

Effectiveness of State-Based Relaxation Therapy on Externalizing/Internalizing Problems in Students with Intermittent Explosive Disorder

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ABSTRACT

Objective: The aim of this study was to investigate the effectiveness of state-based relaxation therapy on externalizing/internalizing problems in students with Intermittent Explosive Disorder (IED).

Methods and Materials: The research method was a quasi-experimental design with a pretest-posttest and follow-up with a control group. The statistical population included all adolescents aged 12-18 years with IED in the 2023-2024 academic year, who were studying in schools in Tehran. The sample size consisted of 30 individuals (15 in the experimental group and 15 in the control group) selected from the statistical population using convenience sampling and assigned to experimental and control groups. The experimental group received state-based relaxation therapy, while the control group remained on the waiting list. The research instruments included the Intermittent Explosive Disorder Questionnaire (Coccaro et al., 2017) and the Achenbach Emotional and Behavioral Problems Questionnaire (Achenbach & Rescorla, 2003). Data were analyzed using repeated measures analysis of variance (ANOVA) and SPSS-27 software.

Findings: The results indicated that state-based relaxation therapy had a significant effect on externalizing/internalizing problems in the posttest and follow-up stages.

Conclusion: The findings of this study provide useful information regarding state-based relaxation therapy, and psychologists and psychiatrists can use this intervention to improve externalizing/internalizing problems in students with IED.

Keywords: State-based relaxation therapy, externalizing problems, internalizing problems, Intermittent Explosive Disorder.

1. Introduction

Intermittent Explosive Disorder (IED) is considered an impulse control disorder characterized by repeated episodes of impulsive, uncontrollable aggression, during which individuals attack others or destroy their property. Individuals with IED experience increasing tension before violent outbursts and a sense of relief after the explosion of anger and aggression (American Psychiatric Association, 2022). Typically, the symptoms of IED manifest in childhood/adolescence and persist into adulthood (Radwan & Coccaro, 2020). The lifetime prevalence of this disorder in adults is approximately 4% (Marillo et al., 2023) and 7.8% in adolescents aged 13 to 17 years (Shao et al., 2019). Individuals with IED have poorer quality of life and greater psychosocial impairment compared to those without the disorder (Hall & Coccaro, 2022).

One of the issues that adolescents with IED might experience is behavioral problems (Barra et al., 2022); these problems in children are categorized into internalizing and externalizing behaviors (Trajkovski et al., 2021). Internalizing symptoms express the individual's inner distress (Black et al., 2022); these problems are characterized by negative emotions and include issues such as withdrawal, anxiety, depression, and somatic complaints (Coccaro et al., 2017; Gharib Pour et al., 2020; Meruelo et al., 2023). In contrast, externalizing symptoms are directed towards the environment and are described as conflicts with others and social norms, including aggressive behavior, delinquency, defiance, and behavioral problems (Achenbach & Rescorla, 2003). Children and adolescents with externalizing symptoms who lack proper social skills use negative evaluations and have difficulties in their relationships; these problems emerge at a young age and worsen with age if not addressed (Chesney & Gordon, 2017). Children and adolescents with behavioral disorders are unsuccessful in making friends, do not allow anyone to enter their personal space, and ultimately become withdrawn and isolated; after a while, due to being rejected by peers, they become destructive, ill-behaved, unpredictable, confrontational, irritable, envious, and stubborn (Sheikhi Gerakoui et al., 2021). However, a child or adolescent might be depressed and anxious while also exhibiting antisocial and hostile behaviors; those with persistent negative behaviors are more susceptible to mental health disorders like IED (Andre et al., 2020).

Another therapeutic approach that has gained attention in recent years for treating psychological problems in

individuals with behavioral disorders is state-based relaxation therapy (Swart & Apsche, 2014). This therapy is considered a third-wave therapy derived from cognitive behavioral therapy, acceptance and commitment therapy, dialectical behavior therapy, functional analytic psychotherapy, mindfulness, and meditation (Apsche et al., 2012). The focus of this method is on providing and developing a new understanding of beliefs that lead to the continuation of unhealthy and incorrect behaviors (Bass & Apsche, 2013). The therapy begins with conceptualization for adolescents, followed by subsequent stages such as mindfulness, acceptance, emotional detachment, cognitive detachment, validation-specification, redirection of practical alternative beliefs, and mindful breathing. The therapeutic process for adolescents primarily emphasizes achieving balance and creating harmony in life (Rezapour et al., 2023). Regarding the effectiveness of state-based relaxation therapy, Rajai et al. (2022) showed that state-based relaxation therapy reduced somatic complaints, aggression, and delinquency in adolescent girls (Rajaei et al., 2022). In another study, Hashemi et al. (2020) demonstrated that state-based relaxation therapy significantly reduced the overall aggression score and its subscales, including physical aggression, verbal aggression, anger, and hostility (Hashemi et al., 2020).

Considering the research findings and the negative impact of IED on the externalizing/internalizing problems of individuals with this disorder, utilizing appropriate psychological interventions can enhance the psychological components of these individuals and lead to significant changes in their rehabilitation methods. Additionally, given the limited studies conducted in Iran on the effectiveness of various therapeutic methods on the psychological characteristics of individuals with IED, this study aimed to investigate the effectiveness of state-based relaxation therapy on the externalizing/internalizing problems of students with IED.

2. Methods and Materials

2.1. Study Design and Participants

The research method was quasi-experimental with a pretest-posttest and follow-up design with a control group. The statistical population included all adolescents aged 12-18 years with IED in the 2024 academic year, studying in schools in Tehran. To select the sample, convenience sampling was used initially by visiting schools, and the Intermittent Explosive Disorder Subscale was completed by

the participants. To ensure the final diagnosis, a semi-structured clinical interview was conducted with the adolescents. Finally, a sample of 30 individuals was selected based on inclusion criteria and then assigned to experimental and control groups. The inclusion criteria were: having IED, being aged 12-18 years, student and parental consent to participate in the study, and the absence of acute and chronic physical and psychological illnesses. The exclusion criteria included: absence from two training sessions and lack of cooperation and failure to complete the specified tasks during the training period.

After selecting individuals based on ethical principles, brief information about the research topic and objectives was provided to them. Participants were assured that the research results would be published as a general conclusion, and they had the right to withdraw from the training at any stage. Written consent was obtained from the participants. The Achenbach Emotional and Behavioral Problems Questionnaire was administered to the experimental and control groups in the pretest stage.

2.2. Measures

2.2.1. Intermittent Explosive Disorder

This questionnaire was designed by Coccaro et al. (2017). Initially, it consisted of 7 items for identifying IED in adults according to DSM-5, but later Coccaro et al. (2017) reduced it to 5 items. Items are scored on a 5-point Likert scale from 0 to 4. Coccaro et al. (2017) reported internal consistency reliability through Cronbach's alpha as 0.87 in the clinical population and 0.72 in the non-clinical population. In Iran, Gharibpour et al. (2020) reported the internal consistency reliability of the questionnaire through Cronbach's alpha as 0.85. Concurrent validity was assessed by correlating the results with the Aggression Questionnaire, yielding a correlation greater than 0.3, which was significant at the 0.01 level (Gharib Pour et al., 2020; Sheikhi Gerakoui et al., 2021).

2.2.2. Behavioral Problems

The Achenbach Emotional and Behavioral Problems Questionnaire: This self-report questionnaire was developed by Achenbach and Rescorla (2003) for children and adolescents. It includes scales for internalizing problems, externalizing problems, and overall problems; the internalizing problems scale includes subscales for withdrawal/depression, somatic complaints, and anxiety.

The externalizing problems scale includes subscales for rule-breaking behavior and aggressive behavior, and the overall problems scale includes all items except items 2 and 4 (allergies and asthma). The items are rated on a three-point scale (Not True, Somewhat or Sometimes True, Very True or Often True), receiving scores of 0, 1, and 2, respectively. Scores below 60 in the T-score for the internalizing, externalizing, and overall problems scales are considered normal or non-clinical; scores between 60-63 are considered borderline-clinical, and scores above 63 are considered clinical. The overall reliability coefficients of the questionnaire forms using Cronbach's alpha were reported as 0.97, with test-retest reliability of 0.94. Additionally, content validity, criterion validity (using psychiatric interviews with children and correlation with the CSI-4 scale), and construct validity (internal relationships of scales) were satisfactory (Achenbach & Rescorla, 2007). In Iran, this questionnaire was standardized by Minaei (2006), with internal consistency coefficients for the scales ranging from 0.63 to 0.95 using Cronbach's alpha. The temporal stability of the scales was assessed using the test-retest method over an interval of 5-8 weeks, yielding stability coefficients ranging from 0.32 to 0.67. The agreement between respondents was also examined, with coefficients ranging from 0.09 to 0.67 (Rajaei et al., 2022; Rezapour et al., 2023; Sheikhi Gerakoui et al., 2021).

2.3. Intervention

2.3.1. State-Based Relaxation Therapy

The experimental group received state-based relaxation therapy in 8 sessions of 60 minutes each over four weeks, with two sessions per week. After the training period, assessments were conducted again in the posttest and 1-month follow-up stages for both the experimental and control groups (Adelifard et al., 2023; Rajaei et al., 2022).

Each session builds on the previous one, progressively introducing techniques such as mindful breathing, emotional and cognitive detachment, acceptance, and conceptualization. The goal is to enable adolescents to achieve emotional and physical self-regulation, recognize and modify maladaptive behaviors, and apply these skills in their daily lives. Below is a detailed description of each session.

Session 1: Pre-test and Typology Assessment

The first session focuses on building a therapeutic alliance and conducting preliminary assessments. The session begins with a pre-test and a typology assessment of

the adolescent and their parents. The first part includes practicing mindful breathing exercises with the counselor. The session covers six initial typological categories, establishing a treatment contract, and explaining the structure of future sessions. The expected change is forming a therapeutic alliance.

Session 2: Continuation of Typology and Emotional Detachment

In the second session, the typology assessment continues, and the aggression scale is administered. The session involves practicing mindful breathing and introducing the concept of emotional detachment. The second set of six typological categories is completed, and adolescents learn to experience and recognize emotional detachment through physical sensations. The expected outcome is increased awareness and recognition of emotions.

Session 3: Addressing Fears and Core Beliefs

The third session focuses on exploring fundamental fears and traumas, and administering the Core Beliefs Questionnaire. The session emphasizes the confidentiality of assessments and introduces the concepts of acceptance and openness to distressing thoughts and feelings. Adolescents complete the fear assessment interview with mindful awareness and practice relaxation techniques. The expected change is an increased understanding and acceptance of thoughts and feelings.

Session 4: Conceptualization and Therapeutic Alliance Evaluation

In the fourth session, a conceptualization chart is created, and the therapeutic alliance is evaluated. Adolescents engage in a mindfulness exercise, "Ocean Visualization," and complete the first three stages of conceptualization. The session explores the connection between fears and core beliefs and examines the fusion of beliefs and behaviors. The expected outcome is the ability to differentiate thoughts, feelings, and their impact on behavior.

Session 5: Recognizing States and Enhancing Awareness

The fifth session aims to recognize states and how they are activated, enhance awareness, and experience mindfulness, acceptance, and validation. The session includes summarizing data, reviewing recent distressing events, and completing the final stages of assessment. Adolescents are introduced to the concept of states and how they are activated in similar situations. The expected change is identifying state-activating situations.

Session 6: Completing the Treatment Plan and Conceptualization

In the sixth session, the treatment plan is completed, and state-based relaxation therapy is introduced. The session involves presenting the conceptualization and explaining how states are activated in similar situations. Adolescents review their feelings and reasons behind them and explore ways to deactivate states through cognitive detachment using the "Radio Metaphor." The expected outcome is the ability to identify connections between state activation, feelings, and beliefs.

Session 7: Consolidating Conceptualization and Redirecting Behaviors

The seventh session focuses on consolidating the conceptualization, validating ineffective behaviors, and redirecting them. The session involves reinforcing the conceptualization, reviewing state-activating situations, specifying behaviors during state activation, and their consequences. Adolescents practice mindful awareness and reflect on replacing ineffective beliefs with effective ones. The expected change is recognizing behaviors triggered by state activation and focusing on alternative behaviors.

Session 8: Consolidation and Generalization of Skills

The final session aims to consolidate concepts and encourage the application of skills in daily life. For adolescents, the session involves reviewing the impacts of belief replacement and behavior changes, summarizing the changes achieved, and validating feelings associated with the end of therapy. Parents discuss their child's problems and changes observed during the sessions. Adolescents practice mindfulness exercises in state-activating situations. The expected outcome is the application of acceptance and detachment skills to remain present, especially during state activation.

2.4. Data analysis

Data analysis was performed using descriptive statistics and repeated measures analysis of variance (ANOVA) in SPSS version 26.

3. Findings and Results

Based on the findings from demographic data, the mean age of the experimental group was 14.33 ± 1.49 years, and the mean age of the control group was 15.40 ± 1.20 years. The descriptive statistics of the pre-test and post-test scores of the research variables by group are reported in [Table 1](#).

Table 1

Descriptive Statistics of Research Variables by Experimental and Control Groups

Variable	Group	Pre-test Mean (SD)	Post-test Mean (SD)	Follow-up Mean (SD)
Externalizing Problems	Experimental	25.73 (2.46)	21.33 (2.82)	21.60 (3.33)
	Control	25.46 (3.29)	26.00 (3.20)	25.61 (3.34)
Internalizing Problems	Experimental	29.33 (4.38)	21.06 (4.75)	22.33 (4.22)
	Control	28.33 (3.90)	28.40 (3.83)	29.06 (3.36)

As seen in Table 1, the mean scores of externalizing and internalizing problems in the experimental group decreased more in the post-test stage compared to the pre-test stage than in the control group. For data analysis, repeated measures analysis of variance (ANOVA) was used, and the underlying assumptions of this test were first examined. The Kolmogorov-Smirnov test was used to check the normality of the score distribution. The results showed that the assumption of normality was not rejected in either group ($P > 0.05$). Levene’s test was used to check the assumption of equal variances for the covariance analysis, and the results indicated that the equality of variance was not rejected for

externalizing problems ($P > 0.05$, $F = 0.086$) and internalizing problems ($P > 0.05$, $F = 0.775$) in the groups. Additionally, the Mauchly’s sphericity test results indicated a significance level less than 0.05, rejecting the sphericity assumption, so the Greenhouse-Geisser correction results were used in the repeated measures model. Therefore, the conditions for performing the covariance analysis test were met.

The results of Wilks’ Lambda multivariate covariance analysis test showed a significant difference between the groups in at least one of the dependent variables ($P < 0.001$).

Table 2

Repeated Measures Analysis of Variance for Intra-Group and Inter-Group Effects

Variable	Source	Sum of Squares	df	Mean Square	F	P	Effect Size
Externalizing Problems	Stages	140.600	1.422	98.882	84.280	0.001	0.751
	Interaction (Stages*Group)	179.356	1.422	126.139	107.511	0.001	0.793
	Group	217.778	1	217.778	8.241	0.001	0.227
Internalizing Problems	Stages	228.956	1.340	170.818	17.836	0.001	0.389
	Interaction (Stages*Group)	292.289	1.340	218.069	22.770	0.001	0.448
	Group	733.878	1	733.878	18.705	0.001	0.400

The results in Table 2 indicate that the F value for the interaction effect of stages and group for the dimensions of externalizing problems ($F = 107.511$) and internalizing problems ($F = 22.770$) is significant ($P < 0.001$).

Additionally, the pairwise comparison of adjusted mean stages (pre-test, post-test, and follow-up) is presented in Table 3.

Table 3

Bonferroni Post Hoc Test Results for Research Variables

Variable	Stages	Mean Difference	Significance Level
Externalizing Problems	Pre-test-Post-test	2.600	0.001
	Pre-test-Follow-up	2.700	0.001
	Post-test-Follow-up	0.100	1.000
Internalizing Problems	Pre-test-Post-test	-3.400	0.001
	Pre-test-Follow-up	-3.367	0.001
	Post-test-Follow-up	0.033	1.000

According to Table 3, in the variables of externalizing and internalizing problems, the mean of the experimental

group in the post-test and follow-up stages is significantly lower than in the pre-test stage ($P < 0.01$), while the

difference between the post-test and follow-up stages is not significant ($P > 0.01$). However, in the control group, there is no difference between the pre-test, post-test, and follow-up stages ($P > 0.01$). This finding indicates that state-based relaxation therapy not only led to an improvement in externalizing and internalizing problems in the experimental group but also maintained this effect in the follow-up stage.

4. Discussion and Conclusion

This study aimed to determine the effectiveness of state-based relaxation therapy on externalizing/internalizing problems in students with Intermittent Explosive Disorder (IED). The results showed that state-based relaxation therapy is effective for externalizing problems in students with IED. This finding aligns somewhat with the prior results (Apsche et al., 2012; Hashemi et al., 2020; Rajaei et al., 2022; Swart & Apsche, 2014). In explaining this finding, the learned skills can be highlighted. These skills include mindful breathing, emotional detachment, cognitive detachment, acceptance, and balancing beliefs toward practical alternative beliefs (Rajaei et al., 2022); thus, adolescents achieve emotional and physical self-regulation by applying these skills. They learn to pay attention to their increasing anxiety when faced with an external event, step back, take a deep breath, and focus on their breathing. In the next step, they identify the specific area of their body where they feel tension, pain, or negative thoughts and detach from them emotionally and cognitively. In other words, they allow themselves to experience their feelings in the moment, thereby separating from pain and negative thoughts. In the next step, they move towards self-acceptance and can accept pain and anger in the moment. Finally, they can use fused beliefs and behaviors to create balance in beliefs in challenging situations (Hashemi et al., 2020).

Another finding of this study showed that state-based relaxation therapy is effective for internalizing problems in students with IED. This finding aligns somewhat with the previous results (Adelifard et al., 2023; Bayles et al., 2014; Hashemi et al., 2020; Rajaei et al., 2022; Swart & Apsche, 2014). One of the effective mechanisms in this therapy is the active engagement of the individual in conceptualizing their problems, thereby realizing that their destructive beliefs lead to maladaptive behaviors (Bayles et al., 2014). Additionally, during the completion of conceptualization, the fears and avoidance-creating factors are identified for the therapist and the adolescent. Subsequently, the therapist creates a treatment plan to calm the fears, beliefs, and behaviors of the

adolescent by establishing a connection between fears and beliefs that guide the adolescent's behavior. Making the adolescent aware of the connection between these three components (fear, belief, and behavior) has a significant impact on balancing this process; for example, an adolescent may fear trusting others and avoid closeness and intimacy, resulting in the belief that everyone betrays them. To help adolescents understand this process better, the therapist conducts a situational analysis in the form of role-playing. Mastering any skill requires reinforcement; here, the therapist must reinforce these skills to help adolescents become proficient. It is evident that if the state-based relaxation in the adolescent leads to adaptive behaviors, the adolescent receives positive feedback from the therapist and those around them, which is crucial for reinforcing learned skills and reducing internalizing problems (Hashemi et al., 2020).

5. Limitations & Suggestions

One limitation of this study was the use of convenience sampling. It is suggested that future research be conducted using random sampling to enhance the external validity of the study. Additionally, it is recommended that this therapeutic approach be compared with other psychological treatment methods for these patients to assess its effectiveness and efficiency compared to other approaches.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contributed in this article.

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