

The Role of Mindfulness and Social Competence in Predicting Girls' Problem Solving Mediated by Cognitive Flexibility: A Causal Model

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Abstract

Background: Examining the evolutionary process in life span indicates that adolescence is known as one of the most vulnerable stages of life, during which the prevalence and occurrence of emotional problems increases significantly. The present study was conducted to determine the causal relationships between problem solving, mindfulness, and social competence mediated by cognitive flexibility of female students.

Methods: The method of the present work was correlational, which was performed in the form of path analysis. The statistical population included all the ninth-grade female students in Zanjan in the academic year 2019. Based on the population size, 338 were selected as a sample through cluster sampling. For data collection, questionnaires of mindfulness (2006), social competence (1990), cognitive flexibility (2010), and problem-solving inventory (1982) were employed. The collected data were analyzed by the use of path analysis method, maximum likelihood method, Pearson correlation tests, path analysis, and SPSS/Amos software version 25.

Results: The results showed that there is a direct relationship between mindfulness ($\beta=0.63$, $P=0.001$) and flexibility ($\beta=0.14$, $P=0.001$) with problem solving. The study of indirect effects also revealed that the effects of social competence on problem solving ($\beta=0.272$, $P=0.001$), mindfulness on flexibility ($\beta=0.165$, $P=0.002$), and mindfulness on problem solving is significant.

Conclusion: Based on the findings of this study, it can be concluded that mindfulness, social competence, and cognitive flexibility can be considered as fundamental factors in solving the problem of ninth-grade female students.

Keywords: Problem solving, Mindfulness, Social skills, Cognitive flexibility

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1. Introduction

A study of the evolutionary process in life span indicates that adolescence is known as one of the most vulnerable stages of life, during which the prevalence and incidence of emotional problems increases significantly (1). However, the findings indicate that there are some gender differences in this regard (2, 3). In other words, women and girls are more vulnerable to several mental disorders. Therefore, identifying relevant and effective factors in them can be a shock to some daily stresses and improve the psychological well-being (2).

On the other hand, due to the extent and continuous changes of life in today's societies, in which increasing stress is known to be an integral consequence, the existence of some basic life skills, such as problem solving, for each person is necessary. In fact, most of the things that people face in their daily lives involve some kind of problem solving. The characteristic of problem solving compared to other aspects of thinking is that problem solving is focused on people's everyday life (4). Consistent with the theoretical literature, a review of

research findings shows that "problem solving" is one of the variables related to pathology and psychological well-being involved in a wide range of psychological problems, such as depression, anxiety, and suicide (5, 6). The use of inefficient problem-solving strategies can also develop some harmful personality patterns in individuals (7). Classical reports also indicate that depressed people not only have poor problem solving compared to normal people, but also turn ordinary life stresses into emotional problems (8). Deficiency in problem solving can be in the form of negative attitude towards the problem (seeing the problem as a threat, doubt in the ability to solve the problem), impulsive problem solving (trying to solve the problem in a hurry and without a specific method) or avoidance (passivity, procrastination, and excessive dependence on others) (6). In addition to the detrimental role of maladaptive strategies, the findings imply that effective problem-solving methods can increase psychological well-being in adolescents (9); hence, identifying factors related to problem solving and the intervention in them can increase mental health which is traumatized due to psychological problems.

By studying the problems of life and educational processes of students, it can be stated that problems often occur in the social context; thus, having some social capabilities can be an effective factor in solving them. A review of the evolutionary approaches of psychopathology also demonstrates that it is one of the fundamental components of the normal evolution of social competence (10), which is also related to problem solving (11). Social competence is a set of skills, attitudes, and emotional states that contribute to a person's socially appropriate attitude (12). Therefore, it can be expected that having social competence can help a person to achieve effective problem-solving methods and proper use of social capacities. Findings have also revealed that social skills directly and through flexibility mediate problem solving in students (13). Kakabararee and Ezati (14) reviewed the quality of social relations as a factor related to solving social problems in students, which is consistent with Stevens' finding (15). In fact, studies have shown that high social self-efficacy has appropriate problem-solving strategies while low social self-efficacy is associated with maladaptive strategies, such as withdrawal and denial, which can be seen in the form of dysfunctional coping and depression (16, 17).

Along with social competence, one of the problem-solving structures attracting a wave of research in recent decades is "mindfulness". Mindfulness is a state of consciousness in which a person deliberately and unconsciously pays attention to the present moment (18). Research has implied that mindfulness is positively associated with factors related to health and well-being and inversely associated with psychological stressors (19, 20). By focusing on components, such as alertness and the present tense, mindfulness can influence people's automated processing and improve their flexibility (21). Therefore, it can be expected that mindfulness as a factor is related to problem solving. The findings have also implied that mindfulness increases problem solving in students. However, research has revealed that most studies on mindfulness focused on clinical and health issues (22) and its relationship with several functional and cognitive areas, such as problem solving, has received less attention.

Some also believe that mindfulness can enhance several cognitive activities, such as creativity performed through "flexibility" (23, 24). Therefore, it can be expected that flexibility can mediate between mindfulness and problem solving. Literature has indicated that mindfulness-based exercises can increase cognitive flexibility by reducing mental rigidity (25). Cognitive flexibility refers to a person's

level of experience in the face of internal and external experiences. This personality trait is present in adolescents to different degrees and determines the type of their reaction to new experiences (26). Martin and Adnerson defined cognitive flexibility as an individual's awareness of communication options and a tendency to adapt to position and self-efficacy in flexibility. They believe that people with this ability are more confident in their ability to communicate effectively, particularly in new situations (27). In fact, it can be stated that having this ability balances people's thoughts and actions in feedback to others and increases their power of adaptation and well-being. Research has also shown that cognitive flexibility can affect problem-solving adaptation in difficult situations by facilitating the process (28). The study by Ghasemi and colleagues (29) demonstrated that there is a significant difference between cognitive flexibility and problem solving in students with math disorders and normal people. Therefore, it can be said that these two structures are known as the two basic dimensions of executive functions that can affect the educational process in adolescents in addition to intervening in their psychological health. Considering the fundamental role of social competence in the scope of change and its relationship with problem solving, it can be expected that it will also play a role in flexibility. Studies have illustrated that there is a negative correlation between deficits in flexibility and social skills and adjustment while there is a positive relationship between aggression and attention deficit hyperactivity disorder (30, 31). However, studies have shown that there are limitations in this regard and some social aspects affecting flexibility and problem solving are still neglected (30, 32). Also, research has often been conducted on a different population of the adolescent community, especially done in samples other than female adolescents, while most stress increases during the adolescence stage. Also, most studies consider limited psychological structures; therefore, some research gaps in this field can be seen (30-33). In general, according to theoretical and research statements, it can be said that if the conceptual model of problem solving is approved, it can be an introduction to some experimental studies on preparing educational-therapeutic packages with the aim of increasing problem-solving ability in teenage girls. Consequently, it is necessary to conduct research with the objective of identifying the significant factors in problem-solving of high school girls, ninth-grade students. Therefore, the present study aimed to determine the causal relationship between social competence and mindfulness by problem solving and mediated by cognitive flexibility in ninth-grade female students.

2. Methods

The current research is a correlational study conducted in the form of path analysis. The statistical population included all the ninth-grade female students in Zanjan, Iran in the academic year 2019, a group of which were selected for our study. According to the information available in the Bachelor of Statistics and Budget of the General Directorate of Education of Zanjan Province, the number of all these students was 2784. Also, all participants completed the ethical consent form to participate in the study. To select the sample population, Zanjan was first divided into four regions (North, South, West, and East). Afterwards, by the use of the cluster sampling method, two schools from each region and a total of eight schools, including schools named Ansar, Shahid Shiroudi, Imam Reza (AS), Hijab, Isar, Parvin Etesami, Sepideh Kashani, and Shahid Bahonar, were selected as sample schools. Considering the sample size determined in Morgan table, 338 students from the chosen schools were selected as the sample population through simple random sampling. To collect data, some standard tools and the researcher questionnaire were employed and subsequently examined. To determine the content validity of the questionnaire, the content validity ratio (CVR) and content validity index (CVI) were used for the quantitative evaluation. Eight experts with PhD in Psychology and according to the Lawshe's table, a $CVR \geq 0.62$ confirmed the necessity of the items. In the second section, to evaluate the CVI, the questions were about the relevancy, clarity, and simplicity of each item based on a Likert scale. A CVI score >0.79 was considered as acceptable score.

1. Five Facet Mindfulness Questionnaire (FFMQ):

This questionnaire is a 39-item self-assessment scale developed by Baer, Smith, and Allen (34). This tool was obtained by performing factor analysis on the items of Freiburg questionnaire, Awareness Scale and Mindfulness Attention, Konchuki Mindfulness Scale, and Southampton Mindfulness Questionnaire. The result comprised five factors (observation, description, action from consciousness, lack of reaction to inner experiences, and lack of judgment), measuring the five dimensions of mindfulness on a five-point Likert scale. In the review of Baer and colleagues, internal consistency for the whole questionnaire and alpha coefficients for its factors have been reported to be acceptable (34). In Iran, the psychometric adequacy of this list on university students has been studied. In the report of Ahmadvand and co-workers, the coefficients of factors are reported to be between 0.55 and 0.83,

which is acceptable. Given the aforementioned reports, it can be thus concluded that the questionnaire utilized in this study is currently a suitable tool for measuring the level of individuals' mindfulness (35). In the present work, content validity ratio ($CVR=0.67$) and content validity index ($CVI=0.81$) were in a reasonable range.

2. Felner Social Competency Questionnaire:

This questionnaire comprises 47 questions answered on a seven-point Likert scale (from strongly agree to strongly disagree) and measures the four dimensions of cognitive skills and abilities, behavioral skills, social adequacy, motivational motivation, and expectation. Flanner and colleagues calculated the construct validity of this questionnaire to be 99% and significant. These researchers also reported its reliability coefficient through the use of the retest method at a time interval of four weeks of 0.89 (36). Abolghasemi and co-workers found the construct validity of the scale through factor analysis and reported the relevant coefficient equal to be 0.82 in their work. The reliability coefficient of this tool was also obtained via Cronbach's alpha coefficient of 0.89 (37). In addition, in our findings, content validity ratio ($CVR=0.63$) and content validity index ($CVI=0.79$) were in the reasonable range.

3. Dennis and Vander Wal Cognitive Flexibility Questionnaire:

The scale consists of 20 questions scored in a seven-point range (strongly agree to strongly disagree) that includes three subcomponents: 1) the desire to understand difficult situations as controllable situations, 2) the ability to understand several alternative justifications for human life events and behavior, and 3) the ability to create multiple alternative solutions for difficult situations. Dennis and Vanderwall shed light on the validity of the questionnaire using 80% factor analysis method and its reliability through Cronbach's alpha for the whole scale, controllability perception, and perception of different options were 91%, 91%, and 84%, respectively (38). In Iran, the internal consistency of the total score of this questionnaire and two factors of problem solving processing and controllability perception have been reported equal to 0.893, 0.779, and 0.81, respectively (32). The total score of the Cognitive Flexibility Questionnaire and two factors of problem-solving processing and controllability perception also had a significant relationship with the overall score of the Beck Depression Test, which was equal to -0.665, 0.577, and -0.597, respectively. This indicates the confirmation of psychometric parameters of this tool in domestic research (39). Our findings implied that the content validity ratio ($CVR=0.70$) and content validity index ($CVI=0.83$) were in an acceptable range.

4. Heppner problem-solving inventory: Made by Heppner, this questionnaire comprises 35 questions along with three subscales (avoidance style, trust style, and personal control style), which are the six scales of Likert scale: Strongly Disagree (0), Disagree (1), Slightly Disagree (2), Slightly Agree (3), Agree (4), and Strongly Agree (5). In a study, Heppner calculated the internal consistency of this questionnaire to be 0.84 with the scale of acceptance or avoidance of problem solving activities and its reliability using Cronbach's alpha coefficient reported above 0.70 (40). In the study of Jalili and colleagues, the face validity of the questionnaire was confirmed by experts and the reliability of the questionnaire was reported with Cronbach's alpha method for a total scale of 0.90 and subscales between 0.72 and 0.85 (41). In the present study, our results also revealed that content validity ratio (CVR=0.75) and content validity index (CVI=0.79) were in an acceptable range.

The method of this research was as follows: First, the relevant letter of introduction was received from the Islamic Azad University of Zanjan and the General Department of Education of Zanjan Province, Iran. Afterwards, it was referred to the selected schools (Ansar, Shahid Shiroodi, Imam Reza (AS), Hijab, Isar, Parvin Etesami, Sepideh Kashani, and Shahid Bahonar) and after the relevant coordination, the questionnaires were given to the students. Finally, the collected data were analyzed via path analysis method and maximum likelihood method, all of which were performed using 25 Amos/Spss version. Chi-square indices (c^2), root mean square error index (RMSEA),

goodness-fit index (GFI), incremental fitness index (IFI), and adaptive fitness index (CFI) were applied to evaluate the model quality. GFI, IFI, and CFI indices must be equal to or greater than 0.95 to indicate a good fit of the model with

The data. A df/c^2 index of smaller than 3 is acceptable and the closer it is to 1, the more ideal the model becomes. Finally, an RMSEA of less than 0.08 reveals that the model is acceptable and the closer it is to 0, the better is the fit of the model.

3. Results

A survey of demographic findings showed that more than 50% of the respondents were in poor to moderate condition in terms of socio-economic status. In addition, 80% of the participants (294 people) were in the age range of 15 to 16. After reporting the demographic findings in this section, the descriptive findings of the research variables in the form of mean and standard deviation were examined.

As indicated in Table 1, most variables are in the range of -2 to + 2 in terms of Kurtosis and skew, illustrating the relative normality of the distribution (42). Also, in line with the previous indicator, the significant level ($P>0.05$) of the Kolmogorov-Smirnov (K-S) test showed that the distribution was normal in the present study.

The correlation matrix of the variables is presented

Table 1: Descriptive findings for research variables

| Variable | Component | Mean | Standard deviation | Skewness | Kurtosis |
|-------------------------------|--------------------------------------|--------|--------------------|----------|----------|
| Mindfulness | Observation | 25.08 | 6.54 | 2.00 | 1.87 |
| | Description | 14.36 | 4.30 | 1.09 | -1.38 |
| | Non- judgment | 16.94 | 4.54 | 1.36 | 1.20 |
| | Non- reactivity | 22.91 | 6.84 | 2.03 | 1.09 |
| | Action with awareness | 39.16 | 17.71 | -1.09 | 1.83 |
| Mindfulness total score | | 115.48 | 35.13 | 0.09 | 0.23 |
| Social competence | Emotional | 17.02 | 4.54 | 0.20 | 0.15 |
| | Behavioral | 27.28 | 4.12 | 1.35 | -1.23 |
| | Motivational | 35.76 | 6.86 | 0.51 | 2.08 |
| | Cognitive | 20.90 | 4.54 | 1.03 | 1.14 |
| Social competence total score | | 106.98 | 12.56 | 1.06 | 1.19 |
| Flexibility | Control-ability | 25.07 | 6.53 | 1.41 | 1.01 |
| | Several alternative justifications | 14.41 | 4.23 | -1.76 | -1.65 |
| | Several alternative solutions | 16.95 | 4.51 | 1.03 | 1.15 |
| Flexibility total score | | 56.46 | 12.81 | 0.86 | 0.63 |
| Problem Solving | Self-Confidence in Problem Solving | 40.84 | 6.04 | 1.08 | 1.11 |
| | Avoidant attachment to problem style | 36.84 | 4.04 | 0.81 | 0.13 |
| | Self-control | 16.32 | 4.43 | 0.23 | 0.25 |
| Problem-Solving total score | | 54.99 | 12.75 | 1.34 | 1.57 |

in Table 2, which allows the superficial inference from the research findings. Examining the relationships of two variables in Table 2 shows that the correlations of the components of mindfulness are in the range of 0.21 to 0.81. Also, the correlation of mindfulness components with the whole scale shows a correlation of 0.70 to 0.90. Examination of the correlation between the subscales of cognitive flexibility with each other and with flexibility total score showed that the minimum and maximum correlation among the components is in the range of 0.42 to 0.61; this indicates a relatively good internal consistency. Additionally, among the subscales, the highest correlation is between controllability and flexibility total score ($r=0.66$; $P<0.01$).

1- Observation, 2- Description, 3- Non- judgment, 4- Non- reactivity, 5- Action with Awareness, 6-

Mindfulness total score, 7-Emotional, 8- Behavioral, 9- Motivational, 10- Cognitive, 11- Social competence total score, 12- control-ability, 13- Several alternative justifications, 14- Several alternative solutions, 15- Flexibility total score, 16- Self-Confidence in Problem Solving, 17- Avoidant attachment to problem style, 18- Self-control, 19- Problem Solving total score.

The study of correlations shows that there is a strong relationship between the components of mindfulness and social competence; however, the correlation between the emotional components is not very strong compared to other cognitive, behavioral, and motivational dimensions. There was a relatively strong correlation between mindfulness total score and social competence total score at the level of 0.01 ($r=0.65$). The association of cognitive flexibility with

Table 2: Correlation matrix among research variables

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|----------|---------|---------|---------|--------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|--------|----|
| 1 | 1 | | | | | | | | | | | | | | | | | | |
| 2 | 0.61** | 1 | | | | | | | | | | | | | | | | | |
| 3 | 0.53** | 0.46** | 1 | | | | | | | | | | | | | | | | |
| 4 | 0.48** | 0.46** | 0.45** | 1 | | | | | | | | | | | | | | | |
| 5 | 0.81** | 0.74** | 0.27** | 0.65** | 1 | | | | | | | | | | | | | | |
| 6 | 0.76** | 0.71** | 0.70** | 0.75** | 0.90** | 1 | | | | | | | | | | | | | |
| 7 | -0.22** | 0.14** | -0.12** | 0.11** | -0.20** | -0.19** | 1 | | | | | | | | | | | | |
| 8 | 0.59** | 0.95** | 0.47** | 0.47** | 0.76** | 0.75** | -0.15** | 1 | | | | | | | | | | | |
| 9 | 0.54** | 0.50* | 0.95** | 0.42** | 0.74** | 0.73** | -0.13* | 0.52** | 1 | | | | | | | | | | |
| 10 | 0.45** | 0.42** | 0.43** | 0.94** | 0.64** | 0.79** | -0.11* | 0.47** | 0.44** | 1 | | | | | | | | | |
| 11 | 0.56** | -0.44** | 0.48** | 0.58** | 0.64** | 0.65** | -0.19** | 0.46** | 0.46** | 0.57** | 1 | | | | | | | | |
| 12 | 0.90** | 0.61** | 0.53** | 0.48** | 0.81** | 0.78** | -0.22** | 0.59** | 0.54** | 0.45** | 0.56** | 1 | | | | | | | |
| 13 | 0.60** | 0.89** | 0.46** | 0.45* | 0.72** | -0.14** | 0.59** | 0.50** | 0.49** | 0.40** | 0.42** | 0.61** | 1 | | | | | | |
| 14 | 0.54** | 0.47** | 0.90** | 0.45** | 0.73** | 0.70** | -0.13* | 0.48** | 0.58** | 0.44** | 0.48** | 0.53** | 0.46** | 1 | | | | | |
| 15 | 0.66** | 0.50** | 0.57** | 0.65** | 0.72** | 0.74** | 0.18** | 0.52** | 0.54** | 0.62** | 0.82** | 0.66** | 0.49** | 57.0** | 1 | | | | |
| 16 | 0.49** | 0.60** | 0.53** | 0.48** | 0.81** | 0.78** | -0.22** | 0.58** | 0.54** | 0.45** | 0.56** | 0.69** | 0.60** | 0.53** | 0.67** | 1 | | | |
| 17 | 0.61** | 0.50** | 0.44** | 0.45** | 0.72** | -0.70** | -0.13* | 0.94** | 0.49** | 0.40** | 0.41** | 0.61** | 0.56** | 0.45** | 0.47** | 0.58** | 1 | | |
| 18 | 0.51** | 0.46** | 0.59** | 0.46** | 0.71** | 0.68** | -0.11** | 0.46** | 0.79** | 0.43** | 0.44** | 0.51** | 0.46** | 0.59** | 0.54** | 0.53** | 0.49* | 1 | |
| 19 | 0.76** | 0.69** | 0.67** | 0.49** | 0.79** | 0.74** | -0.09** | 0.67** | 0.46** | 0.50** | 0.50** | 0.68** | 0.68** | 0.62** | 0.62** | 0.81** | 0.72* | 0.74** | 1 |

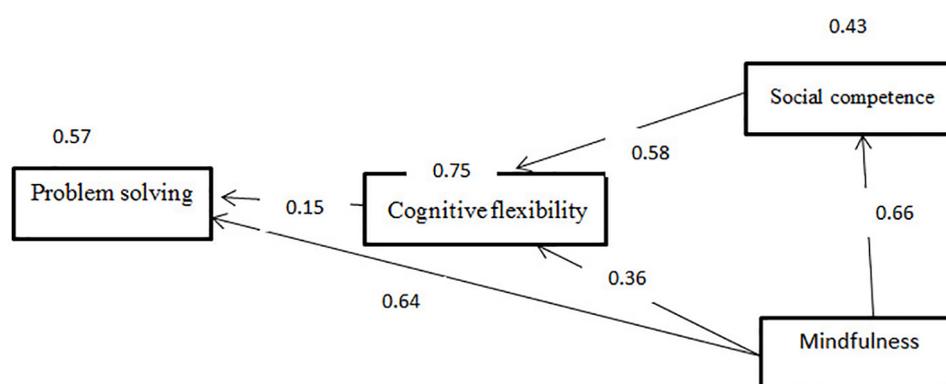


Figure 1: The figure shows proposed model to explain problem solving with path coefficients.

Table 3: Fitness indicators for the conceptual model in explaining problem solving

| Variable fitting indices | CMIN | RMSEA | GFI | CFI | NFI |
|--------------------------|------|-------|------|------|------|
| Problem Solving | 0.00 | 0.68 | 1.00 | 1.00 | 1.00 |

mindfulness and social competence respectively was 0.74 and 0.82, implying a strong correlation with high probability ($P < 0.01$). Observing a two-variable correlation among problem solving and other predictor variables, namely mindfulness ($r = 0.74$; $P < 0.01$), social competence ($r = 0.50$; $P < 0.01$), and flexibility ($r = 0.62$; $P < 0.01$), also reveals significant relationships among the variables. To analyze the causal model on problem-solving behaviors of the ninth-grade students, path analysis was employed. Before the main analysis, the assumptions related to causal modeling were examined, the results of which are reported in the following tables and figures.

In addition to evaluating the Univariate distribution, studying the form of multivariate data distribution “Mahalanobis Distance”, particularly the box plot diagram, showed that the information about 21 participants was in the range of the responses of multivariate outlier. For this reason, information about these participants was removed from the data and then the data analysis was performed. The indices related to variance inflation factor and tolerance factor (tolerance = 0.918; VIF = 1.13) illustrated the confirmation of the assumption of multiple correlation; thus, the conditions were suitable for path analysis, which is reported in this section. As can be seen in Figure 1, the proposed model explains more than half of the problem-solving variance in girls. However, ensuring the adequacy of the model requires examining the indicators of model adequacy and the level of significance of the paths.

After implementing the model, with the aim of

evaluating the indicators related to the goodness of the model, the relevant indicators were reviewed, the results of which are reported in the following tables.

According to Table 3, significance level of Chi-square indicated that the proposed model based on this index did not have a good fitness. However, considering that c^2 is an indicator affecting the sample size strongly, we studied the following indicators. Examination of NFI, CFI, and GFI, all of which were greater than 0.95, stated that the model is in good support. Meanwhile, the high RMSEA did not imply a good fit of the model. Therefore, to increase the quality of the model, the path coefficients table of the model was reviewed and the path coefficients not at a significant level were eliminated.

Table 4 shows the significance level coefficients related to the path of social competence to solve the problem indicated ($P = 0.065$) that the mentioned paths were not statistically significant. Therefore, they were removed from the proposed model and the redefined open model was reviewed, the results of which are represented in the Table 5.

Examination of the indicators related to the quality of the redefined model depicted that after removing the non-significant paths, in addition to confirming the softened fit index, adaptive fit, good fit, and the root mean square root error index (RMSEA) decreased significantly. Consequently, all the indicators approved the modified model. Therefore, the significance level of the path-related coefficients was reviewed. All the paths were at a significant level; hence, the direct and indirect

Table 4: Estimation of path coefficients in the proposed model

| Variables | | β | P |
|------------------------|-----------------------|---------|-------|
| Mindfulness→ | Social competence | 0.65 | 0.001 |
| Social competence→ | Cognitive flexibility | 0.58 | 0.001 |
| Mindfulness→ | Cognitive flexibility | 0.36 | 0.001 |
| Mindfulness→ | Problem solving | 0.65 | 0.001 |
| Cognitive flexibility→ | Problem solving | 0.23 | 0.001 |
| Social competence→ | Problem solving | -0.11 | 0.065 |

Table 5: Fitness indices for the redefined model

| Variable fitting indices | χ^2 | Df | P | RMSEA | GFI | CFI | NFI |
|--------------------------|----------|----|-------|-------|------|------|------|
| Problem solving | 3.37 | 1 | 0.006 | 0.08 | 0.99 | 0.99 | 0.99 |

Table 6: Estimation coefficients of the relationship model among mindfulness, social competence, and problem solving mediated by flexibility

| Response variable | Predictive variable | Direct effect | | | | Indirect effect | Total effect |
|-------------------|---------------------|------------------------|----------------|-------------------|--------|-----------------|--------------|
| | | Non-standard estimates | Standard error | Standard estimate | P | | |
| Social competence | Mindfulness | 1.29 | 0.081 | 0.657 | <0.001 | ----- | 0.657 |
| Flexibility | Social competence | 0.55 | 0.034 | 0.583 | <0.001 | ----- | 0.538 |
| Problem solving | competence | | | | | 0.085 | 0.085 |
| Flexibility | Mindfulness | 0.67 | 0.067 | 0.363 | <0.001 | 0.383 | 0.746 |
| Problem solving | Mindfulness | 0.58 | 0.049 | 0.639 | <0.001 | 0.109 | 0.748 |
| Problem solving | Flexibility | 0.07 | 0.026 | 0.146 | 0.007 | ----- | 0.146 |

effects and the whole relationship are discussed in the Table 6.

Based on Table 5, it can be said that there were direct relationships between mindfulness ($\beta=0.63$, $P=0.001$) and flexibility ($\beta=0.14$, $P=0.001$) with problem-solving. The study of indirect effects demonstrated that the effects of social competence on problem solving ($\beta=0.272$, $P=0.001$), mindfulness on flexibility ($\beta=0.165$, $P=0.002$), and the mindfulness on problem solving were significant. Overall, according to Figure 2, the findings of the analysis revealed indicated that the modified model was able to explain more than half of the variance of problem-solving in the subjects.

4. Discussion

The purpose of the current work was to determine the causal relationships among mindfulness, social competence, and problem solving mediated by cognitive flexibility in ninth-grade students. Findings from the analysis showed that there was a significant relationship among mindfulness, social competence, and flexibility with problem solving and the final model was able to explain 0.57 of the variance of problem solving in the subjects.

The first finding of the study revealed that mindfulness had significant direct and indirect effects

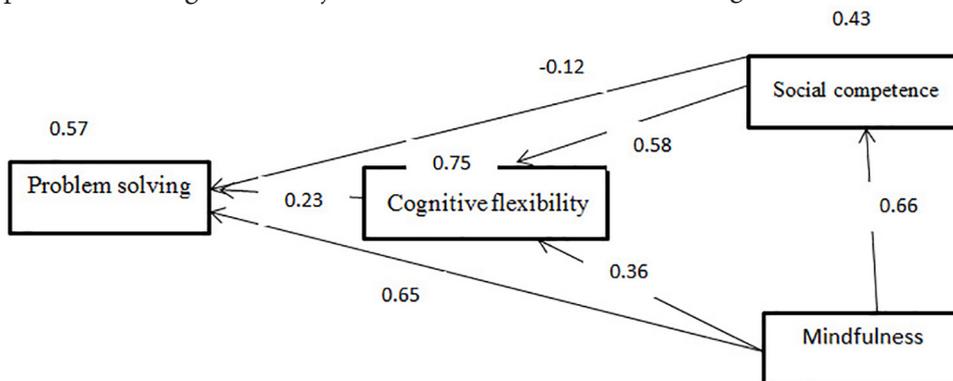


Figure 2: The figure shows the corrected fit figure to explain problem solving.

(flexibility mediation) on problem solving, which was in line with the studies of Pourmohamadi and Bagheri (21) and Moore and Malinowski (25). Consistent with the present findings, studies have implied that mindfulness-based meditations improve problem-solving insights by increasing people's awareness (43). It can also be stated that mindfulness emphasizes the present by focusing on acceptance and non-judgment rather than the past. This can increase people's flexibility, which gives people the ability to organize their prior knowledge and contributes to developed and easy responses to diverse and changing environmental needs (35).

The present explanation may be based on the broad and build theory of positive emotions (44). According to this theory, positive emotions, as opposed to negative emotions limiting the behavioral treasury of individuals to certain actions, expand the positive emotions of the treasury of actions and behavior that result in the facilitation of flexibility. Furthermore, mindfulness by increasing the attention to the present and withdrawing from some harmful thought processes, such as rumination can reduce harmful factors, cause the spread of positive emotions (45) in individuals, which results in an increase in the treasury of thought-action. Finally, it will facilitate flexibility and problem solving.

Other findings of the present study include the relationship between social competence and problem solving. Based on our results, social competence mediated the flexibility of problem solving indirectly. This is in accordance with the findings of Reijntjes and colleagues (46). Stevens also believed that children with high cognitive flexibility have better social skills and show less behavioral problems (15). Explaining this finding, it can be said that having skills such as the ability to learn, different perspectives, behavior management, and the ability to work with others, which are known as the basic components of social adequacy, have a high degree of overlap with some cognitive abilities known as "Executive functions". These capabilities (Executive functions) allow the individual to evaluate their behavior, select the most appropriate ones, and make the necessary changes (47). Cognitive flexibility is considered as one of these functions providing effective problem solving for the individual. In fact, this ability causes a person to focus on previous situations and apply what one has learned and flexibility to solve or understand the problem one faces in new situations. Therefore, due to the overlap of social competence and executive functions, it can

be expected that the high levels of social competence are associated with high flexibility and thus problem solving. Social competence also allows a person to have a good management of their interpersonal behavior; thus, the person feels less tension and conflict in this area. Therefore, less negative emotions, more open vision, and more flexibility are experienced, and facilitates the problem-solving process.

4.1. Limitation

The present study was associated with some limitations that require caution in generalizing the findings to other communities. For example, although the study of unisex can be a strong point due to the high emotional problems in this group, the generalization of the findings to boys is limited. The present results are limited to the ninth-grade students in Zanjan, Iran which was not controlled by some demographic variables; hence, it is necessary for future studies with different geographical conditions to provide more generalizable findings to researchers and relevant institutions. Finally, it is suggested that in future research, the mentioned research be performed in two sexes. Considering that the presented model could explain the appropriate part of problem solving, it is suggested that future studies be conducted by preparing some educational packages. Therapies based on research variables can increase the solution of the problem to provide a platform for empowering students and adolescents in the face of the ongoing changes in the world today.

5. Conclusions

The results revealed that there was a direct relationship between mindfulness and problem solving, mediated by cognitive flexibility. Cognitive flexibility could also mediate between social competence and problem solving. Also, based on the findings of this research, it can be concluded that mindfulness, social competence, and cognitive flexibility could be considered as fundamental factors in the problem solving of ninth-grade female students.

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Ethical Approval

This study was approved by the Research Council of

the Islamic Azad University, Zanjan Branch with the code of IR.IAU.Z.REC.1399.027.

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