
Psychometric Properties of the Friendship Self-Regulation Questionnaire (SRQ-F) at the Emerging Adulthood

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Article history:

Received date: 2021/03/27

Review date: 2021/05/10

Accepted date: 2021/05/16

Keywords:

Friendship Self-Regulation, Vitality, Basic Psychological Needs, Factor Structure, Reliability

Abstract

Purpose: The purpose of this study was to investigate the psychometric properties of the Friendship Self-Regulation Questionnaire (SRQ-F) in students.

Methodology: In a descriptive-correlation and validation study, 216 and 226 graduate students from Ferdowsi University of Mashhad selected through multi-stage sampling method. Data were collected using the Friendship Self-Regulation Questionnaire (Ryan & Connell, 1989), Basic Need Satisfaction in Relationships (LaGuardia, et al, 2002) and Subjective Vitality Scale-State level Version (Ryan & Frederick, 1997). Internal consistency, exploratory and confirmatory factor analysis and criterion validity were analyzed.

Findings: The results showed that the scale had four-factor structure with the variance explained 67.20%. The confirmatory factor analysis was confirmed. The scale had good construction reliability. The criterion validity confirmed in relation to basic need satisfaction in relationships and subjective vitality in friendship ($P \leq 0.01$).

Conclusion: The Friendship Self-Regulation Questionnaire (SRQ-F) had good internal consistency as well as exploratory and confirmatory validity in students. This questionnaire can be used as a valid instrument in future studies.

Please cite this article as: Tanhayeh Reshvanloo F, Kareshki H, Amin Yazdi S A. (2021). Psychometric Properties of the Friendship Self-Regulation Questionnaire (SRQ-F) at the Emerging Adulthood, *Iranian Journal of Educational Sociology*, 4(2): 139-148.

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1. Introduction

Emerging adulthood is a period of development spanning the ages 18 to 25 and is an emerging concept in the study of lifespan (Arnett, 2000). This period of life is associated with the discovery of identity, instability, self-focus, feelings of being in-between and possibilities and there are few people who have not involved in intimate relationships during this period and therefore have not faced with challenges and problems. Developing multiple, fleeting, and uncommitted relationships without intimacy or the inability to make and maintain meaningful and long-lasting relationships are among major challenges. Accordingly, conflict in relationships can be considered as a turning point in emerging adulthood (Shulman, et al, 2013). From the perspective of psychosocial development (Erikson, 1968), the crisis of early adulthood is intimacy versus isolation, and the successful resolution of this crisis can lead to the development of satisfying relationships and a sense of commitment, security and care; structures that are associated with relationship well-being, or development of warm, satisfying, and trusting relationships based on empathy, affection, intimacy, commitment and vitality (Patrick, et al , 2007; Gaine, & La Guardia , 2009).

Self-determination theory (SDT) (Deci, & Ryan, 1985; Ryan & Deci, 2019) is one of the contemporary theories that have been able to investigate well-being from an organic, contextual and motivational perspective and examines the role of basic psychological needs. The reasons why people engage in various activities is investigated in this theory. Accordingly, intrinsic motivation of individuals depends on the satisfaction of the three inherent and universal needs of autonomy or the fundamental tendency of the individual to be the cause or agent of their actions, competence or perception of mastery of actions and achievement of goals and relatedness or sense of security and belonging to others (Ryan, Curren & Deci, 2013; Ryan & Deci, 2017). According to SDT, the tendency for autonomic arousal to perform an activity, or conversely the perception of control over behaviors, gradually shifts from extrinsic regulation to interjected regulation and then to identified regulation during internalization and moves to self-regulation and internal self-regulation. This means that initially the regulation of behaviors is based on external criteria and related to others, and, finally, during the process of internalization, personal criteria are the basis of regulating behaviors (Ryan, Connell & Deci, 1985). So that in extrinsic regulation, an external factor such as reward and punishment motivates the behavior. In interjected regulation, although individuals have internal reasons, external factors are the source of their behaviors through the affirmation of individuals' self-concept or the preparation to cause anxiety and guilt. In identified regulation, external motivations affect the individuals' value system and are placed among them. Finally, in intrinsic regulation, pleasure, excitement, and passion are behavior motivators, and external consequences are ignored. The internalization process is reinforced by the need for competence and draws energy from the need for relatedness. Accordingly, basic psychological needs satisfaction leads to self-regulation (Ryan & Deci, 2020). Extrinsic regulation and interjected regulation are relatively extrinsic motivations and are considered self-determined in contrast to identified and intrinsic regulations. The mentioned self-regulatory styles cannot be considered as completely stable traits. However, they are not characteristics that change at any time and place (Ryan & Deci, 2000). Research has shown that in friendly relationships self-regulation is associated with social competence (Soenens, & Vansteenkiste, 2005), social acceptance (Shea, Millea, & Diehl, 2013), basic psychological needs satisfaction (Lee, 2018), prosocial self-regulation (Razavieh & Alborzi, 2004) and academic self-regulation (Alborzi, 2009).

Within the framework of SDT, the Self-Regulation Questionnaire (SRQ) has been developed in specific areas (Ryan & Deci, 2000). At first, Ryan & Connell (2000) presented questionnaires to examine self-regulation in school work and prosocially behavior. Then other forms in various fields such as Treatment (Williams, Grow, Freedman, Ryan & Deci, 1999; Levesque et al., 2007), Learning (Black & Deci, 2001) and Religion (Ryan, Rigby & King, 1993) were developed and validated. Scoring of these questionnaires is possible in three ways. In the first procedure, four independent scores are calculated for self-regulatory styles. In the second procedure, the Relative Autonomy Index (RAI) are calculated by

assigning the coefficient of -2 to external regulation and -1 to interjected regulation, as controlled subscales, and also the coefficient of +1 for identified regulation and +2 for intrinsic motivation, as autonomous subscales and then the difference between the two sets is calculated. In the third procedure, two scores are calculated and used for controlled regulation and autonomous regulation (Gordeeva, Sychev, & Lynch, 2020). The Friendship Self-Regulation Questionnaire (SRQ-F) has been also developed based on the same model. In this 20-item questionnaire, there are four questions including "Why am I close friends with this person now?", "Why do I spend time with my friend?", "Why do I listen to my friend's problems, or to what my friend has to say?" and "Why do I keep promises to my friend?" Then, for each question, five reasons are given and students are asked to determine how each reason is true for them. Finally, four scores are calculated for External Regulation, Interjected Regulation, Identified Regulation and Intrinsic Motivation and RAI are also calculated.

In various studies, the factor structure of the Academic Self-Regulation Questionnaire (SRQ-A) (Gordeeva, Sychev, & Lynch, 2020) has been investigated. Alborzi (2009) normalized SRQ-A in primary school students and confirmed its factor validity. She also found a positive and significant correlation between SRQ-A and the Religion Self-Regulation Questionnaire (SRQ-R) and SRQ-F. Ahmadyan, Azizitorab, & Azizi (2020) also used this questionnaire. Furthermore, Rahmanian, Vaez Mousavi, & Sohrabi (2015) and Behzadnia, Ahmadi, & Amani (2017) normalized the Exercise Self-Regulation Questionnaire (SRQ-E) and examined its factor structure. Nevertheless, a review of the research background showed that the factor structure of SRQ-F has not been studied in foreign and domestic studies. However, its reliability has been reported in some studies. For example, Shea, Millea, & Diehl (2013) reported Cronbach's alpha of 0.87 for this questionnaire. Soenens & Vansteenkiste (2005) also used this scale and reported Cronbach's alpha of 0.73 for RAI. Lee (2018) also used this questionnaire and reported Cronbach's alpha of 0.62 to 0.87 for the subscales. Razavieh, Alborzi (2004) also obtained a correlation of 0.65 between the total score of this questionnaire and the Prosaically Self-Regulation Questionnaire (SRQ-P). A review of the statistical population of these studies also showed that Soenens & Vansteenkiste (2005) and Shea, Millea, & Diehl (2013) conducted their study on adolescents and Alborzi (2009) also studied primary school students. Only Lee (2018) in his study examined a sample of university students whose average age was 25.14. In general, it seems that no information is available for psychometric properties; especially the factor structure of the SRQ-F and this questionnaire has not been used for the statistical population of students in the early stages of youth (18 to 25 years). Based on this, it seems that conducting a study on a sample of Iranian university students who are in their early teens can provide a valid tool for the use of domestic researchers. The present study aimed to investigate the psychometric properties of Friendship Self-Regulation Questionnaire (SRQ-F) in university students.

2. Methodology

The present study was a descriptive research and more precisely a test validation. The statistical population of the study consisted of undergraduate students of Ferdowsi University of Mashhad in the autumn semester of the academic year 2020-2021. To achieve the objectives of the research, two studies were developed. In the first study, internal consistency and exploratory factor analysis (EFA) were investigated. In the second study, confirmatory factor analysis (CFA), criterion validity and gender differences were examined. According to the suggestion of MacCallum, Widaman, Zhang, & Hong (1999), in exploratory studies it is better to consider the minimum sample size of 100 to 200 students. Comrey & Lee (1992) also consider at least 200 students as the sample suitable for investigating CFA. Accordingly, given the possible loss of samples in each study, the sample size was considered 250 students. In each study, the sample was selected separately by multistage random sampling. Thus, initially four educational groups were considered (Humanities, Basic Sciences, Engineering and Technology, Agriculture and Veterinary Medicine and Art). As in the fall semester of the academic year 2020-2021 the

classrooms were closed due to the COVID-19 pandemic, data collection was done online. An electronic questionnaire link designed at <https://docs.google.com/forms> was shared through interaction with teachers and student group leaders in class groups on the social network of Telegram. This process took place in two separate stages and the classes were not shared in the two studies. Data collection in the first study was done from 5 to 20 December 2020 and in the second study from 21 December 2020 to 4 January 2021. Data collection was continued until the desired sample size was obtained. To test the test-retest reliability, 60 students were selected at the same time that the first study was conducted and after three weeks they completed the SRQ-F again. The objectives of the project were provided for the participants in the electronic forms and in addition to assuring the confidentiality of the information, the voluntary participation in the research was emphasized. This study was approved by the University Ethics Committee with the code IR.UM.REC.1399.098. Finally, after the incomplete questionnaires were excluded, the data of 216 and 226 students who had completed the questionnaires were analyzed in the first and the second study, respectively. Data were collected using the following questionnaires:

Friendship Self-Regulation Questionnaire (SRQ-F): This questionnaire was developed by Ryan & Connell (1989). In this questionnaire four questions are asked about students' reasons for having friendly relationships. There are five answers for each question; using a seven-point Likert scale ranging from not at all true (1) to very true (7), respondents should determine to what extent each of the answers is true about them. Finally, the scores of four subscales of extrinsic regulation, interjected regulation, identified regulation and intrinsic motivation and RAI are calculated. Good validity and reliability have been reported for this questionnaire. For example, Shea, Millea, & Diehl (2013) reported Cronbach's alpha of 0.87 for this questionnaire. Razavieh & Alborzi (2004) obtained a correlation of 0.65 between the total score of this questionnaire and SRQ-P. Alborzi (2009) also achieved a positive and significant correlation between SRQ-F and SRQ-A.

To prepare the scale, it was translated into Persian by a faculty member of the Department of Psychology. The reverse translation was performed by another faculty member of the Department of Psychology. Finally, the two forms were adapted by two faculty members with study experience in English-speaking countries. After correcting the translation, the final form was ready to be used (Appendix). **Basic Need Satisfaction in Relationships (BNS-RS):** This scale was developed by La Guardia, Ryan, Couchman, & Deci (2000) and measures the three subscales of autonomy, competence and relatedness with nine items. This scale can be used for different people such as parents, spouse, co-workers and friends. This scale is scored on a seven-point Likert scale ranging from not at all true (1) to very true (7). A higher score in each subscale, after reversing some items, indicates a more favorable situation of the person in that subscale. Cronbach's alpha coefficients for this scale have been reported from 0.85 to 0.94 (Langdon, Sturges, & Schlote, 2018). In a study among university students, Tanhaye Reshvanloo, Saeidi Rezvani, Samadiye, & Kareshki (in press) examined the psychometric properties of BNS-RS. They reported desirable exploratory and confirmatory factor validation of the scale with a three-factor structure. They reported Cronbach's alpha coefficients of 0.68 to 0.88 in two studies for subscales and total scale scores. In this study, Cronbach's alpha coefficients were 0.87, 0.79 and 0.96 for autonomy, competence and relatedness, respectively.

Subjective Vitality Scale-State Level Version (SVS-SLV): The original version of this scale was developed by Ryan & Frederick (1997) and has seven items scored in a seven-point Likert scale ranging from not at all true (1) to very true (7). Higher scores mean higher mental vitality and vice versa. Ryan & Frederick (1997) examined the exploratory factor validity of this scale and found the explained variance of the one-factor structure to be 70%. They also reported Cronbach's alpha of 0.92. In a sample of Iranian university students, Tanhaye Reshvanloo, Kareshki & Torkamani (2019) found a more appropriate exploratory and confirmatory factor validity of the 6-item version. This structure explained 75.04% of the variance. Cronbach's alpha coefficients and split-half were 0.93 and 0.92, respectively. The question-

answer indicators were also at a desirable level. In the present study, vitality in relationships with friends was examined by items such as “When I'm with my friends, I feel alive and vital”. In the present study, the reliability of this scale was obtained 0.94 by calculating Cronbach's alpha.

In the first study, the analysis of internal consistency and exploratory factor analysis (EFA) were performed. In the second study, confirmatory factor analysis (CFA) and then construct reliability and convergent validity were examined by calculating composite reliability (CR) and average variance extracted (AVE) of factors. Criterion validity in relation to basic psychological needs, vitality in relationships with Pearson correlation coefficient, and gender differences with MANOVA were also assessed. Test-retest coefficients were also evaluated by calculating Pearson correlation coefficient. Analyses were performed with SPSS.25 and Amos.24.

3. Findings

In the first study (n=216), 73.1% of the population were women; the mean age was 20.26(SD=1.54; range 18 to 25 years); 93.5% of the participants were single. In the second study (n=226), 68.1% of the participants were women; the mean age were 20.38 (SD=1.63; range 18 to 25 years) and 93.8% of them were single. In the test-retest group (n=60), 68.3% were women and the mean of participants' age were 21.08 (SD=1.87; range 19 to 25 years) and 85.5% of them were single.

To examine the internal consistency in the first study (n=216), the inter-item correlation and item-total correlation were examined and compared with the cut-off point of 0.30 (Cohen, 1992). The results showed that the correlation between the items varied from 0.30 to 0.51 and the correlation between the items and the total score varied from 0.30 to 0.60. Descriptive indicators and internal consistency coefficients are shown in Table (1).

Table1. Descriptive statistics, internal consistency coefficients and EFA results for SRQ-F

items	Mean	Standard Deviation	item-total correlation	communalities	factor loadings			
					identified regulation	interjected regulation	external regulation	intrinsic motivation
16	5.74	1.43	0.56	0.76	0.89			
17	5.04	1.79	0.60	0.62	0.74			
8	4.69	1.89	0.52	0.55	0.73			
4	5.10	1.86	0.53	0.58	0.69			
12	5.19	1.72	0.59	0.57	0.68			
1	3.38	2.15	0.41	0.78		0.88		
14	3.61	1.89	0.49	0.75		0.86		
11	2.94	1.96	0.45	0.73		0.83		
5	3.81	1.85	0.41	0.756		0.74		
18	3.27	1.83	0.39	0.50		0.66		
9	6.19	1.27	0.37	0.77			-0.86	
20	5.68	1.68	0.39	0.64			-0.80	
3	6.02	1.52	0.51	0.79			-0.78	
15	5.62	1.63	0.43	0.59			-0.72	
7	4.75	2.21	0.30	0.59			-0.63	
2	5.84	1.61	0.31	0.83				0.94
10	5.54	1.85	0.36	0.83				0.93
6	5.68	1.60	0.48	0.80				0.85
13	5.99	1.24	0.33	0.54				0.73
19	5.75	1.48	0.46	0.66				0.65
eigenvalues					5.71	3.73	2.61	1.34
explained variance					28.54	18.67	13.05	6.94
Cronbach's alpha					0.83	0.87	0.82	0.89
split half coefficients					0.85	0.87	0.81	0.86
test-retest coefficients					0.61	0.62	0.64	0.70

In the EFA study, the Kaiser, Meyer, Olkin (KMO) and Bartlett Sphericity test were first calculated. The results showed that conditions allow analysis ($KMO=0.82$, $\chi^2=2602.19$, $df=190$, $P<0.0001$). Principal components analysis (PCA) was performed with factor loading cutoff > 0.40 . The initial analysis yielded four factors with eigenvalue > 1 . Scree Plot also supported this structure. The cumulative explained variance of this structure was 67.20%. The results of Table (1) show that all items have communalities greater than 0.50 and factor loadings greater than 0.60. The resulting structure was no different from the original version.

In the second study ($n=226$) CFA was performed by maximum likelihood method. To evaluate the model's fitness, values between 1 and 3 for χ^2/df , values of 0.08 for the Root Mean Square Error of Approximation (RMSEA) and values of 0.90 and above for Goodness of Fit Index (GFI), Comparative Fit Index (CFI) and Incremental Fit Index (IFI) were considered as the criteria (Tabachnick, & Fidell, 2015). The results of the analysis with the correction of covariance among the errors showed that all factor loadings are greater than 0.60 and are significant ($P<0.01$). The examination of the model fitness indices showed that the model was desirable ($\chi^2/df=1.74$, $GFI=0.90$, $CFI=0.96$, $IFI=0.96$, $RMSEA=0.05$). Standardized factor loadings are shown in Figure (1).

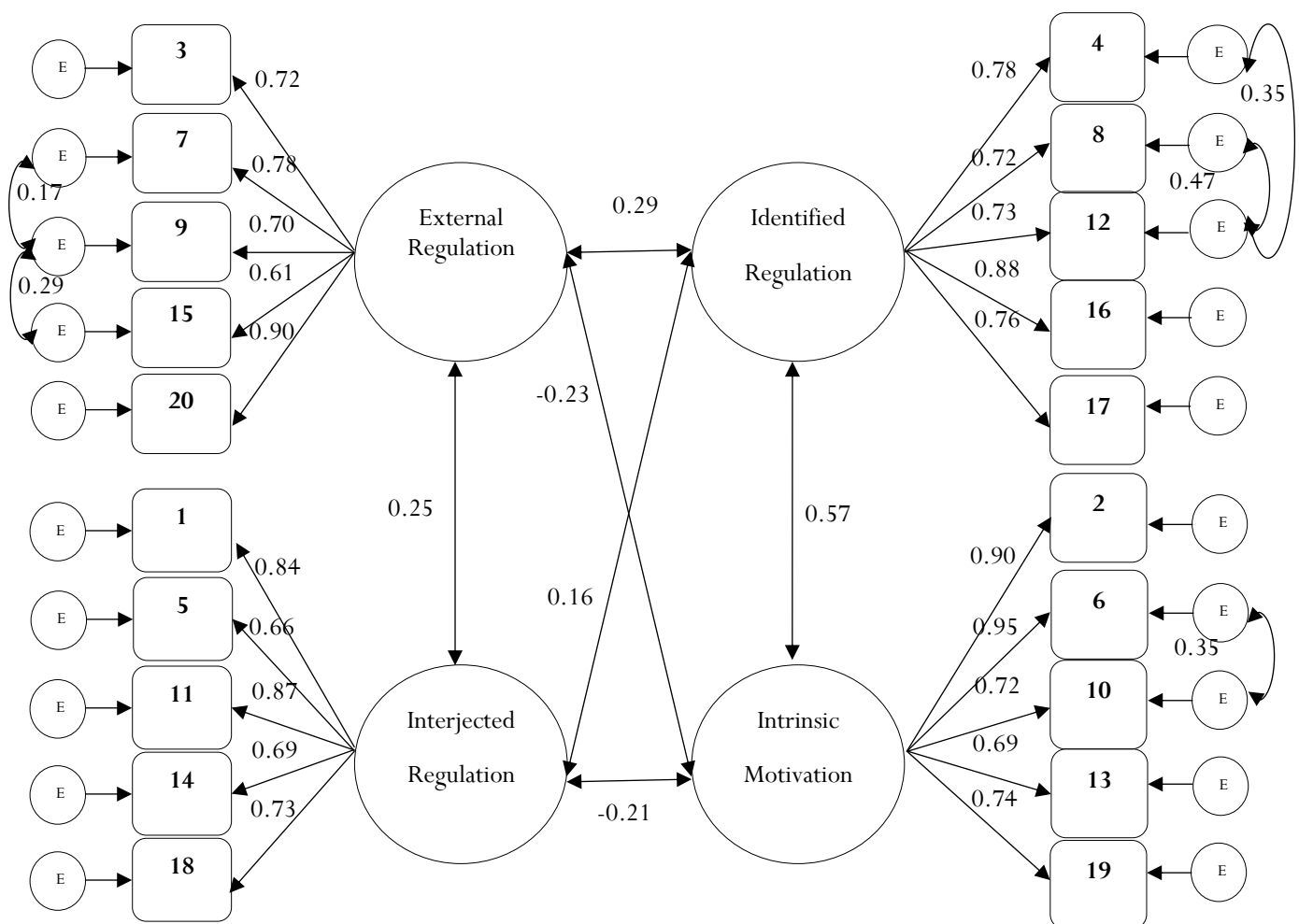


Figure 1. Final measurement model of SRQ-F (standardized coefficients are reported)

In the assessment of construct reliability, CR is a better measure than Cronbach's alpha by considering the factor loading of each item. In addition, convergent validity is achieved if the CR coefficients are greater than 0.70 and the AVE is greater than 0.50 and the relationship is $AVE < CR$. According to the method of Fornell & Larcker (1981), if the AVE for each structure is greater than squared correlation between the structures, divergent validity is achieved (Hair, Hult, Ringle, & Sarstedt, 2017). The results of examining these indicators in Table (2) show that CR, convergent and divergent validity have been achieved.

Table2. Composite reliability, Convergent and Divergent validity for SRQ-F

subscales	CR	AVE	convergent validity	divergent validity			
external regulation	0.86	0.56	0.86>0.56	0.75			
interjected regulation	0.87	0.57	0.87>0.57	0.06	0.75		
identified regulation	0.88	0.60	0.88>0.60	0.01	0.04	0.77	
intrinsic motivation	0.90	0.65	0.90>0.65	0.09	0.03	0.23	0.81

In the assessment of criterion validity, the results of Table (3) show that there is a significant negative correlation between external regulation and interjected regulation and autonomy, competence and relatedness as well as vitality in relationships with friends ($P < 0.01$). The relationship between identified regulation, intrinsic motivation and RAI with these variables was positive and significant ($P < 0.01$).

Table3. Correlation coefficients between SRQ-F subscales with basic needs and vitality

variables	1	2	3	4	5	autonomy	competence	relatedness	vitality
1. external regulation	-					-0.24**	-0.21**	-0.21**	-0.36**
2. interjected regulation	0.26**	-				-0.17**	-0.16**	-0.21**	-0.24**
3. identified regulation	-0.12	0.06	-			0.30**	0.35**	0.32**	0.46**
4. intrinsic motivation	-0.30**	-0.17**	0.48**	-		0.28**	0.31**	0.33**	0.41**
5. Relative Autonomy Index (RAI)	-0.72**	-0.48**	0.55**	0.79**	-	0.38**	0.38**	0.40**	0.56**
Mean	5.53	3.22	4.72	5.94	2.33	17.30	17.15	16.76	34.52
Standard Deviation	1.36	1.64	1.61	1.32	5.71	3.75	3.40	4.45	6.83

* $P < 0.05$ ** $P < 0.01$

Gender differences were assessed by MANOVA. Before that normality was examined by Kolmogorov-Smirnov test ($P > 0.05$), Levene's Test of Equality of Error Variances ($P > 0.05$), Box's Test of Equality of Covariance Matrices ($P > 0.05$) and Bartlett's test of Sphericity ($P < 0.01$) were also assessed. The results showed that gender differences were significant only in interjected regulation ($F = 8.51$, $P < 0.01$) and women had a higher mean (3.67 vs. 3.01). Gender differences were also significant in RAI ($F = 3.91$, $P < 0.05$) and women had a higher mean (2.84 vs. 1.23).

Finally, the results of Table (1) show that in the second study ($n = 226$) Cronbach's alpha coefficients vary from 0.82 to 0.89 and Spearman-Brown Coefficients vary from 0.81 to 0.86. The assessment of test-retest reliability ($n = 60$) after three weeks also showed that test-retest coefficients vary from 0.61 to 0.70. Accordingly, the reliability of SRQ-F was also confirmed.

4. Discussion

The purpose of this study was to investigate the psychometric properties of the Friendship Self-Regulation Questionnaire (SRQ-F) in students. The examination of factor structure with EFA and CFA showed that SRQ-F has a four-factor structure, including extrinsic regulation, interjected regulation, identified regulation and intrinsic motivation. The items are loaded under the relevant factors in line with the original version and each factor contains five items. This finding is consistent with the results of research on self-regulation questionnaires based on SDT (Ryan & Connell, 1989; Black & Deci, 2000; Williams, et al, 1996; Levesque, et al, 2007; Gordeeva, Sychev, Lynch, 2020). In addition, the findings showed that CR, convergent and divergent validity are also desirable and the four dimensions of friendship self-

regulation, while related to each other, are separate factors. Accordingly and consistent with other studies, SRQ-F seems to have good validity in relation to the infrastructure.

The examination results of the criterion validity showed that there is a significant negative correlation between extrinsic regulation and interjected regulation and feelings of autonomy, competence and relatedness, as well as vitality in relationships with friends. The relationship between identified regulation, intrinsic motivation and RAI was positive with these variables. This finding is consistent with SDT, as according to this theory, the intrinsic motivation of individuals depends on basic psychological needs satisfaction including autonomy, competence and relatedness (Ryan, Curren & Deci, 2013; Ryan & Deci, 2017) and the satisfaction of these psychological needs leads to self-regulation (Ryan & Deci, 2020). In addition, according to Relationships Motivation Theory (RMT), meeting these needs and autonomous regulation internally move people toward close and voluntary relationships and create a sense of satisfaction and well-being in relationships (Deci & Ryan, 2014; Ryan & Deci, 2017). Based on this, it seems that the existence of negative relationships among extrinsic regulation and introjected regulation and meeting psychological needs and vitality in relationships with friends and on the other hand positive relationships among identified regulation, intrinsic motivation and RAI and these variables indicate the desirable criterion validity of SRQ-F in explaining relevant theoretical constructs.

The results of research on gender differences showed that there is a difference between the two genders only in interjected regulation and RAI and women has a higher average. Soenens & Vansteenkiste (2005) also in their study reported significant gender differences in favor of women in SRQ-A and SRQ-F. Gordeeva, Sychev, Lynch (2020) also reported gender differences in self-regulation. In their study, women had a higher average in all dimensions except external regulation. Weis, Heikamp, & Trommsdorff (2013) believe that based on social expectations, women need to control their behaviors and emotions in social situations more than men and there are more social rules for their behaviors and emotions. That is why they have higher self-regulation. Other findings of the present study indicated appropriate internal consistency between the scale items as well as each item and the total score. Cronbach's alpha and split-half coefficients were also at a good level. This finding is consistent with previous research (Soenens & Vansteenkiste, 2005; Lee, 2018, Alborzi, 2009). They reported Cronbach's alpha coefficients of 0.62 and 0.87. Accordingly, the reliability of SRQ-F is desirable.

Overall, it seems that Friendship Self-Regulation Questionnaire (SRQ-F) with four-factor structure including extrinsic regulation, interjected regulation, identified regulation and intrinsic motivation has good factor reliability and validity. Based on the findings of the present study, this scale has good validity and reliability among men and women in the age range of 18 to 25 years. However, it seems that the scale should be used with caution because, like other studies, the present study had some limitations such as it was conducted in a particular cultural and social context, with small number of research samples, and only self-report tools were used to examine the criterion validity. These limitations restrict the generalization of results to other social and cultural groups and contexts. Therefore, future researchers are suggested to conduct similar studies in different academic settings and study convergent and divergent validity in relation to relevant structures.

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