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THE RELATIONSHIP BETWEEN MINDFULNESS AND COPING STRATEGIES WITH WORKING MEMORY IN POWER PLANT'S STAFFS (CASE STUDY: SHIRVAN COMBINED CYCLE POWER PLANT)

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ABSTRACT

The purpose of this study was to investigate the relationship between mindfulness and coping strategies with working memory in employees of Shirvan's combined cycle power plant. The statistical society consisted of all employees of the gas and steam sectors of Shirvan CCPP (700 people). According to Krejcie and Morgan table, the research samples were 248 people, which have been selected accidentally. The research method was descriptive and correlational, that has been conducted in the form of field. The data collection tool in this research was a four-pages questionnaire with 108 questions, including three standard questionnaires on Mindfulness of Baer et al (2006), coping strategies of Lazarus and Folkman (1984), and Daneman and Carpenter's (1980) working memory. Furthermore, the descriptive and inferential statistical methods (Kolmogorov-Smirnov, Spearman correlation coefficient at a significant level of $P < 0.05$ and simple linear regression) were used for data analysis and also Smart PLS software has been used to survey the mediating role of coping strategies in the relationship between mindfulness and working memory. The results indicated that there is a significant relationship between mindfulness and problem-based/emotion-based coping strategies with the working memory of power plant's staffs. In addition, mindfulness and problem-based/emotion-based coping strategies have the ability to predict the working memory of employees. Besides, the results showed that coping strategies play a mediator role in the relationship between mindfulness and working memory. With respect to the research findings, human resources managers of Shirvan CCPP are suggested to improve the personnel's working memory by holding the mindfulness and coping strategies training courses.

Keywords: *Mindfulness, Coping strategies, Working memory and Shirvan CCPP.*

INTRODUCTION

The Working memory is a form of short-term memory that is more complicated a bit and refers to the ability of people in temporary storage and data manipulation when they are performing cognitive assignments (Baddeley, 2000). Working memory is raised when a person has to check different options and make a quick and accurate decision. For instance, someone goes to the shop and wants to make a decision that buying bigger laundry powder is more economical or the small one? In this case, he must recall the price of each powder, then do mental calculations for comparison, and then decide to buy which one (Nelson & Gilbert 2005).

Working memory is the core of high-level cognitive activities and is an essential component in learning processes of logical reasoning, problem solving, and fluid intelligence. It even has a role in regulation of emotions and social interactions (Angel et al, Quotes by Zinke et al, 2011). Working memory plays an important role in natural and normal performance and its malfunction is the main cause of disorders such as psychiatric and neurological. Working memory function is influenced by various demographic factors such as age, gender, education level and general intelligence; and decreases with age as well (Caplan, 2007, Quotes by Yousefi et al, 2009). Working memory can be related to various variables, that mindfulness is one of them.

Some scholars consider mindfulness as a prerequisite for solving managerial problems, understanding the environmental conditions correctly, recognizing the strengths and weaknesses of the organization, and an important factor in intellectual stability and management thinking. Mindfulness refers to a meditation which emphasis on present moment awareness. Over the past 30 years, therapeutic use of mindfulness interest has been increased, somehow that, the review of its background of realization shows up more than 70 scientific articles which have been published till 2007 (Ludwig & Kabat-Zinn, 2008).

It seems that mindfulness, based on its cognitive, yet flexible and non-judgmental structure, not only have the ability to explain the cognitive relationship deeper, but also points out the new dimensions of mind and body link (Kabat Zin, 2005). Mindfulness studies in work and organizational environments have figured out the promising results (Cunningham, 2013, Quotes by Fattahi et al, 2015).

From the perspective of(Lazarus and Folkman 1998, Quotes by Abolghasemi and Narimani, 2005), coping, refers to the person Intellectual, emotional and behavioral efforts which being used to overcoming, tolerating or minimizing stress complications when faced with psychological pressures. Coping styles are defined as attempts either to enhance the fit between the person and the environment or to manage the events that perceived as stressful.

Lazarus and Folkman (1998) consider the copying strategies as the method of changing or interpreting the situations. In their view, these strategies are a dynamic and continuous process and generally divided into two types of Problem-focused and Emotion-focused. Problem-focused coping strategies (focusing on the problem) indicates actions that aimed to change or reduce the stressful situations. Usually, when a situation or event can changed or a person imagines that the situation can be controlled and modified, the problem-focused strategy will be used. The emotion-focused coping strategies (focused on excitement) are the setting up an emotional response to a problem. While the situation or event is unchangeable or one has this idea, the emotion-focused strategy can be used. Of course, it can't be said that there is a good or bad coping strategy, in special situations and conditions, each of these two types of coping strategies will be used as a way to fight issues and problems, in such a way that any of these strategies may have constructive or non-constructive status. For instance, one who uses a constructive problem-focused coping strategy, usually accepts the problem-solving responsibility, seeks to obtain correct information about the problem, looking for help from others, make realistic and practical decisions, trying to carry out the plans singly or with the help of others, have an optimistic view of doing things and solving problems, and has high levels of self-efficacy and happiness. Vis-a-vis, a person who use a non-constructive problem-focused coping strategy, accepts less responsibility for the solution of the problem, seeks



inadequate and incorrect information, looking for help in inappropriate resources, makes unrealistic decisions, has a pessimistic view and low levels of self-efficacy and happiness (Car, 2004). However, according to the provided contents and descriptions and considering the stressfulness of the power plant's personnel activities, this study has investigated the relationship between mindfulness and coping strategies with working memory in the staff of this organization.

Research history

Sorati (2012) has studied the effectiveness of mindfulness therapy on improving coping styles in MS patients in Tehran in her dissertation research. The research findings indicated the effectiveness of mindfulness therapy in reducing of avoidance and emotion-focused coping styles and maintaining the effectiveness during tracking period, and also increasing the problem-focused coping style and maintaining the effectiveness during tracking period.

Khedri and Dabaghi (2014) have surveyed the relationship between the coping styles and the mental health of a military force headquarter's duty soldiers. The results of the study showed that the average soldier's health is at an unsatisfactory level. There is also a positive correlation between problem-focused coping strategies and soldiers' mental health, and the emotion-focused coping style has a negative correlation with the mental health of the soldiers. Generally, the use of problem-focused coping strategies leads to improved mental health of the soldiers, and those with low mental health mostly use emotion-focused coping strategies.

Josefsson et al (2014) came up with a research titled "The Effects of a Short-term Mindfulness Based Intervention on Self-reported Mindfulness, Decentering, Executive Attention, Psychological Health, and Coping Style: Examining Unique Mindfulness Effects and Mediators". Analyses of covariance showed that the mindfulness group scored higher than the wait-list group on self-reported mindfulness and psychological well-being. However, no differences were found on decentring, anxiety, depression, executive attention, or coping style. Moreover, the study failed to distinguish any unique mindfulness effects since there were no differences between mindfulness and relaxation on any of the variables.

Fattahi et al (2015) in a study entitled "The Effect of Mindfulness Teaching and Practicing Technique on Focus and Attention Increasing" which were performed on two equal groups in Fars Province found that, the teaching and practice of mindfulness has a positive effect on the increasing of transitional attention and people's focus.

Lind et al (2014) in a research titled "Searching for existential security: A prospective qualitative study on the influence of mindfulness therapy on experienced stress and coping strategies among patients with somatoform disorders" found that treatment positively influenced the patients' illness perceptions, stress-experiences, body- and self-awareness, coping strategies, self-image, social identity and social functioning.

Azkhosh and Nobakht (2016) in a research entitled "The relationship between Mindfulness and Coping Strategies in Chronic pain patients" determined the mindfulness and coping strategies ratio of the chronic pain patients and compare it with the normal people. The results of this study showed that the relationship between mindfulness and emotion-focused coping strategies in the chronic pain group was negative and significant, while this relationship was not significant in the normal group. Nevertheless, there is a positive and significant relationship between mindfulness and problem-focused coping strategies in both groups. In addition, the results didn't show any significant difference in problem-focused coping



strategies. These results suggest that the people, who have a higher mindfulness level in both chronic pain and non-patient groups, mostly use problem-focused coping strategies.

Quach et al (2016) in a research entitled "A Randomized Controlled Trial Examining the Effect of Mindfulness Meditation on Working Memory Capacity in Adolescents" observed that participants in the mindfulness meditation condition showed significant improvements in active working memory, whereas those in the hatha yoga and waitlist control groups did not. No statistically significant between-group differences were found for stress or anxiety. Results highlight the importance of investigating the components of mindfulness-based interventions among adolescents given that such interventions may improve cognitive function. More broadly, mindfulness interventions may be delivered in an abridged format, thus increasing their potential for integration into school settings and into existing treatment protocols.

Gholami (2016) in a research entitled "Influence of mindfulness education on active memory and solving the verbal problem of Overactive\ Lack of attention students" was concluded that training the mindfulness methods has affected active memory and problem solving function of overactive students and has increased their active memory and problem solving performance.

Dubert et al (2016) in a research entitled "Mindfulness and Emotion Regulation among Nursing Students: Investigating the Mediation Effect of Working Memory Capacity" were concluded that, there was a direct effect of dispositional mindfulness on emotion regulation and working memory capacity. However, working memory capacity did not directly mediate the effect of mindfulness on emotion regulation. These findings suggest that mindfulness may influence prospective nursing professionals' working memory capacity and ability to regulate emotions. Nevertheless, working memory capacity did not explain how mindfulness influenced the use of reappraisal as an emotion regulation strategy.

Ranjbar et al (2016) have investigated the effect of mindfulness training on stress, anxiety and coping strategies in high school female students with stress in a research. The results of multivariate covariance analysis showed that, training the mindfulness method has a significant effect on reducing the stress level of female students. In addition, the results indicated that the mindfulness method has a significant effect on the coping strategies' subscales, including direct coping, self-controlling, and acceptance of responsibility. The training of mindfulness method didn't have a significant effect on decreasing of anxiety level in female students.

METHODOLOGY

Objectives of the Study:

- ✓ Survey the relationship between mindfulness and working memory in employees of Shirvan combined cycle power plant.
- ✓ Survey the relationship between problem-focused coping styles and working memory in employees of Shirvan combined cycle power plant.
- ✓ Survey the relationship between emotion-focused coping styles and working memory in employees of Shirvan combined cycle power plant.
- ✓ Survey the mediator role of coping styles in the relationship between mindfulness and working memory in employees of Shirvan combined cycle power plant.



Sampling Design

The statistical society consisted of all employees of the gas and steam sectors of Shirvan CCPP (700 people). According to Krejcie and Morgan table, the research sample was 248 people, which have been selected accidentally.

Data Collection

The research method was descriptive and correlational, that has been conducted in the form of field. The data collection tool in this research was a four-pages questionnaire with 108 questions, including three standard questionnaires on Mindfulness of Baer et al (2006), coping strategies of Lazarus and Folkman (1984), and Daneman and Carpenter's (1980) working memory. To answer the questionnaires, the sample subjects were asked to give their opinions for mindfulness and coping strategies questionnaires in five-points Likert scale (from never:1 to high: 5) and also, provide correct or incorrect answers and write the recalled last word for the active working memory capacity questionnaire. In order to collect data, questionnaires were distributed and collected at Shirvan combined cycle power plant located in Shirvan city.

Hypothesis

- ✓ There is a meaningful relationship between mindfulness and working memory in the staff of power plant.
- ✓ There is a significant relationship between problem- focused coping styles and working memory of power plan staffs.
- ✓ There is a significant relationship between emotion-focused coping styles and working memory of power plan staffs.
- ✓ Coping styles have a mediating role in the relationship between mindfulness and working memory.
- ✓ The research model has a good fit.



DATA ANALYSIS

The first three hypotheses of the research: There is a significant relationship between mindfulness and problem-focused / emotion-focused coping styles with working memory in power plant staffs.

Table 1: Relationship between mindfulness, problem-focused / emotion-focused coping styles and employees' working memory

Variables	Working memory	
	Correlation coefficient	Sig
Mindfulness	0.159	0.012
Problem-focused coping styles	0.17	0.007
emotion-focused coping styles	0.186	0.003

With respect to the results of Spearman's correlation coefficient, the obtained significance level is less than 0.05; therefore, with 95% confidence can say that there is a meaningful relationship between mindfulness and problem-focused / emotion-focused coping styles with employees' working memory, which is a positive and direct.

Table 2: Model Summary

Regression model	Correlation coefficient (r)	R2	Justified R2	Standard error of estimate	Durbin Watson
1	0.136	0.018	0.014	29.33021	2.569
1	0.175	0.031	0.027	29.14743	2.462
1	0.189	0.036	0.032	29.06911	2.511

Table 3: ANOVA test results

Model	Sum of Squares	Freedom Degrees	Means Square	F	Sig
1 Total Remained Regression	3977.620	1	3977.620	4.624	0.033
	211624.273	246	860.261		
	215601.893	247			
1 Total Remained Regression	6607.008	1	6607.008	7.777	0.006
	208994.886	246	849.573		
	215601.893	247			
1 Total Remained Regression	7728.656	1	7728.656	9.146	0.003
	207873.237	246	845.013		
	215601.893	247			

Table 2 shows the results of predicting of the working memory variable from mindfulness and problem-focused / emotion-focused coping styles with using simple linear regression. The correlation coefficient between working memory and mindfulness is $r=0.136$, between working memory and problem-focused coping styles is $r=0.175$ and between working memory and emotion-focused coping styles is $r=0.189$. Because of positiveness of these figures, the relationship between working memory with mindfulness and problem-focused / emotion-focused- coping styles is direct. Hence, by increasing the mindfulness, the problem-focused / emotion-focused-focused coping styles and working memory will be increased. As for the amounts of coefficients of determination ($R^2=0.018$, $R^2=0.031$ and $R^2=0.036$, respectively), about 1.8% of the working memory changes can be explained by mindfulness amount, 3.1% by the problem-focused coping styles amount and 3.6% by the of emotion-focused coping styles amount. In addition, the assumption of the independence of the errors is confirmed considering the amount of Watson Camera statistics.

The table 3 results also show that the value of the “F” test is meaningful at the error less than 0.001, that means the regression model of research composed of a predictive variable and a criterion variable is a good model.

Table 4: Results of coefficients of variation mindfulness regression effect on the working memory variable

Model	Predictive variables	Non-standard coefficients		Standard coefficients	t	Sig
		B	Standard error	Beta		
1	(Fixed) Mindfulness	20.665	14.020	0.136	1.474	0.142
		7.462	3.470		2.150	0.033
1	(Fixed) Problem-focused coping styles	10.124	14.612	0.175	0.693	0.489
		10.176	3.649		2.789	0.006
1	(Fixed) Emotion-focused coping Styles	20.077	10.242	0.189	1.960	0.051
		7.998	2.645		3.054	0.003

The results of table 4 show that mindfulness, problem-focused coping styles and emotion-focused coping styles have a significant effect on employees' working memory. In other words, per increasing one unit of change in mindfulness variable, power plant employees' working memory is increased by 0.136 units; per increasing one unit of change in problem-focused coping styles, power plant employees' working memory is increased by 0.175 units, and per increasing one unit of change in the emotion-focused coping styles, power plant employees' working memory is increased by 0.189 units. In addition, the following regression equations can be set to predict working memory by mindfulness, problem-focused coping styles and emotion-focused coping styles.

$$\text{Working memory} = (20.665) + (0.136) \text{ Mindfulness}$$

$$\text{Working memory} = (10.124) + (0.175) \text{ Problem-focused coping styles}$$

$$\text{Working memory} = (20.077) + (0.189) \text{ Emotion-focused coping styles}$$

Hypothesis 4: The coping styles play a mediator role in the relationship between mindfulness and working memory.

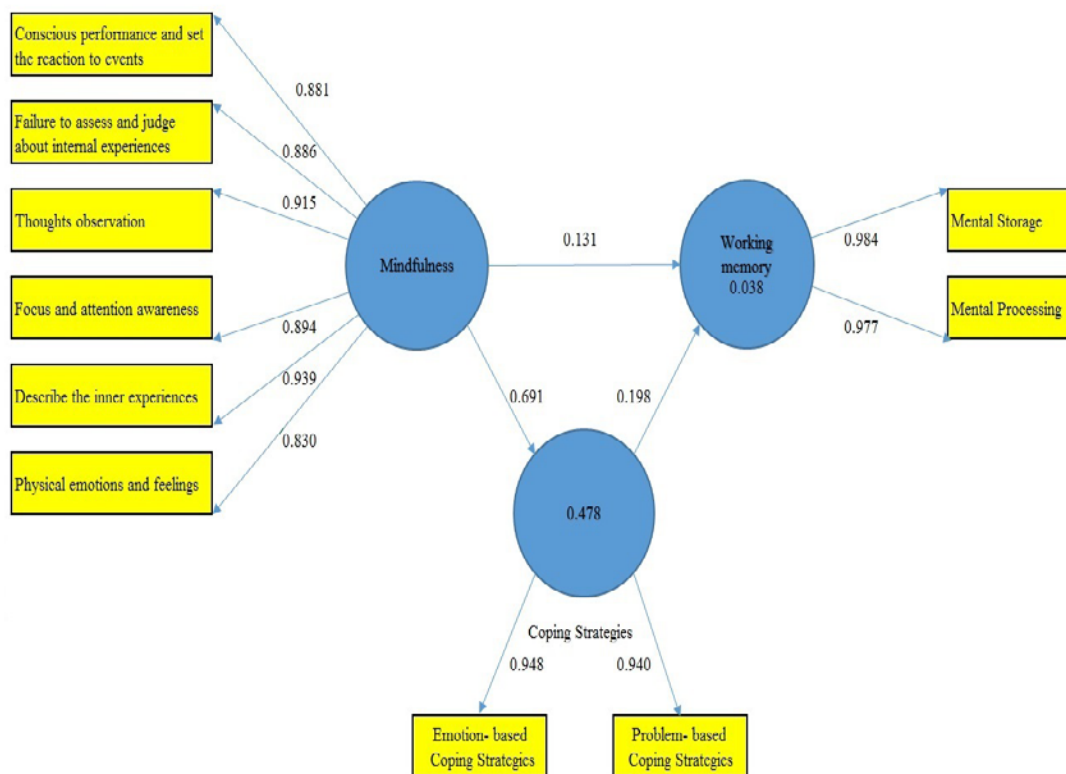


Figure 1- Structural Equation Modeling in meaningful state: Coping styles play a mediator role in the effect of mindfulness on employees' working memory.



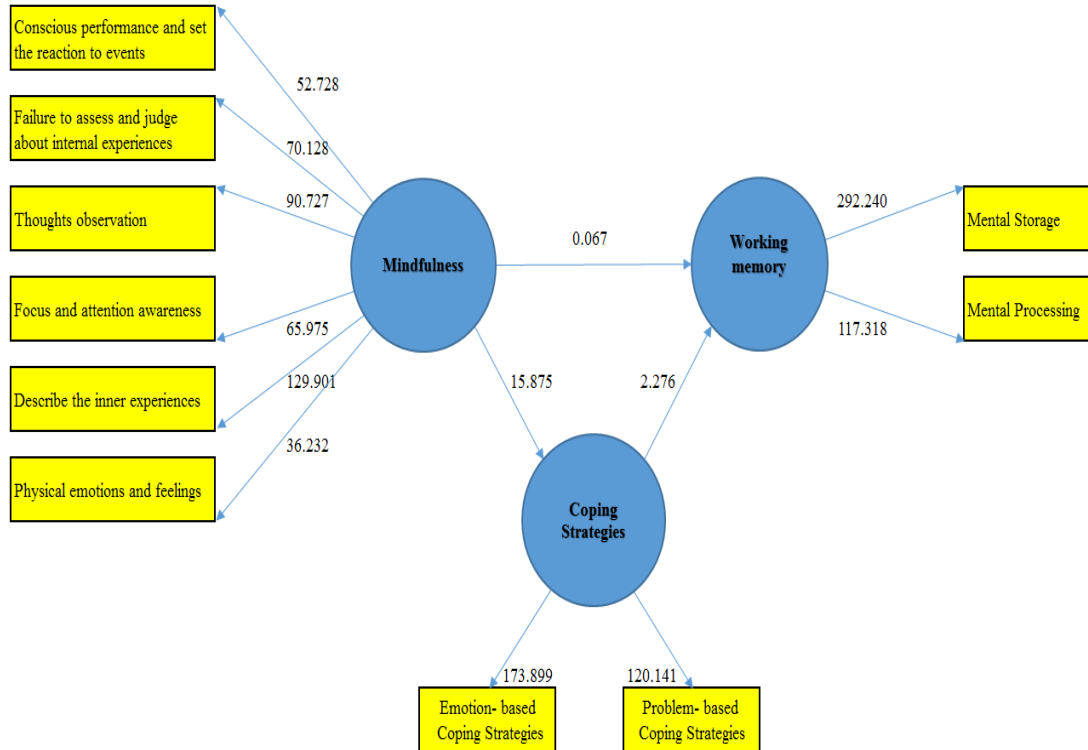


Figure 2- Structural Equation Modeling in standard state: Coping styles play a mediator role in the effect of mindfulness on employees' working memory.

Table 5: Model fit indices

Index Variable	Average Variance Extracted (AVE)	Cronbach's Alpha	Composite Reliability (CR)	HTMT	SRMR
Desirable amount	>0.5	>0.7	>0.7	>1	0.8>
Working memory	0.961	0.960	0.980	0.136	0.052
mindfulness	0.795	0.948	0.959	0.210	
Coping styles	0.892	0.879	0.943	0.749	

The reported results in table 5 show that the developed model is supported by empirical research data; in other words, the fitting of the data to the model is established and the values of all indicators imply the desirability of the structural equations model. However, as the mediator variable plays a role in the mentioned equation, the direct and indirect effects must be reported, afterwards these values are presented in the following table to clarify the role of mediator variable.

Table 6: Investigate the direct, indirect and total effects

Path	Effects		T statistics	Amount of P.Value
	Direct	Indirect		
Mindfulness → Working memory	Direct	-0.006	0.067	0.947
	Indirect	0.137	2.264	0.024
	Total	0.0131	2.127	0.034

According to the obtained results in Fig 2, whereas the meaningful value of the path (0.067) is in the interval of -1.96 to 1.96 , therefore, it can be concluded that the path is not meaningful and mindfulness doesn't directly affect employees' working memory. However, the results of the study of the effect of mindfulness on working memory with the mediator role of coping styles mentioned in Table 6 showed that, mindfulness affects power plant staff's working memory (0.137) through coping styles.

DISCUSSION AND CONCLUSION

The results of the first hypothesis showed that there is a positive and significant relationship between mindfulness and working memory in the power plant's employees, which is consistent with the research's results of Gholami (2016), Dubert et al (2016), and participants in the meditation condition group of Quach et al (2016); and inconsistent with those in the hatha yoga and waitlist control groups of Quach et al (2016) research's result. The ability to process the information, especially in the work environment, is one of the most important abilities that people need it to have psychological balance and well-being and avoid siding in perception, obviously, they will face a lot of problems in their work environment without it. In the meantime, some trainings can enhances working memory and help people to establish a healthy relationship at work. With respect to the results of this research, mindfulness is one of these trainings. Somewhen, a critical situation may occur for everyone whether in private life or in the work environment, which affect his psychological balance, working memory and concentration of attention on work as well. Nevertheless, boosting the mindfulness in people makes them enable to control themselves in the face of difficult conditions and avoid any early judgment by internal control and tact. This causes the individual's inner peace and strengthens working memory.

The results of the second hypothesis showed that there is a positive and significant relationship between problem-focused coping styles and working memory in power plant staffs, which is consistent with the research's results of Khedri and Dabaghi (2014). Individuals react differently in response to stressors. The work environment is not empty of stressors, why so people with different personalities, attitudes and beliefs are working together in a specific set and the pressure of top managers, disagreements between colleagues and the stress created to deliver or perform a task at a specified time and in the best quality, are the factors that can lead to stressful situations for individuals. Ultimately, what is important and considerable for the staff is that they must keep their working memory in order to provide better conditions for their implementation, and this is not possible except by relaxing and applying the proper insight. In simple explanation, one needs to keep his coldness in critical condition. Like mindfulness, the use of problem-focused coping styles has been effective on the working memory as well and can help employees in stressful situations. An individual who strengthens the problem-focused approach to dealing with stressors knows exactly, what conditions should be avoided, to keep calm on which issues, and in which cases, with a deliberate confrontation, solve the problems. This discipline and serenity in dealing with the problems and obstacles causes one to control the situation by adopting problem-focused approach in the dynamic working environment, which is experiencing new problems every day in such a way that it affects the focus and memory of individuals. Coping strategies are practically related to the individual's intellectual functions, and the person can achieve it with the thought and



concentration. Therefore, while using the problem-focused coping styles, given that one is seeking accurate information about the problem and makes realistic practical decisions, working memory is also enhanced.

The results of the third hypothesis showed that there is a positive and significant relationship between emotion-focused coping styles and working memory in the staff of power plant, which is inconsistent with the Sorati (2012) findings. Heretofore, we talked about the relationship of mindfulness and problem-focused coping styles with working memory. It turned out that these two methods are logical states that a person can use in dealing with a stressor; but sometimes it is difficult to deal with some problems, especially social problems that may occur in the workplace and beyond the control of the individual. Somewhen, one faces such issues has to compare himself with others in order to balance his attitude and behavior and assuming the same conditions for all to accept and tolerate it. In fact, this method is a kind of self-deception and sometimes one has no choice but to accept to cope with environmental conditions and to calm himself down. As previously stated in the definitions and explanations of the emotion-focused coping styles, in this approach, it is possible to be countered by stressors or ultimately overcome them by taking various measures such as self-control, positive assessment, acceptance of responsibility, etc. The adoption of each one of these methods has a direct impact on the human mind, and because of the involvement of the mind to make quick and accurate decisions among the various available options, it strengthens the working memory. It is also possible to educate people about how to apply psychological measures in emergencies and anxieties to creates a healthy work environment and tolerable for them and reducing the severity of stressors that cause working memory impairment.

The results of the fourth hypothesis showed that the mindfulness is affecting the working memory of the power plant's employees indirectly and through coping styles. During confronted with annoying and stressful events, those who have more positive self-perception and show higher levels of control beliefs and self-efficacy, will experience less emotional excitement, and subsequently their performance in cognitive tasks is less distorted and depressed. People in situations that use efficient coping styles have more control over those situations and less likely to be in trouble in their tasks which is the same solution to achieve better performance, and is shown by using appropriate coping styles in the form of increasing the person's psychological capacity to successfully survive critical situations and stay away from the damage caused by the occurred psychological crisis. According to the results of this study, the use of this approach when combined with the mindfulness, in addition to its strengthening, also increases its effect on the working memory of individuals (As it can be seen in the results, the effect of mindfulness on the working memory of individuals has increased significantly through the mediator role of coping styles). The mentioned conditions indicate that, when a person has mastered in coping styles and it have been strengthened in him, the effect of mindfulness intervention - which can enhance the initial recognition of the symptoms of a problem and its application is likely to be effective in preventing the problem - on working memory enhancement will be well reflected in him. By enhancing the working memory, the conditions for better focus on doing the work and processing work information in the staff will also increase, which means better management of the organization in achieving the goals set.



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