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Meditation boosts problem solving and resilience in adults: A comparison between Inner Engineering program and Mindfulness.

Abstract

This study compares the effects of two types of meditation, Inner Engineering, and mindfulness, on problem-solving and resilience. The study utilized a causal-comparative research design and included a convenience sampling method to select 137 participants, with 56 practicing Inner Engineering, 39 practicing mindfulness, and a control group of 39 individuals who did not practice any type of meditation. Data was collected through online questionnaires, and statistical analysis was conducted using SPSS 24 software. The results suggest that the Inner Engineering meditation program is more effective than mindfulness meditation in increasing resilience and problem-solving abilities. However, mindfulness meditation may improve cognitive function, attention performance, and cognitive flexibility, leading to effective problem-solving. Overall, both meditation methods have the potential to increase resilience and problem-solving abilities. The findings contribute to the existing literature on the benefits of meditation and highlight the potential role of different types of meditation in enhancing problem-solving and resilience. The study adds to the knowledge base of the effects of meditation and provides valuable insights into the benefits of different types of meditation.

Keywords: *meditation, Inner Engineering, mindfulness, problem-solving, resilience*

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Introduction

A healthy lifestyle, effective communication, and personal success depend on many factors and skills, e.g., education, creativity, empathy, and cooperation. Problem-solving and resilience are among the most important abilities that can help us adapt to stressful situations or to bounce back from difficult ones (Rastogi & Chaturvedi, & Arora, N., Trivedi, & Singh, & Vyas, 2018). To find a quick solution, one needs to define the problem clearly. However, this might be complicated, overlapped, and hard to recognize in everyday life and in the real world. Additionally, culture-dependent factors and unconscious conflicts in dealing with problems must be considered. All mentioned causes can disrupt the decision-making process. therefore one will risk his relationships, , burden stress and be affected by mental disorders(Dörner, & Funke,2017).

Also, sometimes problems come out to be beyond our tolerance and control, thus putting us in a stressful situation. A very concrete example of that was the Covid-19 pandemic. The virus confronted humans with a situation that was ambiguous and unexpected, and the solution seemed out of reach.

In such a critical situation where every aspect of our personal and social life is at risk, and we are facing the fear of death of ourselves and our loved ones, resilience and problem-solving seems to be vital skill to cope with the circumstance and to react constructively. In this case, an incorrect definition of the problem and the inability to withstand the stressful condition of Covid-19 led us to make conspiracy theories, unprincipled and even dangerous solutions (Lupe, Keefer & Szigethy,2020).

The fact is that every day of life is full of problems. Hence, the way and speed of solving them determine our life quality. The findings show that meditation is one of the tools that cause self-efficacy, improves the mental and physical quality of life, and reduces stress. (Goldstein, L., Nidich, S. I., Goodman, R., & Goodman,2018). The ability to problem-solve a skill with a multi-dimensional process that starts from the point of creating and defining the problem and ends with the solution obtained through learning, creativity, or insight at the moment (Tulver, Kaup, Laukkonen, & Aru, 2021, Fathi, Sobhi& Hejazi,2021) on the other hand, our autonomous nervous system increases the function of the body's immune system by activating the parasympathetic nervous system (PNS). Besides, Some of the most notable research findings suggest that the mental activity involved in meditation practices can facilitate neuroplasticity and connectivity in regions in the brain related to emotion and attention regulation (Brandmeyer, T., Delorme, A., & Wahbeh, H. (2019); (Holzel et al., 2011); Lazar et al., 2005; Lutz et al., 2004; Shapiro et al., 2006; Vago and David, 2012). This process invites better cognitive complexity, creativity, and recovery during stress. One meta-analysis of 4 randomized controlled trials of 190 participants found that mindfulness meditation leads to increased telomerase activity in peripheral blood mononuclear cells (Schutte and Malouff, 2014), demonstrating that meditation (or the associated mental activity) can influence the immune system. Resilience is an adaptation to this system and the outside environment (Liu & Boyatzis, (2021). Resilient people can positively adapt to crisis and stress while maintaining their health and safety. In fact,

they have the ability to solve problems in crises and overcome these situations without facing severe mental disorders (Yuan, Y. (2021).

Meditation is usually considered a set of diverse and specific methods of distinct attention training that is used to improve and gain insight into mental activity. (Cahn and Polich, 2009). Through the observation of ongoing mental and physical experience, this training is thought to improve the mechanisms underlying self-regulation (Holzel et al., 2011; Kabat-Zinn et al., 1985; Lutz et al., 2008; Shapiro et al., 2006; Tang et al., 2007; Vago and David, 2012) and can manifest as changes in mental states or as long-lasting traits (Cahn and Polich, 2006). In various studies, the significance of meditation on problem-solving has been pointed out. For example, a study on people with borderline personality disorder with a deficiency in social problem-solving showed that mindfulness contributes significantly to their growth in the process of problem-solving and effective social communication (Keng& Tan, 2017). Also, resilience is a capacity with different dimensions and a dynamic skill that is influenced not only by the external environment but also by internal tools and helps individuals to change and develop (Laird, Krause, Funes & Lavretsky,2019). One of these facilitators is meditation. Since there are many different types of meditation, in this research, we discuss the difference between mindfulness meditation and Shambahvi Mahamudra meditation, which is being taught in the Inner Engineering program. In the present research, these two meditation methods have been investigated regarding their influence on problem-solving ability and resilience.

Method

The research method was a causal-comparative study. Doing and not doing meditation were considered independent variables, problem-solving, resilience, and their components as dependent variables. The statistical population of this research consisted of people who do meditation. Out of 95 people, 56 people reported practicing the Inner Engineering method (Shambahvi Mahamudra), and 39 had practiced the mindfulness method. These people were selected with the convenience sampling method. Online questionnaires were used in this regard. Also, 39 people who did not do any kind of meditation were selected as a control group. Inner Engineering is a four-day program of asana practices, breathing, and mental exercises designed by Sahdguru, the founder of the Isha Yoga Center. During this program, healthy vegetarian food is prepared by volunteers for the participants, and the necessary support is provided to create a safe and carefree environment for the entire participants. This program is also taught online. Since in this model of meditation, the emphasis is on the first-hand experience of the participants, the steps and process of doing it are not mentioned in the Inner Engineering book. All the current research participants who have chosen the option of Inner Engineering have participated in this program and have done the 4-day program, got supervision from the teachers for 40 days, and did the meditation for at least six months, two days a week. Mindfulness (which is a spiritual or psychological faculty that forms an essential part of Buddhist meditation practice) is defined as the "awareness that arises through paying attention to the present moment, non-judgmentally and concentrating on the breath process" (Kabat-Zinn, 1982, 1990). Unlike Shambavi Mahamudra meditation, in which the range of research is limited, there has been a variety of research on mindfulness and its effects on several mental disorders, including depression and obsession (Baer, 2003). All the current research participants who chose the mindfulness option have participated in this program and practiced it for at least six months, two days a week.

The inclusion criteria were practicing at least one type of mentioned meditation method, and the exclusion criteria for exit were the unwillingness to complete the questionnaire or the incompleteness of their answers in the questionnaire. A descriptive statistical method was used in this research. The multivariate variance analysis was used to analyze the data, utilizing spss 24 software.

Measuring tools/measurement

Demographic information form: First, questions related to age, education, gender, and the method of meditation were asked. The purpose of these questions was to control interfering variables, the type and amount of meditation.

Personal problem-solving inventory (Heppner & Peterson, 1982): this questionnaire includes 35 items and is designed to measure how people react to their daily problems. A lower score indicates better performance. The questionnaire has three separate subscales: Problem-Solving Confidence (11), approach-avoidance style (16), and personal control (5). Relatively high internal consistency was reported for this questionnaire. Studies reported an alpha value between 0.72 and 0.85 in the subscale of confidence (0.85), approach-avoidance (0.84), personal control (0.72), and the final total score (0.85) (Hepner and Petersen, 1982). The retest reliability of the total score of the questionnaire was reported in the range of 0.83 to 0.89 within two weeks, which indicates that a problem-solving questionnaire is a reliable tool for measuring problem-solving ability. This questionnaire was translated by Rafati and with the guidance of Khosravi in 2005 and was used for the first time in Iran (Khosravi et al. 2006). Cronbach's alpha obtained in the research of Khosravi, Darvizah, and Rafati (2006) is equal to 0.68, and in the research of Al-Bhaj (2015), it is equal to 0.66. Also, in Rastgo et al.'s research

(2009), the reliability of this questionnaire was reported between 0.83 and 0.89. In the present study, the reliability was checked using Cronbach's alpha method, and the reliability was 0.73 for the whole test, confidence in problem-solving (0.72), tendency to avoid (0.70), and personal control (0.77).

The Connor- Davidson Resilience scale (CD-RISC): The scale has 25 items; subscales of resilience include personal competence, high standards and tenacity (8 questions), trust in one's instincts, tolerance of negative affect, and strengthening effects of stress (7 questions), secure relationships, positive acceptance of change and secure relationships with others (5 questions), control (3 questions), and spiritual influences (2 questions). The internal consistency for this scale was calculated using Cronbach's alpha coefficient and is equal to 0.89 (Connor and Davidson, 2003). A Likert scoring is used from entirely false to always true. In the study of Mohammad Khani et al. (2016), the internal consistency was 0.93. In Jabari and Najari's research (2019), the reliability was 0.83. In the present study, the reliability of the questionnaire using Cronbach's alpha method was 0.92, and for the components of individual competence (0.88), trust in individual instincts (0.73), acceptance of change and secure relationships (70/70), control (0.71), and spiritual influences (0.71) scores were reliable.

Results

The total participants in this research were 134 people, of which 95 people (70%) did meditation, and 39 people (30%) did not do any type of meditation. Of these 95 people, 56 people (48.1%) meditated with the inner engineering method, and 39 (29.1%) practiced mindfulness meditation. 68 people (50.7%) had been meditating for more than one year, 10 people (7.5%) for more than 6 months, and 17 people (12%) for less than six months. 62 people (46.3%) meditated every day, and 33 people (24%) meditated two to three days a week. In terms of the education variable, 23 people (17.2%) had a diploma or lower, 50 people (37.3%) had a bachelor's degree, and 61 people (45.5%) had a master's degree or higher. Regarding gender, 91 (68%) of the research participants were female, and 43 (32%) were male. Also, the average and standard deviation of the age of the participants in the research were 35.81 and 12.01.

Table 1. Average Standard Deviation and Mean

Method						
	Inner engineering		**Mindfulness**		I don't meditate	
	Mean	**Standard Deviation**	Mean	**Standard Deviation**	Mean	**Standard Deviation**
Confidence to solve the problem	18.49	81.3	10.35	43.10	5.31	96.7
Avoidance tendency	21.57	72.7	46.51	3.6	74.49	54.7
Personal control	57.12	6.4	59.18	82.5	28.17	82.5
Problem-solving	96.118	16.11	15.1	68.12	8.98	38.15
Individual competence	50.32	46.4	13.21	74.8	56.2	25.6
Trust individual instincts	68.25	81.3	59.18	73.5	67.18	2.5
Positive acceptance of change	29.18	10.3	23.12	47.5	72.11	70.3
control	82.11	88.1	10.8	19.3	82.7	44.2
Spiritual effects	46.6	92.1	44.5	71.2	15.5	15.2
Resilience	75.94	6.11	49.65	56.23	92.63	94.16

Table 1 shows the mean and standard deviation of the research variables. The obtained results show that, except for personal control, the mindfulness group and the group that does not meditate have better performance. In the resilience variable and its components, the group that has done the inner engineering meditation method performs better in resilience.

Multivariate variance analysis was used to check the research hypotheses; first, the statistical assumptions of this method were checked. The Kolmogorov-Smirnov test was used to check the normality of the data. The obtained results showed that all the variables and their components, i.e., problem-solving (z=0.200, P=0.069), confidence in solving the problem (z=0.200, P=0.085), approach-avoidance (z=0.099, P=0.101), personal control (z=0.200, P=0.097), resilience (z=0.200, P=0.079), individual competence (346 z=0/0, P=0.969), trust in individual instincts (z=0.198, P=0.099), secure relationships (z=0.200, P=0.071), control (z=0.087 0, P= z=0.108) and spiritual influences (z=0.200, P=0.099) have a normal distribution. Levine's test was used to check the homogeneity of variance and the significance level obtained for the variables of problem-solving (P=0.656), confidence in problem-solving (P=0.867), approach-avoidance (P=0.185), personal control (P=0.315), resilience (P=0.274), individual competence (P=0.661), trust in individual instincts (P=0.344), secure relationships (P=0.301), control (P=0.072) =), spiritual influences (P=0.966) are not significant, so the assumption of homogeneity of variances is maintained. Also, the results obtained for the Mbox test are not significant, so the assumption of homogeneity of the variances-covariance matrix has been passed (BOX' P=0.127, F=1.890, M=10.326).

The results of Wilks's lambda test showed that the effect of the group on the combination of problem-solving variables and its components, i.e., confidence in solving the problem, approach-avoidance, and personal control is significant (P = 0.01, F = 22.54, WILK'S = 0.430). This result shows that there is a difference between the types of meditation methods, at least in one of these variables.

Table 2, Analysis of variance between groups for problem-solving and its components

source	The dependent variable	sum of squares	Degrees of freedom	Mean of squares	F	significance
Group	Problem-solving	10787.81	2	5393.9	32.18	0.01
	Trust individual instincts	8771.25	2	4385.63	78.23	0.01
	Avoidance /tendency	14822.52	2	741.26	14.23	0.01
	Personal control	971.41	2	485.7	18.27	0.01

The results of Table 2 show that there is a difference between the types of meditation methods in problem-solving (P = 0.01, F = 32.180) and its components, i.e., confidence in problem-solving (P = 0.01, F = 78.233) approach-avoidance style (P = 0.01, F = 14.233) and personal control (P = 0.01, F = 18.268).

Table 3. Tukey's post hoc test for problem-solving and its components

The dependent variable	Group	Group	difference in averages	standard error	significance
	Inner engineering	Mindfulness	14.07	1.56	0.01

Trust individual instincts		I don't meditate	18.12	1.56	0.01
	Mindfulness	I don't meditate	4.05	1.69	0.018
Avoidance /tendency	Inner engineering	Mindfulness	5.57	1.5	0.01
		I don't meditate	7.47	1.5	0.01
	Mindfulness	I don't meditate	1.71	1.63	0.295
Personal control	Inner engineering	Mindfulness	-6.01	1.07	0.01
		I don't meditate	-4.71	1.07	0.01
	Mindfulness	I don't meditate	1.30	1.16	0.265
Problem-solving	Inner engineering	Mindfulness	13.81	2.7	0.01
		I don't meditate	20.88	2.7	0.01
	Mindfulness	I don't meditate	7.07	2.93	0.017

Table 3 shows the difference between the types of meditation methods in each problem-solving variable and its components. Results showed that the engineering group had a lower average in the personal control component than the other two groups. However, in other components, the engineering group achieved a higher score than the average scores of the other two groups.

Also, Wilks's lambda test results showed that the group's effect on the combination of resilience variables and its components is significant (P = 0.01, F = 9.458, WILK'S = 0.531). This result shows that there is a difference between the types of meditation methods, at least in one of the resilience subscales.

Table 4. Analysis of variance between groups for resilience and its components

Resource	The dependent variable	sum of squares	Degrees of freedom	Mean of squares	F	significance
Group	Resilience	29472.86	2	14736.42	49.84	0.01
	Individual competence	4433.27	2	2216.64	52.93	0.01
	Trust individual instincts	1620.44	2	810.22	35.3	0.01

	Trust individual instincts	1303.53	2	651.79	39.05	0.01
	Control	487.21	2	243.6	39.61	0.01
	Spiritual effects	46.13	2	23.06	4.6	0.012

As Table 4 shows, there is a difference between all types of meditation methods in resilience (F=49.831, P=0.01), individual competence (F=52.932, P=0.01), confidence in individual instincts (F=0.01 P = 35.305, P = 0.01), positive acceptance (P = 39.055, P = 0.01), control (P = 39.615, P = 0.01) and spiritual influences component (P = 602.01, P = 0.01) 4 F=)

Table 5. Tukey's post hoc test for resilience and its components

The dependent variable	Group	Group	difference in averages	standard error	significance
Individual competence	Inner engineering	Mindfulness	11.37	1.34	0.01
		I don't meditate	11.93	1.34	0.01
	Mindfulness	I don't meditate	0.56	1.46	0.7
Trust individual instincts	Inner engineering	Mindfulness	7.08	0.99	0.01
		I don't meditate	7.01	0.99	0.01
	Mindfulness	I don't meditate	-0.07	1.08	0.94
Trust individual instincts	Inner engineering	Mindfulness	6.05	0.85	0.01
		I don't meditate	6.56	0.85	0.01
	Mindfulness	I don't meditate	0.51	0.92	0.58
Control	Inner engineering	Mindfulness	3.71	0.51	0.01
		I don't meditate	4	0.51	0.01
	Mindfulness	I don't meditate	0.28	0.56	0.62
Spiritual effects	Inner engineering	Mindfulness	1.02	0.46	0.03
		I don't meditate	1.31	0.46	0.01
	Mindfulness	I don't meditate	0.28	0.5	0.58

Resilience	Inner engineering	Mindfulness	29.26	3.58	0.01
		I don't meditate	30.82	3.58	0.01
	Mindfulness	I don't meditate	1.56	3.89	0.69

Table 5 shows the difference between the types of meditation methods in the resilience variable and its components using a post hoc test. The results show that there is a significant difference in resilience scores in all subscales between the inner engineering and mindfulness meditation group and the group that does not meditate; the inner engineering group performs better, but there is not a significant difference between the mindfulness group and the group that does not meditate.

Conclusion

Results showed that the group that has done the inner engineering meditation method reports a higher resilience in the resilience variable and its components. The results show that there is a significant difference in resilience scores in all subscales between the inner engineering and mindfulness meditation group and the group that does not meditate. The inner engineering group performs better, but there is no significant difference between the mindfulness group and the group that does not meditate.

In addition, each type of meditation method impacts problem-solving and its components, i.e., confidence in problem-solving, approach-avoidance style, and personal control in a different way. The results show that in the personal control component, the engineering group has a lower average than the other two groups. However, in other components, the engineering group achieved a higher score than the average scores of the other two groups.

The researchers of this research think the reason that Shambavi Mahmoudra's meditation, which is taught under the Inner Engineering program, has a greater impact on resilience and problem-solving probably is the special breathing exercises during meditation. The exercise is followed by concentration on the forehead. While it is a simple practice but it is a fundamental physical preparation exercise. Because these breathing and physical exercises probably reduce the stress level and, as a result, increase the ability to endure. Resilience has been suggested to be a factor that potentially buffers against the negative impact of work stress (Howard, 2008). Resilience may explain why some employees with chronically high levels of work stress do not burn out but thrive and achieve a more remarkable ability to manage future challenges (Kinman & Grant, 2011). Research approves the positive effect of meditation in this regard. In a well-controlled study, subjects learned meditation during a four-day program, and three months later, their brains were examined by intense magnetic resonance imaging scans. In this study, the left rostral anterior cingulate cortex (rACC) and the dorsomedial prefrontal cortex (dmPFC) were significantly more relaxed than the control group. As a result of this brain relaxation, the resilience of these people increased significantly. (Kwak, Lee, Jung, Hur,Bae, Hwang. & Kwon, J. S. (2019) It also sounds reasonable to propose that the increased insight ability and concentration brought about by meditation may be related to the fact that the participants had maintained a more alert and aware state of consciousness. Some Findings imply that meditation promoted insight by keeping people alert and mindful. This appears to be different from the possible mechanism underlying the promotion of insight during a passive type of relaxation, like sleep, that does not require any mental effort (Ren Jun et al., 2011), which can be helpful for both abilities of resiliency and problem-solving.

Although the current research results show that the Inner Engineering program is more effective than mindfulness in resilience and problem-solving, this does not mean that mindfulness has no effect on these two factors. And numerous research has witnessed the help of mindfulness to increase resilience and problem-solving ability.

For instance, mindfulness meditation may offer a pathway for better attentional performance and cognitive flexibility to daily stressors, effectively increasing resilience. Fitzgerald and Lueke (2017) studied analytical thinking due to mindfulness, which can lead to effective problem-solving. The researchers found mindfulness training improves cognitive function with greater reflective thought processing. Engaging in mindfulness meditation allows individuals to view thoughts and emotions as mental events which come and go constantly. The acknowledgment of thoughts and emotions allows individuals to react non-judgmentally, stop automatic reactions to thoughts, and respond to impulses and environmental stimuli with better cognitive control, a critical tool for student success academically and personally.

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