

Contents lists available at https://www.magiran.com/magazine/8046

Journal of Human Relations Studies

Journal home page: http://jhrs.uma.ac.ir/



Research Paper

Investigating the Role of Emotional Self-Awareness, Cognitive Emotion Regulation and Social Adequacy in Predicting Marital Satisfaction





- 1. Assistant Professor, Department of Educational Sciences, University of Tabriz, Tabriz, Iran.
- 2. Ph.D student of Psychology, Department of Psychology, Alzahra University, Tabriz, Iran.



Citation Gharadaghi, A. & Masoumi Ala, S. (2022). [Investigating the Role of Emotional Self-Awareness, Cognitive Emotion Regulation and Social Adequacy in Predicting Marital Satisfaction (Persian)]. Human Relations Studies, 2(4):32-39. https://dx.doi.org/10.22098/jhrs.2022.9781.1034



doi 10.22098/jhrs.2022.9781.1034

ARTICLEINFO:

Received: 2021/11/02 Accepted: 2022/ 01/30 Available Online: 2022/02/22

Key words:

Emotional selfawareness, Cognitive emotion regulation, Social adequacy, Marital satisfaction

ABSTRACT

Objective The aim of this study was to investigate the role of emotional self-awareness, cognitive emotion regulation, and social adequacy in predicting marital satisfaction.

Methods The method of this research was descriptive-correlational. The statistical population of this study included teachers of Kalibar city, whose number was 1000 and from this number, according to Cochran's formula, 275 statistical samples were selected by stratified random sampling method. Data collection tools was Marital Satisfaction Questionnaire, Emotional Self-Awareness Questionnaire, Cognitive Emotion Regulation Questionnaire, Social Satisfaction Questionnaire. The method used in this study was to test the main hypothesis of multiple regression.

Results The results showed that a total of two independent variables of emotional self-awareness and social adequacy remained in the formation of regression and the net determination coefficient was R = 0.36 and this coefficient indicated that about 0.36 of the variance of marital satisfaction by independent variables in The figure is explained. In general, the results showed that there is a significant relationship between emotional selfawareness and cognitive emotion regulation and social adequacy with marital satisfaction (sig = 0.000).

Conclusion The results of the present study can be used in premarital education as well as in interventions related to family and couples.

1. Introduction

All The family is a social organization that consists of a union between a man and a woman. Among the manifestations of human social life are the existence of healthy and constructive interactions between human beings and the establishment of love for all kinds and the expression of intimacy and empathy for each other. The family is a place to satisfy various physical, intellectual and emotional needs, and it is an undeniable necessity to be aware of biological and psychological needs and to know how to satisfy them and to be equipped with techniques for recognizing biological psychological desires. A person's satisfaction with married life is considered as his satisfaction with the family and family satisfaction means life satisfaction and as a result will facilitate the growth, excellence and material spiritual development of society (Pluut, Ilies, Weng, Liang, 2021).

*Corresponding Author:

Ali Gharadaghi

Address: Assistant Professor, Department of Educational Sciences, University of Tabriz, Tabriz, Iran.

E-mail: dr.gharadaghi@gmail.com

Hendrik, Dijke and Hendrik, (1998); According to Nasiriyah Dehsorkhi and Mousavi (2015), they have defined marital satisfaction as a mental experience and personal happiness and contentment in marital relationships. Marital satisfaction is a state of mind that reflects the perceived benefits and values of marrying an individual. The increase in the number of troubled couples, the imbalance of families, the disruption of marital relations and the increase in divorce rates in recent years have caused concern among sociologists and psychologists. Psychological research on couples has shown that less than half of them achieve a degree of satisfaction (Widiastuti, 2021). Given that cognitions are influential in the marital relationship and this issue has been considered for a long time, theoretical and experimental advances have led to a greater understanding of effective cognitions in the marital relationship.

One of the main variables studied in the present study is the role of emotional self-awareness and cognitive emotion regulation in predicting marital satisfaction. People who are more aware of their emotions have better skills in managing emotional problems and spend less time paying attention to their emotional reactions than people who can recognize a particular emotion in a stressful situation. And use fewer cognitive resources. This allows them to explore other reactions and allows them to turn their attention to other tasks or to use more adaptive strategies (Berrocal, Pablo Fernández, Pacheco & Extremera, 2006). Cognitive emotion regulation actually refers to the cognitive method of managing and manipulating the input of emotion evoking information that can improve the quality of life of couples (Ochsner & Gross, 2005). Cognitive emotion regulation can be defined as the management of evoked information by conscious cognitive strategies (Zolomaki and Han, 2010; quoted by Zare and Solgi, 2012). It also refers to the processes by which we influence what emotions to experience, when to experience them, and how to express them (Sezgil, Bozni, & Bazinksa, 2012; quoted by Zare and Solgi, 2012). In fact, psychological adjustment depends to a large extent on the regulation of emotions. Therefore, emotion regulation is one of the most important tasks for physical and psychological health, especially in marital relationships (Riahi, Golzari, Mootabi, 2020). In this regard, the research of Heidari, Shahbazi, Ghafourifard, Sheikhi (2017) has shown that emotional intelligence can predict marital satisfaction. In fact, couples with higher emotional intelligence have higher marital satisfaction (Hajihasani, Sim, 2019). Also, cognitive emotion regulation has an important role in marital satisfaction (Rusu, Bodenmann, Kayser, 2019). so that the training of cognitive emotion regulation skills is known to be effective in increasing marital satisfaction (Mirzaei, Sarvaqd, Baquli, Kuroshunia, 2019).

Another factor that seems to affect marital satisfaction is social adequacy. Social adequacy is a concept that can be used to regulate and provide coherence in the relatively distinct dimensions of friendships. Social adequacy consists of a set of key behaviors based on growth (Pinchak, Rollins, 1960). Social adequacy is the ability of human performance to exercise personal independence and social responsibility. Felner, Lease, Phillips (1990) have argued that the distinction between social adequacy and mental health is a more efficient approach. They have suggested that social adequacy should be considered as an essential component of healthy mental health (Felner et al., 1990). This view suggests that some degree of social adequacy is essential to achieve positive mental health outcomes. However, some people may be socially adequate and still fail to achieve mental health for other reasons (Flanner et al., 1990). One of the reasonable reasons for researching the details of marital satisfaction is understanding its centrality in the health of family and individuals. Divorce statistics, which are the most reliable indicator of turmoil, also indicate that marital satisfaction is not easily achievable (McKay, 2019). Since the family is one of the main pillars of society, achieving a healthy society is obviously dependent on the health of the family and the realization of a healthy family is conditional on its people having mental health and having a favorable relationship with each other. Therefore, addressing the role of emotional self-awareness, cognitive emotion regulation and social adequacy to achieve marital satisfaction seems necessary. Therefore, the present study seeks to determine whether emotional selfawareness, cognitive emotion regulation and social adequacy are able to predict the marital satisfaction of teachers in the city of Kalibar?

2. Materials and Methods

The present study is a descriptive and correlational survey. The statistical population of this research is the teachers of Kalibar city in 2017, whose total number is about 1000 people. According to Cochran's formula, a statistical sample of 275 people were selected using stratified random sampling and examined.

1- Marital Satisfaction Questionnaire: The first part includes the questions of the marital satisfaction questionnaire. This questionnaire was initially developed to describe the dynamics of marriage for research, but it was not long before it was used as a diagnostic tool for married couples seeking marriage counseling and enrichment (Olson and Olson, 1997). The main version of the test has 115 questions, which include the dimensions and topics of personality, communication, conflict resolution, financial issues, leisure, sex, parenting, communication with family and friends, marriage plans, and religious and spiritual orientation. Olson first introduced the 15-question form, and then the 47-question form was developed, which was used in this study. The latter form includes the components of communication, financial management, leisure, sex, parental duties, relatives and friends, religious orientation, personality issues, and conflict resolution. In the 47-question form, there are 5 options for each question. The choice of questions are strongly agree, agree, have no opinion, disagree, strongly disagree. Olson and Olson (1997) reported the validity of the latter form using the alpha coefficient method of 0.92. Mahdavian (1997) obtained the validity of this test using Pearson correlation coefficient and retest method (one week apart) for men 0.937, for women 0.944 and for men and women 0.94 (Ameri, 2002).

2- Emotional Self-Awareness Questionnaire: This questionnaire has 33 items and was developed by Kair, Reed and Croke et al. (2012). Twenty questions are related to insight and self-awareness, ten questions are related to rumination and 12 questions are related to multidisciplinary evaluation. This scale has five subscales and 33 items. In the study of Kair, Reed and Croke et al. (2012) in addition to measuring its face and content validity, the reliability of the Emotional Self-Awareness Scale based on Cronbach's alpha was reported to be 0.83. In Mahna and Talepasand (2016) research, while measuring face validity, the reliability of the emotional self-awareness scale based on Cronbach's alpha was equal to 0.79.

3- Cognitive Emotion Regulation Questionnaire:

The third section includes the Cognitive Emotion Regulation Questionnaire, which is a self-assessment questionnaire designed in 1999 by Grenfsky, Craig, Spinhaun, published in 2001. This questionnaire deals exclusively with the thoughts of people after negative experiences. The main version of this questionnaire has 9 items with 9 components (self-blame, acceptance, mental rumination, positive re-attention, re-attention to planning, positive re-evaluation, adoption of opinion, catastrophic perception, blaming others). In this questionnaire, the strategies of selfblame, blaming others, mental rumination and catastrophic are all negative strategies of emotion regulation and the strategies of accepting reconsideration of planning, positive reconsideration, positive marketing and adopting a positive perspective on each other. They make up the emotion regulation (Granfski, Kraj, Spenhaun, 2002). The creators of this reported its reliability questionnaire Cronbach's alpha for 91% positive strategies, 87% negative strategies and 93% of the total questionnaire. In factor analysis that Aminabadi et al. (2011) performed a questionnaire using the principal components analysis method. 36 items were reduced to 26 items and 9 components to 4 components and reliability coefficients for self-blame and catastrophic perception were 77%, coping and acceptance 70%, positive thinking 76% and blame others 64% and 75% for the whole questionnaire. Which has sufficient credibility. In order to evaluate the convergent validity of the Cognitive Emotion Regulation Questionnaire, the correlation between the four factors of emotion regulation and the three factors of anxiety, depression and stress was examined. All factors at the 0.01% level have a significant correlation with anxiety, depression and stress.

4- Social Adequacy Questionnaire: The fourth part included the Social Adequacy Questionnaire, which was developed by Parandin (2006) based on Flanner (1990) four-dimensional model and includes four factors: behavioral skills, cognitive skills, emotional skills and motivational motivations. This questionnaire is a tool of 47 questions. Cronbach's alpha method has been used to investigate the internal consistency of the scale and subscales. The alpha coefficient obtained from the omission of questions that had little correlation with the total score is equal to (0.88), which indicates that the questionnaire has an acceptable internal consistency coefficient.

In order to use the reliability method, in addition to the alpha coefficient, retesting has also been used. The questionnaire was administered to 30 subjects in a period of 4 weeks, the correlation coefficient between the two runs in the retest (r = 0.889) was obtained. The construct validity of this questionnaire has been examined through two methods. The correlation of the whole scale with the subscales is very high and is reported to be 99% significant. Also, the validity of the scale structure has been investigated by factor analysis, the KMO value (sampling adequacy) is equal to 0.826. Also, all values related to the correlation of questions with the whole test in order to analyze the main components have been reported above 50%, which indicates a high correlation between each question and the whole test.

3. Results

Test of the main hypothesis of the research: Emotional self-awareness and cognitive regulation of emotion and social adequacy have a predictive role in marital satisfaction of couples in Kaliber.

In the above hypothesis, there are three independent quantitative variables and one

dependent variable that quantitative regression test is used. In order to explain the level of marital satisfaction based on the sum of significant independent variables, multiple regression was used by stepwise method (Kalantari, 2003). Finally, according to the information in Table (1), it is observed that in total, two important independent variables remained in the formation of regression, whose multiple correlation coefficient with marital satisfaction was equal to R = 0.612 and the coefficient of determination was equal to R^2 0.375 And the coefficient of net determination is equal to $\overline{R^2} = 0.36$ This coefficient indicates that about 36% of the variance of marital satisfaction is explained by the independent variables in the figure and 64% of the variance of marital satisfaction by variables outside The subject of this research, for example, can be explained by more fundamental factors. And this coefficient indicates that about 36% of the variance of marital satisfaction can be explained by independent variables in the figure and 64% of the variance of marital satisfaction can be explained by variables outside the subject of this study, such as more underlying factors.

Table 1. Multiple correlation coefficient to explain marital satisfaction

1	Form	Multiple correlation coefficient	Determination coefficient	Net determination coefficient	Standard estimation error
	1	0.573	0.329	0.326	9.505
	2	0.612	0.375	0.369	9.194

Hypothesis 1: There is a significant relationship between the role of emotional self-awareness

(recognition, identification, transformation, environmentalism, problem - solving) and marital satisfaction.

Table 2. Pearson r test to determine the correlation between the components of emotional self-awareness and marital satisfaction

Variable	Pearson correlation coefficient Marital Satisfaction	Significance level	Number
Emotional self-awareness	0.332	0.000	250
Recognition	0.226	0.000	250
Identification	0.296	0.000	250
Transformation	0.300	0.000	250
Environmentalism	0.252	0.000	250
problem solving	0.305	0.000	250

The results of Pearson correlation test show a significant level for the relationship between the independent sub-variable of emotional self-awareness and all its components with the dependent variable of marital satisfaction among teacher couples with Pearson values of r=0.332 and sig=0.000. And since

the value of the significance level is less than 0.01, it can be expressed with 0.99 confidence; The higher the emotional self-awareness among teacher couples in Kalibar city, the higher the level of marital satisfaction among couples

Hypothesis 2: There is a significant relationship between the role of marital satisfaction and the components of cognitive emotion regulation (self-blame, acceptance, rumination, Positive attention again, Re-focus on planning, Positive re-evaluation, adoption of opinion, catastrophic perception, blaming others).

According to the above table, it can be seen that the main hypothesis is confirmed and the null hypothesis is rejected. The results of Pearson correlation test show a significant level of relationship between the independent sub-variable of social adequacy and all its components with the dependent variable of marital

satisfaction among teacher couples in Kalibar city with Pearson value of r=0.573 and sig=0.000. And because the significance level is less than 0.01, it can be expressed with 99% confidence; The more social adequacy there is among teacher couples in Kalibar city, the higher the level of marital satisfaction will be among couples. In other words, there is a significant direct relationship between these two variables and its component. Therefore, with 99% confidence, there is a significant, positive and direct relationship between social satisfaction and all its components with marital satisfaction, below average.

Table 3. Pearson r test to determine the correlation between cognitive emotion regulation components and marital satisfaction

Variable	Pearson correlation coefficient Marital Satisfaction	Significance level	Number
Cognitive regulation of emotion	0.278	0.000	250
Blame yourself	0.179	0.000	250
Acceptance	0.175	0.003	250
Ruminant	-0.158	0.014	250
Positive attention again	0.258	0.000	250
Re-focus on planning	0.271	0.000	250
Positive re-evaluation	0.262	0.000	250
Adopt a point of view	0.215	0.000	250
Catastrophic	0.005	0.945	250
Blame others	-0.137	0.001	250

According to the above table, it can be seen that the main hypothesis is confirmed and the null hypothesis is rejected. The results of Pearson correlation test show that there is a significant level of relationship between the sub-independent variable of cognitive emotion regulation and all its components (except catastrophic) with the dependent variable of marital satisfaction among teacher couples in Kaliber. With Pearson value is r=0.278 and sig=0.000. And because the

significance level is less than 0.01, it can be expressed with 99% confidence; The higher the cognitive regulation of emotion among teacher couples in Kaliber, the higher the level of marital satisfaction among couples. In other words, it can be said that there is a significant, positive, direct, lower than average relationship between marital satisfaction between the two variables of cognitive regulation of emotion and all its components (except catastrophic).

Table 4. Pearson r test to determine the correlation between social adequacy and marital satisfaction components

Variable	Pearson correlation coefficient of marital satisfaction	Significance	Number
Social adequacy	0.573	0.000	250
Behavioral skills	0.437	0.000	250
Cognitive skills	0.171	0.007	250
Emotional skills	0.565	0.000	250
Motivational preparation	0.476	0.000	250

According to the above table, it can be seen that the main hypothesis is confirmed and the null hypothesis is rejected. The results of Pearson correlation test show a significant level of relationship between the

independent sub-variable of social adequacy and all its components with the dependent variable of marital satisfaction among teacher couples in Kalibar city with Pearson value of r = 0.573 and sig = 0.000.

And since the value of significance level is less than 0.01, it can be expressed with 99% confidence; The more social adequacy there is among teacher couples in Kalibar city, the higher the level of marital satisfaction will be among couples. In other words, there is a significant direct relationship between these two variables and its components. Therefore, with 99% confidence, there is a significant, positive and direct relationship between social satisfaction and all its components with marital satisfaction, below average.

4. Discussion and Conclusion:

This study aimed to investigate the role of emotional self-awareness, cognitive emotion regulation and social adequacy in predicting marital satisfaction.. The results showed that emotional selfawareness and related skills play an essential role in predicting marital satisfaction. This finding is consistent with the research results by Heidari et al (2017) and Hajihasani and Sim (2019). As mentioned earlier, people who are more aware of their emotions have better skills in managing emotional problems and can recognize specific emotions in a stressful situation compared to other people. And spend less time paying attention to their emotional reactions. This allows them to explore other reactions and directs their thoughts to other tasks or to adopt more adaptive coping strategies, and therefore it seems logical that they also play an important role in marital relationships. The results of Pearson correlation test in the present study also show a significant level of relationship between the independent sub-variable of emotional self-awareness and all its components with the dependent variable of marital satisfaction among teacher couples in Kalibar. This means that the higher the emotional self-awareness among the teacher couples of Kalibar city, the higher the level of marital satisfaction will be among the couples. Emotions are the hallmarks of automated performance patterns that are important for survival. Our cognitive ability creates opportunities to modify these early emotional patterns and to develop better adaptive patterns. This means that emotional self-awareness plays an essential role in adapting to the environment. The most telling (though invisible) sign of self-awareness is the tendency to self-reflection and thinking. Conscious people mostly take time to be alone and think in private; This method allows them to think about things instead of reacting emotionally. Many prominent managers, in fact, cultivate a thoughtful way of thinking in their spiritual life and incorporate it into their work life. For some this thinking may involve prayer or meditation, and for others a philosophical search for self-understanding; All of these qualities enable conscious individuals to act with the certainty and resilience that resonance requires.

When a person is faced with an emotional situation, feeling good and optimistic is not enough to control the emotion, but he needs to have the best cognitive function in these situations. When a person is faced with an emotional situation, feeling good and optimistic is not enough to control the emotion, but he needs to have the best cognitive function in these situations. In essence, emotion regulation requires an optimal interaction of cognition and emotion to deal with adverse situations because humans interpret everything they encounter, and cognitive interpretations determine individuals' reactions. On the other hand, changes in each of the different parts of the functioning of cognitive systems such as memory, attention and alertness cause mood swings, so the role of cognitive emotion regulation in people's adaptation to stressful life events cannot be ignored. The results of Pearson correlation test in the present study show a significant level of relationship between the independent sub-variable of cognitive emotion regulation and all its components (except catastrophic) with the dependent variable of marital satisfaction among teacher couples in Kaliber. In other words, the higher the cognitive regulation of emotion among teacher couples in Kaliber city, the higher the level of marital satisfaction among couples. The result is consistent with the research resultsby Rusu, Bodenmann, Kayser (2019), Mirzaei, et al (2017). Also, according to the findings of Sadri et al. (2016), emotion regulation training has been effective on cognitive regulation of emotion, loneliness and social intimacy with an addicted husband.

The results of the present study also showed that one of the infuential factors in predicting marital satisfaction is social adequacy. Social adequacy includes the behaviors and social, emotional, and cognitive skills that human beings acquire on the path to a healthy transition from childhood to adulthood. If a person has low social adequacy, he will face difficulties in areas of work, daily living skills, independent living and participation in society. As employers often say, social adequacy is more important than actual work experience. In the present

study, the findings showed that having four skills of social adequacy play an essential role in marital satisfaction. This finding is consistent with the research results by Flanner et al. (1990). Flanner defined the concept of social adequacy in four dimensions (1- Cognitive skills and abilities 2-Behavioral skills 3- Emotional adequacy 4-Motivational components and expectation). Having all four skills is very important for teachers, whether for schooling or in private life and marital relationships. The results of Pearson correlation test showed that the higher the social adequacy among teacher couples in Kalibar city, the higher the level of marital satisfaction among couples. In other words, there is a significant direct relationship between these two variables and their components. Therefore, the lack of essential skills will cause marital dissatisfaction and reduced performance in the discussion of education in schools. The results of the present study can be used in premarital education as well as in interventions related to families and couples. It is suggested that the variables of emotional self-awareness, cognitive regulation of emotion and social adequacy about other relationships be examined.

5. Ethical Considerations

Compliance with ethical guidelines

All ethical principles are considered in this article. The participants were informed about the purpose of the research and its implementation stages. They were also assured about the confidentiality of their information and were free to leave the study whenever they wished, and if desired, the research results would be available to them.

Funding

This research did not receive any grant from funding agencies in the public, commercial, or non-profit sectors.

Authors' contributions

All authors have participated in the design, implementation and writing of all sections of the present study.

Conflicts of interest

The authors declared no conflict of interest.

References:

- Berrocal, P., & Pacheco, N. (2006). Emotional intelligence as predictor of mental, social and physical health in university students. *Spanish Journal of Psychology*, 9(1), 45-51. Doi: 10.1017/s1138741600005965
- Felner, R. D., Lease, A. M., & Phillips, R. S. C. (1990).

 Social competence and the language of adequacy as a subject matter for psychology:

 A quadripartite tri-level framework. The development of social competence in adolescence, 245-264.
- Hajihasani, M., & Sim, T. (2019). Marital satisfaction among girls with early marriage in Iran: Emotional intelligence and religious orientation. *International Journal of Adolescence and Youth*, 24(3), 297-306. Doi: 10.1080/02673843.2018.1528167
- Heidari, M., Shahbazi, S., Ghafourifard, M., & Sheikhi, R. A. (2017). Prediction of marital satisfaction based on emotional intelligence in postmenopausal women. *Journal of Menopausal Medicine*, 23(3), 196-201. Doi: 10.6118%2Fjmm.2017.23.3.196
- McKay, S. (2019). Family stability improves as divorce rates fall. *London*, *UK: Marriage Foundation*.

Doi: 10.1080/10502556.2020.1799308

- Mirzaei, Gh., Sarvaqd, S., Baquli, H., & Kuroshunia, M. (2019). The effectiveness of cognitive emotion regulation strategies on the dimensions of marital conflict in married staff of Shahid Beheshti Hospital in Shiraz. *Psychological Methods and Models*. 10 (36), 131-144.
 - https://www.sid.ir/en/Journal/ViewPaper.asp x?ID=738283
- Nasiriyah Dehsorkhi, R., & Mousavi, F. (1394). Study of some correlations between sexual satisfaction and marital satisfaction of married women in Isfahan, *Journal of Rooyesh Ravanshenasi*, 4 (11), 135-152. http://dorl.net/dor/20.1001.1.2383353.1394. 4.2.7.7
- Ochsner, K. N., & Gross, J. J. (2005b) The cognitive control of emotion. *Trendse in cognitive sciences*, 9, 242-249.

Doi: 10.1016/j.tics.2005.03.010

- Pluut, H., Ilies, R., Su, R., Weng, Q., & Liang, A. X. (2021). How social stressors at work influence marital behaviors at home: An interpersonal model of work–family spillover. *Journal of Occupational Health Psychology*.
 - Doi.apa.org/doi/10.1037/ocp0000298
- Rusu, P. P., Bodenmann, G., & Kayser, K. (2019). Cognitive emotion regulation and positive dyadic outcomes in married couples. *Journal of Social and Personal Relationships*, 36(1), 359-376.
 - Doi: 10.1177%2F0265407517751664
- Sadri Damirchi E, Asadi Shishegaran S, Esmaili
 Ghazivaloii F. Effectiveness of Emotion
 Regulation Training on Cognitive Emotional
 Regulation, Loneliness and Social Intimacy

- in Women with Addicted Spouse. Socialworkmag. 2016; 5 (2) :37-46 http://socialworkmag.ir/article-1-128-en.html
- Widiastuti, D. (2021). Marital Satisfaction in Individuals Who Remarry After Divorce. In *International Conference on Psychological Studies (ICPSYCHE 2020)* (pp. 131-137). Atlantis Press. Doi: 10.2991/assehr.k.210423.019
- Zare, H., & Solgi, Z. (1391). Investigating the Relationship between Cognitive Emotion Regulation Strategies and Depression, Anxiety and Stress in Students. *Journal of Mental Health Research*. 6 (3), 29-19. https://www.sid.ir/en/journal/ViewPaper.asp x?ID=354819