho_A reliability coefficients are all above 0.7, complying with the suggestions of Dijkstra and Henseler (2015).

The discriminant validity was assessed using Fornel and Larcker (1981) by comparing the square root of each AVE in the diagonal with the correlation coefficients (off-diagonal) for each construct in the relevant rows and columns. As depicted in Table 2, this measurement model supports the discriminant validity between the constructs.

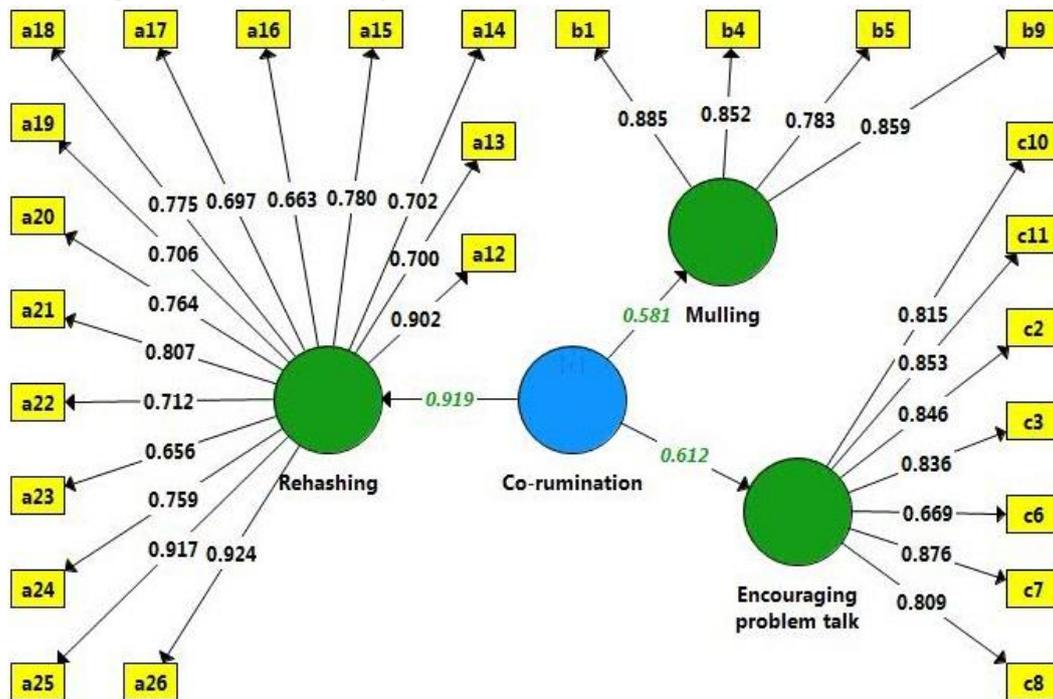


Figure1. PLS-SEM confirmatory factor analysis and structural model of CRQ, with SmartPLS.

Table 1. Composite reliability and goodness of fit results for the CRQ measurement model.

Factor	Alpha	CR	AVE	Rho_A	R2	R2adj	Q2
rehashing	0.949	0.955	0.591	0.953	0.844	0.843	0.525
encouraging problem talk	0.913	0.933	0.668	0.919	0.375	0.370	0.552
mulling	0.866	0.909	0.715	0.866	0.337	0.331	0.511
co-rumination	0.934	0.942	0.519	0.938	-	-	0.344

Table 2. Discriminant validity

	rehashing	encouraging	mulling
rehashing	0.769		
encouraging problem talk	0.306	0.817	
mulling	0.369	0.312	0.846

Table 3. Descriptive statistics and Pearson’s correlation coefficients

Variables	1	2	3	4	5	6
rehashing	-					
encouraging problem talk	0.31**	-				
mulling	0.30**	0.37**	-			
co-rumination	0.64**	0.58**	0.91**	-		
depression	0.30**	0.25**	0.44**	0.48**	-	
age	0.19*	0.24**	0.22*	0.27**	0.10	-
Mean	17.70	9.56	39.93	67.19	5.98	31.55
Standard Deviation	5.57	3.13	11.46	15.76	4.28	7.60

**P<0.01 *P<0.05

Table 3 shows the correlations between co-rumination with depression and age. Results showed that there are positive and significant

relationship between rehashing, encouraging problem talk, mulling, and co-rumination with depression and age (P<0.05).

Table 4. Hierarchical moderated regression analysis of the moderating effects of age on the relationships between co-rumination with depression

model		B	S.E	β	t	P
1	encouraging problem talk	0.17	0.09	0.17	1.96	0.053
	mulling	0.06	0.09	0.06	0.69	0.493
	rehashing	0.37	0.09	0.37	4.03	0.001
	age	-0.02	0.09	-0.02	-0.28	0.777
ΔR=0.48 ΔR2=0.23 ΔR2adjusted=0.20 ΔF=8.40 P<0.001						
2	encouraging problem talk	0.21	0.09	0.21	2.32	0.022
	mulling	0.06	0.09	0.06	0.68	0.497
	rehashing	0.37	0.09	0.37	3.97	0.001
	age	-0.06	0.09	-0.06	-0.64	0.527
	age x encouraging problem talk	-0.11	0.09	-0.10	-1.19	0.238
	age x mulling	0.09	0.10	0.08	0.84	0.403
	age x rehashing	-0.13	0.09	-0.14	-1.51	0.135
ΔR=0.50 ΔR2=0.25 ΔR2adjusted=0.21 ΔF=5.81 P<0.001						

The results of hierarchical moderated regression analysis presented in Table 4. Results showed that encouraging problem talk (β=0.21) and rehashing (β=0.37) significantly predicted depression (ΔR²=0.25). Mulling, age and moderating effects didn't play a role in predicting depression (P>0.05).

Finally, the presence of a positive and significant correlation between the dimensions of rehashing, encouraging problem talk and mulling with each other and with the total co-rumination score

(Table2), the Cronbach’s alpha of 0.86 to 0.95 and Spearman-Brown’s split-half coefficients of 0.90 to 0.95 for the subscales and the Cronbach’s alpha of 0.93 and Spearman-Brown’s split-half coefficient of 0.72 for the total co-rumination score were indicative of a proper reliability of CRQ.

Discussion

The aim of the present study is to examining the factor structure, convergent validity and reliability and of the CRQ in women. According to the results,

CRQ had proper internal consistency and reliability. This finding are in congruence with previous studies (Parr 2015; Fan et al. 2016). In addition, results of factor analysis indicated that CRQ has a three-factor structure. This structure had a good fit with the data which is consistent with the results obtained by Davidson et al. (2014). They obtained a three-factor structure consisting of 26 items.

Other results demonstrated a positive correlation between the subscales and the total score of CRQ and depression. In this regard, our findings are in line with the results of the previous studies (Davidson et al., 2014; Kroemeke & Gruszczyńska, 2014; Balsamo et al., 2015; Criss et al., 2016; Miller et al., 2020; Bastin et al., 2021), which are indicative of the proper convergent validity of the scale.

Results showed that there are positive and significant relationship between rehashing, encouraging problem talk, mulling, and co-rumination with age. These findings are not consistent with the results of previous research (Ames-Sikora et al., 2017). They didn't find a significant relationship between age and co-rumination. Davidson et al. (2014) affirmed that while co-rumination can be more observed in the adolescents, it exists at all ages. But the results of the present study showed that with increasing women's age, co-rumination increases accordingly. At older ages, women seem to build a more cohesive communication network and talk more about their issues with their friends.

On the other hand, the results of hierarchical moderated regression analysis of the moderating effects of age on the relationships between co-rumination with depression showed that encouraging problem talk and rehashing significantly predicted depression. Mulling, age and moderating effects didn't play a role in predicting depression. Criss et al., (2016) indicated that depression can be predicted by the co-rumination. Based on the findings of the present study, there seems to be a relationship between co-rumination and depression at all ages. Although

women have a lot of dyadic relations were, as expected, these relationships cannot protect women against depression (Rose, 2002).

One of the major limitations of this research was the application of simple sampling, which limited the generalizability of the results and use of tools in other groups (e.g., students). The available version was assessed in terms of the relationship with friends. In this respect, it is suggested that the tool be applied to the groups, including spouses, children, parents, and colleagues, in future studies.

In sum, it seems that co-rumination is an interpersonal behavior that lead to the development of depressive symptoms. While there has been considerable interest in studying this construct, little psychometric information about the Co-Rumination Questionnaire (CRQ) in Iranian population. The current study indicated the factor structure, reliability, and convergent validity of the CRQ. Factor analyses revealed responses were best characterized by a 3-factor structure, termed Rehashing, Mulling, and Encouraging Problem Talk. The CRQ subscales evidenced adequate internal consistency and were significantly related to self-report measures of depression. This questionnaire can be confidently used by psychologists and researchers interested in studying depression.

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