

The Effectiveness of Metacognitive Training on Emotional Intelligence and Ego Defense Styles

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Abstract

Emotional Intelligence (EI) is a learning and influential skill in a constellation of noncognitive competencies that lead to successful coping and mature behavior in difficult situations, and there is also a need for training techniques such as metacognitive training that can answer the needs of organizations for their workforce in this field. To see the effectiveness of metacognitive training on EI, and Ego defense styles among Parsian Bank's employees, 450 employees were selected through convenience sampling technique. The Bar-On emotional intelligence inventory and Defense Styles Questionnaire were applied to assess EI and ego defense styles of participants and then of these, 44 employees were selected who obtained average scores, and they were randomly assigned into two equal groups of experimental and control. This research was quasi-experimental with a design of pretest-posttest and with a control group. Metacognitive training was conducted on the experimental group during nine sessions with two hours based on over two months based on the Nine-layer Pyramid Model of Emotional Intelligence. Also, multivariate analysis of covariance (MANCOVA) was employed for data analysis. As a result, given the past findings and direct results of this study, one can achieve the understanding that metacognitive training has the potential to enhance EI and mature defense styles ($P < 0.05$), reducing neurotic defense styles ($P < 0.5$), but has insignificant effect on the immature defense style of bank's employees.

Keywords

Emotional Intelligence, Ego Defense Styles, Metacognitive Training, Social Well-Being

1. Introduction

Emotional intelligence (EI) was first described and conceptualized by [Salovey and Mayer \(1990\)](#) as an ability to recognize, understand, and manage one's own emotions, as well as the emotions of others, both individually and in groups ([Bru-Luna et al., 2021](#)). It is considered a type of social intelligence, involving the monitoring and discriminating emotions to guide one's thinking and actions ([Mayer & Salovey, 1993](#)). EI encompasses the emotional, personal, social, and survival dimensions of intelligence, and is crucial for daily functioning ([Stein & Deonaraine, 2015](#)). It has been measured through various approaches, including specific-ability and integrative-model ([Mayer et al., 2008](#)). [Bar-On et al. \(2000\)](#) outline the proposed five components of EI such as intrapersonal EI, interpersonal EI, adaptability, stress management, and general mood. Bar-On concluded in its studies that people with a higher average emotional quotient (EQ) are generally more successful in meeting environmental demands and pressures. Bar-On equally contributes EI and cognitive intelligence to a person's general intelligence, which then offers an indication of a person's potential for success in Life ([Bar-On et al., 2000](#); [Bar-On, 2003](#); [Joseph et al., 2015](#)).

On the other hand, past studies indicated that individuals with high levels of EI attain more success in the workplace, trust the work environment, and are more flexible in stressful situations than those with low EI ([Hassan et al., 2019](#)). Therefore, organizations accept EI as one of the possible management tools that can help them gain competitive benefits. People with high emotional abilities also have better social capabilities, longer relationships, and improved competency in solving conflicts ([Rafati et al., 2004](#)). The direct relationship between EI and a healthy life demonstrates that using EI capabilities can bring success in life ([Todres et al., 2010](#)).

Ego defenses, a concept first introduced by [Freud \(1936\)](#), have been defined as automatic psychological processes that protect the individual from awareness of internal or external dangers ([Buchborn et al., 2023](#)). Ego defenses, whose responsibility is to protect the Ego from different forms of anxiety, may be functional or dysfunctional according to how they are used in the environment. They are categorized in to three major defense styles based on twenty different Ego defenses ([Danto, 2023](#)) and can be measured using tools like the Life Style Index and the Defense Mechanisms Inventory ([Conte & Plutchik, 1995](#)). They can also be adaptive or pathological and are influenced by a person's response to stress ([Vaillant, 1994](#)). Ego defenses, as classified by Vaillant in the 1970s and 1980s, range from immature (e.g., projection, passive aggression) and neurotic (e.g., intellectualization, displacement) to mature defenses (e.g., humor, sublimation). Immature and neurotic defenses are particularly prevalent in individuals with personality disorders ([Vaillant & Drake, 1985](#)). The choice of ego mechanisms can evolve, with mature defenses associated with more successful life adjustments ([Vaillant, 1971](#)). The mature defense style represents normal, adaptive and functional method of coping ([Amirinia et al., 2015, 2024](#)). In contrast, the immature

and neurotic styles may be considered to be a consequence of dysfunctional and maladaptive coping strategies (Sorensen, 2022). Levit (1993) supported the idea of developmental transitions in defense use during adolescence, with an increase in defenses entailing reversal. These studies collectively highlight the importance of understanding and addressing Ego defenses in mental health and well-being.

The association between the components of EI including difficulty in identifying and describing feelings and externally oriented thinking with ego defense styles was investigated in past studies. Pellitteri (2002) found that adaptive defense styles were correlated with overall EI, while Cramer (1999) and Bogo et al. (1970) both identified a predictive relationship between defense mechanisms and ego level, with the former study showing a curvilinear relationship and the latter study identifying specific Ego defenses associated with higher or lower ego levels (Cariola, 2020). Plutchik et al. (1979) and Vaillant et al. (1986) further explored the interplay between defense mechanisms, emotions, and psychological health, with Vaillant and Drake (1985) explicitly linking the maturity of ego defenses to the presence of personality disorders. These studies collectively suggest that EI and ego defenses are intertwined, with EI potentially influencing the use of adaptive defense mechanisms and also, EI was positively associated with mature Ego defenses and negatively associated with immature Ego defenses (Besharat et al., 2007; Amirinia et al., 2015, 2024). Although, the main findings of our study in the past, show that there is a significant positive correlation between EI and immature defenses such as acting-out, isolation, autistic fantasy and passive aggression, particularly concerning intrapersonal intelligence, general mood, and social skills. Additionally, our study indicates that EI plays a crucial role in controlling mature defense mechanisms in situations where individuals may be misjudged (Amirinia et al., 2024). Therefore, we need appropriate training methods to increase EI in people.

A range of training methods have found to improve EI. Gilar-Corbí et al. (2018) demonstrated the effectiveness of a multimethodological approach, including online, in-class, and coaching methods. Clarke (2010) found that team-based learning can enhance emotional abilities, particularly when combined with emotional intelligence training. Similarly, Grant (2007) showed that a long-term coaching skills training program can improve EI. Zijlmans et al. (2011) and Hen (2014) both found that specific training programs can enhance EI in staff working with challenging clients and in teachers, respectively. Lim and Lau (2021) identified two critical approaches to emotional intelligence training: increasing emotional knowledge and competencies, and using brain-training principles to improve cognitive processes.

Metacognition training is one of these methods. Metacognition, literary means “cognition about cognition, or knowledge about knowledge” (Woolfolk & Shaughnessy, 2004). Metacognition, an essential aspect of human intelligence and learning, involves the awareness and control of cognitive processes, emotions, and motivations (Papaleontiou-Louca, 2003). It is a set of methods used to monitor and regulate one’s behavior (Rhodes, 2019), and is crucial for successful learning

(Livingston, 2003). Metacognition is not only an individual ability, but also a socially situated and socially constructed one (Garrison & Akyol, 2015). It is often associated with John Flavell's concept of metacognitive knowledge and experiences (Livingston, 2003). Explicitly teaching metacognitive strategies can improved (Gallagher, 2003). Theory and research in metacognition have introduced as a basis for understanding and treating psychological dysfunction (Wells & Cartwright-Hatton, 2004). Henson and Eller (1999), Lindstrom (1995), and Bruer (1994) suggest that metacognition attempts to increase the awareness of thinking procedures and methods, thereby helping the learner to control, regulate, guide and master the learning processes, the ultimate purpose being the appreciation and comprehension of learning strategies (Mahasneh et al., 2019). Because of mature defense style correlate with EI related to social well-being, we need a uniuue way of training to be able to have a positive impact on them (Amirinia et al., 2015, 2024). Metacognition is related to social well-being because it allows a person to be aware of others' thoughts and intentions automatically, and this helps to increase the interaction with others thus they address the feedback and justification of their behavior and awareness of interpersonal perception and control processes of interpersonal relationship (Oraki et al., 2022; Amirinia et al., 2015, 2024).

Metacognition training, as defined by Palincsar (1986), involves teaching students to plan, implement, and evaluate strategic approaches to learning and problem-solving. This training can be applied in various contexts, such as in the development of cognitive and metacognitive skills in teachers (Kozulin, 2021), in the management of cognitive biases in schizophrenia patients (Gaweda et al., 2009), and in medical education (Gonullu & Artar, 2014). The effectiveness of metacognition training is evident in its ability to accelerate learning and skill transfer (Redding & Walberg, 2012), improve classroom instruction (Wham, 1987), and enhance cognitive performance (Veenman, 2015).

Belogash & Melnichuk (2020) argued the role of metacognitive skills in EI, and Mattingly & Kraiger (2019) provide further support for the effectiveness of training in enhancing EI, suggesting that improved through formal training programs. Drigas & Mitsea (2020) presented EI coincides with the levels of self-organization or with the levels of metacognitive development and provided the core components of metacognition demonstrating the significance of it in learning and self-knowledge. These studies collectively suggest that metacognitive training can be effective in improving EI.

In addition, Research has shown a relationship between EI and mature Ego defenses. Pellitteri (2002) found that adaptive defense styles were correlated with overall EI, while Mishar and Bangun (2014) emphasized the importance of EI in reducing negative Ego defenses (Gartani & Zarhbouh, 2023). Cramer (1999) further supported this by demonstrating that using mature Ego defenses, such as Identification, decreased with psychological maturity. Lastly, Cudzik et al. (2019) highlighted the role of EI in protecting against depression, suggesting that it may

also influence the use of mature Ego defenses. Through this study, we presented the metacognitive skills training required to develop and cultivate EI and mature defense mechanisms and reduce negative Ego defenses.

Research consistently supports the effectiveness of Metacognitive Training on EI. [Belogash & Melnichuk \(2020\)](#) further emphasized the role of metacognitive skills in EI, particularly in academic success. [Mattingly & Kraiger \(2019\)](#) also reported a moderate positive effect of training on EI, regardless of design, gender, or type of EI measure. [Drigas et al. \(2021\)](#) provided a comprehensive model for developing EI, highlighting the importance of metacognitive and metaemotional skills. Their research proved that the cultivation and training of these metacognitive and metaemotional abilities and skills with strategies is essential for the increase of EI and has a significant impact on our personality and all kinds of relationships that an individual might have. Furthermore [Drigas et al. \(2021\)](#) suggested that the development and enhancement of EI through the learning and training of metacognitive and metaemotional strategies and skills will act as a catalyst in the work environment resulting in better performance and well-being on the part of employees and leaders.

In the current study, we will focus on understanding the effectiveness of metacognitive training directly on EI and Ego defense styles in bank employees.

2. Methods

2.1. Participants, Procedure, and Measures

The study was conducted quasi-experimental with a design of pretest-posttest among employees of Parsian Bank within Tehran branches in Iran in 2022, while a sample size of $n = 44$ was determined. They were selected through convenience sampling technique and so that first the questionnaires were distributed among the 450 employees of the Persian Bank, and of these 44 employees were selected from those who obtained average scores. then they were randomly assigned into two equal groups of experimental ($n = 22$) and control ($n = 22$). Classification criteria in experimental groups, their emotional intelligence scores based on a cutting point. The study adopted stratified random sampling method. For the experimental group, metacognitive and meta emotional training strategies through the nine-layer pyramid model of EI were taught in eight two-hour sessions. The instrument for data collection included Emotional Quotient Inventory (EQ-I) and Defense Styles Questionnaire (DSQ-40) which was administered before and after instruction. The validity and reliability of the questionnaire had been previously confirmed. The collected data were analyzed by descriptive statistics, mean and standard deviation and the hypotheses were tested by MANCOVA through PASW software.

2.2. Research Instruments

2.2.1. Emotional Quotient Inventory (EQ-I)

In general, Bar-On considers EI and cognitive intelligence to contribute equally

to a person's general intelligence, which then offers an indication of one's potential to succeed in life (Bar-On, 2004; Mishar & Bangun, 2014). Four hundred fifty participants completed the Farsi version of the Bar-On EI inventory according to Dehshiri (2003) in Iran (Persian version), and all data were analyzed with PASW. Bar-On EQ-i is a 133-item questionnaire with a 5-point Likert response scale. This test and its subscales have reliability (the Cornbach's alpha coefficient was found to be 0.86) and validity (73%) in Iranian culture. With the adapted version in Iran, the Cornbach's alpha coefficient was found to be 0.76, and the results of the factor analysis provided some support for the inventory hypothesized structure. This Inventory is a 90-item and responses to each item can range from; "1 = very seldom or not true of me" to "5 very often or true of me" for positively or negatively-keyed items respectively (Dehshiri, 2003). The scales and subscales are; intrapersonal intelligence (emotional self-awareness, assertiveness, self-regard, self-actualization, independence), interpersonal intelligence (empathy, interpersonal relationships, and social responsibility), adaptability (problem-solving, reality testing, and flexibility), stress management (stress tolerance, impulse control), and general mood (happiness, optimism). Higher scores indicate a higher level of emotional intelligence. In this study, the questionnaire provides a total score. Cronbach's alpha coefficients were 0.91 for intrapersonal intelligence, 0.87 for interpersonal intelligence, 0.88 for adaptability, 0.85 for stress management, 0.87 for general mood, and 0.96 for the emotional Quotient (EQ).

2.2.1. Defense Styles Questionnaire (DSQ-40)

Defense Styles Questionnaire (DSQ-40) is a 40 items questionnaire developed by Andrews et al. (1993) measuring three categories of defense mechanisms that may be used by respondents. The Persian version of this questionnaire was translated by Besharat et al. (2007). The 40 items measure three styles labeled: mature, immature, and neurotic. Respondents answered each item on a nine-point Likert scale, ranging from "Completely Agree" to "Completely Disagree". The Mature defense style includes defense mechanisms of sublimation, humor, anticipation, and suppression. The Neurotic defense style consist of defense mechanisms of undoing, pseudo-altruism, idealization, and reaction formation. The Immature defense style includes the following defense mechanisms: projection, passive aggression, acting-out, isolation, devaluation, autistic fantasy, denial, displacement, dissociation, splitting, rationalization, and somatization. Cronbach's alphas of 0.75, 0.73 and 0.72 were reported for the three defense styles of mature, neurotic and immature respectively. Furthermore, test-retest reliability of $r = 0.81$ was reported after a four-week interval in 30 subjects (Besharat & Shahidi, 2011). In this study, in the present study, Cronbach's alphas of 0.82, 0.76, and 0.81 were for the three defense styles of mature, neurotic and immature respectively.

2.2.3. Metacognitions Training Protocol

Metacognition training for the experimental group has been designed through Metacognitive and Meta emotional Training Strategies through the Nine-layer

Pyramid Model of EI by Drigas et al. (2021), which is particularly important for achieving learning, self-awareness, social awareness, and transcendence through the eight pillars of Metacognition consist of: 1) knowledge about human emotions, their characteristics, and their functionality, 2) Self-awareness and self-evaluation of ourselves, 3) Self-monitoring our emotional self, 4) Self-regulation, 5) Adaption, 6) Recognition, 7) Discrimination, 8. Mnemosyne (memory in Greek) (Drigas & Mitsea, 2020).

The nine-layer pyramid model of metacognitive and meta-emotional skills that cultivate EI and were presented by Drigas et al. (2021), were first translated into Persian, and then metacognitive training was done according to each layer and the instructions for it. It was held in nine two hours sessions were held in 9 weeks (more than two months) that briefly in the following order: First session: The Layer of Emotional Stimuli that is the perception and awareness of the internal state of the body to be aware of internal emotions. Second session: The Layer of Emotion Recognition is perception and expression of emotions. Third session: The Layer of Self-Awareness with the help of which it is possible to manage themselves both preventively and in action. Fourth session: The Layer of Self-Management to deal better with an emotional situation, regulate emotions accordingly, and pursue our values and goals. Fifth session: The Layer of Social Awareness, Empathy, and Discrimination of Emotions. Sixth session: The Layer of Social Skills, Expertise in Emotions. Seventh session: The Layer of Self-Actualization as a beneficial interpretation of positive events. Eighth session: The Layer of Transcendence monitors self, others and universe is a third-person perspective to recognize their potential and go beyond oneself. Ninth session: The Layer of Emotional Unity as the highest level in the pyramid of EI (Drigas et al., 2021).

3. Results

The participants in this research were between 30 to 37 years old, while 20 individuals of 44 participants were male. The investigation of the results of the independence test showed the numbers of the experimental and the control groups are not significantly different considering demographic traits after nine sessions of metacognitive training over two months. Therefore, due to lack of correlation between demographic characteristics and dependent variable, there was no need to statistically control them. **Table 1** shows the mean and standard deviation of scores of EQ and defense styles in the experiment and control groups in pre-test and post-test times. The mean scores of experiment groups were increased in post-test as reveals in **Table 1**.

Box test was not significant for any of the variables ($BOX = 28/44$, $F = 1/65$, $P = 0/053$). The conditioned matrices' homogeneity of variance/covariance were thus met. To investigate the significance of this difference, the summary of multivariate analysis of covariance (MANCOVA) results is presented in the **Table 2**.

Because there are two groups in this study, Pillai's Trace tends to be reported and as be observed, according to **Table 2**, Pillai's Trace test results showed that the effect of metacognition training on EQ is 0/68, which means that 68% dif-

ferences of post-test scores for the EQ are explained by training and the same for other dependent variables can be said; 37%, 44% and 41% differences of post-test scores for the mature, neurotic and Immature Defense Styles, respectively by metacognitive training. By controlling the pre-test there was a significant difference between experiment and control groups, at least in one dependent variable. To find this difference, the analysis results are presented in **Table 3**.

According to **Table 3**, results show that means scores of all variables in experimental groups was significantly higher than the control group except Immature Defense Styles.

Table 1. Mean and standard deviation of pre-test and post-test group.

Variables	Steps	Control group		Experimental group		Total	
		Mean	SD	Mean	SD	Mean	SD
1) EQ (total)	Pre-test	310/77	37/50	324/32	27/29	317/55	33/13
	Post-test	314/68	31/46	342/09	32/17	328/39	34/37
2) Mature	Pre-test	39/64	9/25	42/23	7/45	40/93	8/40
	Post-test	39/82	8/72	47/45	9/46	43/64	9/79
3) Neurotic	Pre-test	38/77	4/95	42/55	8/61	40/66	7/20
	Post-test	39/91	5/86	43/91	8/94	41/91	7/74
4) Immature	Pre-test	96/50	15/47	107/59	23/42	102/05	20/41
	Post-test	95/77	15/43	101/82	21/21	98/80	18/59

Table 2. Summary results of the experimental and control group.

Dep. variable	Pillai's Trace	F	P	η^2
1) EQ-i	0/677	13/84	0.000****	0/68
2) Mature Defense Style	0/372	3/90	0/007**	0/37
3) Neurotic Defense Style	0/440	5/19	0/001****	0/44
4) Immature Defense Style	0/408	4/55	0/003***	0/41

Note: *The significant at the 0.5 level, **The significant at the 0.05 level, ***The significant at the 0.005 level, ****The significant at the 0.001 level.

Table 3. Compare mean difference scores of dependent variables between groups.

variables	Control group = I, Experimental group = J	
	Mean Difference (I-J)	P
1) EQ-i	-17/165	0/006**
2) Mature Defense Style	-4/488	0/049**
3) Neurotic Defense Style	-1/575	0/420*
4) Immature Defense Style	-0/605	0/895

Note: *The significant at the 0.5 level, **The significant at the 0.05 level.

4. Discussion and Conclusion

In this research, metacognition trainings for enhancing social well-being could also be effective in increasing EI, mature defense style and reduce neurotic defense style but has insignificant effect on the immature defense style of bank's employees. This finding could positively cover the findings of other researchers. For example, Alavinia & Mollahosseini (2012) found a positive relationship between learners' EI and their use of metacognitive strategies. Sharei et al. (2012) found that meta-cognition, and EI contribute significantly to the prediction of problem-solving ability and Mahasneh et al. (2019) indicated that generally high level of cognition regulation, understanding of cognition and cognition processing meta-cognition are related to a high levels of emotional knowledge, emotion regulation, empathy, and social commitment EI., as Carpenter et al. (2019) showed increases in metacognitive calibration were observed with adaptive training, which generalized to untrained stimuli and an untrained task, indicating the potential for a domain-general enhancement of metacognitive abilities in EI., metacognition training has a positive effect on decreased negative emotions general well-being (Van Cappellen et al., 2022) and increased social bounds (Rafie et al, 2020; Oraki et al., 2022). Moreover, Drigas et al. (2021) presented the metacognitive and meta emotional skills needed to develop the individual's EI based on the pyramid model of emotional intelligence. However, further research is needed on the impact of this type of metacognitive training on all personality traits. As we can see in this research, this model did not be affect immature behaviors. However, it has had a positive effect on mature and neurotic defense styles. However, this can be attributed to the limitation of the conditions of conducting the test or the duration of the effect on the personality. Another study finding was that the pyramid model of EI was performed on employees in Iran for the first time, which could more accurately examine the results by doing and repeating the research in workplace environments.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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