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Prediction of Psychosomatic Symptoms Based on Adverse Childhood Experiences and Cognitive Emotion Regulation in Individuals Aged 20 to 50 Years

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A B S T R A C T

Purpose: The present study aimed to determine the relationship between adverse childhood experiences and cognitive emotion regulation with psychosomatic symptoms in adults.

Methods and Materials: The research method was correlational. The statistical population consisted of all individuals aged 20 to 50 years residing in Shiraz in the year 2024. From this population, 300 individuals were selected through convenience sampling. The research instruments included the Somatization Questionnaire by Kroenke et al. (2002), the Adverse Childhood Experiences Questionnaire by Felitti et al. (1998), and the Cognitive Emotion Regulation Questionnaire by Garnefski and Kraaij (2006). Data analysis was conducted using multiple regression with SPSS software.

Findings: The results indicated that there was no significant relationship between adverse childhood experiences and psychosomatic symptoms in adults. However, adaptive cognitive emotion regulation was found to predict psychosomatic symptoms with a regression slope of -0.091 in the linear equation. Moreover, maladaptive cognitive emotion regulation could predict psychosomatic symptoms with a regression slope of 0.443 in the linear equation.

Conclusion: Therefore, it is concluded that adverse childhood experiences do not predict psychosomatic symptoms; however, cognitive emotion regulation can predict psychosomatic symptoms in adults.

Keywords: *Psychosomatic symptoms, adverse childhood experiences, cognitive emotion regulation.*

1. Introduction

With the advent of the DSM-III, the classical concept of hysteria was fragmented and replaced with several distinct "somatoform" disorders. In 1987 (DSM-III-R), these classifications were revised into the categories that are currently in use. These included conversion disorder, somatization disorder, body dysmorphic disorder, somatoform pain disorder, undifferentiated somatoform disorder, somatoform disorder not otherwise specified, and hypochondriasis. In 2013, the American Psychiatric Association (APA) introduced "Somatic Symptom Disorder" as a new diagnostic category in the Diagnostic and Statistical Manual of Mental Disorders, replacing the criteria for somatization disorder used in DSM-IV. These criteria include: (1) distressing or functionally impairing somatic symptoms, (2) excessive and persistent thoughts about the seriousness of symptoms (cognitive dimension), high levels of anxiety about health or symptoms (emotional dimension), and excessive time and energy devoted to these symptoms or health concerns (behavioral dimension), and (3) persistence of these criteria for at least six months (Sefotho et al., 2024; Werner, 2025).

Additionally, DSM-5 explicitly permits the diagnosis of somatic symptom disorder alongside any co-occurring medical condition, thus aiming to eliminate the dualism between mind and body. The new diagnostic criteria were also introduced to reduce the stigma associated with former somatoform disorder labels in DSM-IV-TR and in the 10th edition of the International Classification of Diseases (ICD-10). Furthermore, in the 11th edition of the International Classification of Diseases (ICD-11), which became effective in January 2022, the previous somatic disorder categories were substantially revised and redefined as "bodily distress disorder" (Löwe, 2022).

Somatic symptom disorder and other disorders characterized by prominent physical symptoms are now grouped under a new category in DSM-5 called "Somatic Symptom and Related Disorders." The fifth edition of the DSM replaced the term "somatoform disorders" with "somatic symptom and related disorders" and revised the labels and diagnostic criteria accordingly (Rief & Martin, 2014). The symptoms of somatization disorder, also known as somatic symptom disorders, include one or more physical complaints that are accompanied by excessive thoughts, feelings, or behaviors related to the symptoms, resulting in significant distress or functional impairment. These symptoms may or may not be medically explainable.

Somatic symptom disorders are associated with heightened awareness of bodily sensations and a tendency to interpret these sensations as signs of medical illness. While the precise etiology of somatic symptom disorders remains unclear, studies have identified childhood neglect, sexual abuse, and overall adverse childhood experiences as risk and contributing factors in the development of such symptoms (de Souza & Houghton, 2022).

Anda et al. (2020) and Edward et al. (2004) demonstrated that adverse childhood experiences are associated with hypertension, cardiovascular problems, and other physical health issues (Anda et al., 2020; Edwards et al., 2004). In a similar context, Exley et al. (2015) reported a significant association between adverse childhood experiences and levels of stress as well as the emergence of somatic symptoms. Adverse childhood experiences refer to traumatic or stressful events that occur before the age of 18. These include sexual, physical, and emotional abuse, as well as various forms of family dysfunction, such as parental mental illness, divorce, or separation. Recently, these experiences have garnered increased attention due to their wide-ranging and long-lasting impacts on both physical and mental health. Epidemiological studies have consistently shown a strong relationship between adverse childhood experiences and multiple health risk behaviors and adverse health outcomes in adulthood (Abbasi et al., 2022; Mozdaghii, 2022).

Studies also indicate that cognitive emotion regulation is another influential variable in the manifestation of somatic symptoms (Saeed et al., 2021). According to Gratz and Roemer (2008), emotion regulation helps individuals learn how to experience or express emotions. Similarly, Garnefski and Kraaij (2006) conceptualize cognitive emotion regulation as the individual's cognitive appraisal in response to distressing or anxiety-inducing events. Based on the model proposed by Garnefski and Kraaij (2002), there are nine emotion regulation strategies, categorized into adaptive and maladaptive groups (Garnefski & Kraaij, 2019). Research has shown that difficulties in emotion regulation play a significant role in the development of somatic symptoms (Saeed et al., 2021). Individuals with poor emotion regulation struggle to manage and reduce negative emotions when faced with stressful life situations. These individuals are more likely to employ maladaptive strategies. Frequent use of maladaptive strategies intensifies fear and negative emotions, reduces psychological resilience, and increases stress—which in turn is a major factor in exacerbating somatic symptoms.

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Conversely, using adaptive strategies reduces negative affect and enhances positive affect, thereby improving the individual's capacity to resolve problems and prevent the onset of somatic symptoms (Baker & McNulty, 2015).

Therefore, this study is significant because it suggests that governments should provide targeted services for individuals with somatic symptom disorders or symptoms thereof. Improving both the mental and physical well-being of these individuals benefits society as a whole, as better public health contributes to greater social, economic, and cultural development. Moreover, reducing somatic symptoms in the general population can lower governmental expenditures related to managing physical and psychological illnesses. Consequently, conducting this research not only addresses a theoretical gap in the literature but also offers crucial insights for researchers aiming to understand somatic symptom disorders and their contributing factors. It can also serve as a foundation for further research and therapeutic interventions while raising public awareness.

Thus, considering the existing theoretical gap, the present study is of considerable importance in identifying the antecedents of somatic symptoms. The central research question is: Do cognitive emotion regulation and adverse childhood experiences predict somatic symptoms?

2. Methods and Materials

2.1. Study Design and Participants

The present study is fundamental in terms of its objective, quantitative in nature, and correlational in its data collection approach. The implementation was field-based, and the measurement level was at the interval scale. The statistical population included all individuals aged 20 to 50 years residing in Shiraz in 2024. From this population, 300 individuals were selected using convenience sampling.

The procedure was as follows: first, the demographic questionnaire along with other research instruments was prepared on the Google Forms platform. After obtaining the questionnaire link from the system, an easy-to-understand guide was placed at the top of the form. The questionnaire link was then distributed via Telegram, WhatsApp, and Instagram groups. Participants were also requested to share the link with others who met the inclusion criteria. Participants answered the questions by clicking on the desired options, and the responses were automatically submitted to the researcher.

2.2. Measures

2.2.1. Adverse Childhood Experiences Questionnaire

The Adverse Childhood Experiences (ACE) Questionnaire, developed by Felitti et al. (1998), is a retrospective self-report instrument designed to measure exposure to potentially traumatic experiences during childhood, which may have long-term effects on physical and psychological health. This tool originated from a study conducted in 1985 at Dr. Vincent Felitti's obesity clinic in California, where he observed that many individuals who prematurely dropped out of weight loss programs had a history of childhood trauma, including physical or sexual abuse. This observation led to the hypothesis that such experiences might underlie maladaptive coping behaviors in adulthood, such as emotional eating or obesity. The questionnaire consists of 10 binary items (scored as 0 for "No" and 1 for "Yes") that cover five subdomains: physical abuse, verbal abuse, sexual abuse, physical neglect, and emotional neglect. Scores range from 0 to 10, with a cumulative score above 5 considered indicative of significant adverse childhood exposure. This instrument has demonstrated acceptable internal consistency; Felitti et al. (2019) reported a Cronbach's alpha of 0.79, and a more recent validation study conducted in Iran (Mozdaghii, 2022) reported an alpha of 0.89, confirming its psychometric reliability in non-Western populations. It remains a widely used tool in both epidemiological and clinical studies for identifying early-life risk factors linked to various adult health outcomes.

2.2.2. Cognitive Emotion Regulation Questionnaire (CERQ)

The Cognitive Emotion Regulation Questionnaire (CERQ), constructed by Garnefski and Kraaij (2006), is an 18-item multidimensional measure that evaluates individual differences in the cognitive regulation of emotion following stressful or traumatic life events. It employs a five-point Likert scale ranging from 1 ("Never") to 5 ("Always") and is organized into nine conceptually distinct subscales: self-blame, other-blame, rumination, catastrophizing, putting into perspective, positive refocusing, positive reappraisal, acceptance, and refocus on planning. These subscales are further categorized into two overarching domains—adaptive (putting into perspective, positive refocusing, positive reappraisal, acceptance, refocus on planning) and maladaptive strategies (self-blame, other-blame, rumination,

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catastrophizing)—in alignment with cognitive-behavioral models of emotion regulation. Each subscale yields a score ranging from 2 to 10, with higher scores indicating more frequent use of the respective cognitive strategy. This tool is particularly valuable in research on emotional functioning and psychopathology, as it differentiates between constructive and dysfunctional cognitive coping mechanisms. Garnefski and Kraaij (2006) reported satisfactory internal consistency for the subscales, with Cronbach's alpha values ranging from 0.71 to 0.81. In an Iranian sample, Abbasi et al. (2022) confirmed this reliability with alpha values ranging from 0.73 to 0.86, supporting its cross-cultural applicability (Abbasi et al., 2022). The CERQ has been extensively employed in both clinical and non-clinical settings to assess the role of cognitive strategies in emotional regulation and mental health outcomes.

2.2.3. Patient Health Questionnaire – Somatic Symptom Module (PHQ-15)

The Patient Health Questionnaire – Somatic Symptom Module (PHQ-15), developed by Kroenke et al. (2002), is a brief, efficient, and widely used screening tool designed to evaluate the severity of somatization symptoms in both clinical and general populations. Unlike other somatic symptom inventories containing 37 or 53 items, the PHQ-15 offers a concise format that facilitates rapid assessment without sacrificing psychometric robustness. The instrument consists of 15 items that inquire about the frequency of common somatic complaints experienced over the past four weeks, such as gastrointestinal problems, fatigue, pain, and dizziness. Each item is scored using a 3-point Likert scale: 0 ("Not bothered at all"), 1 ("Bothered a little"), and 2 ("Bothered a lot"), resulting in a total score ranging from 0 to 30. Severity thresholds have been established as follows: scores under 4 suggest minimal somatization, scores between 5–9 indicate low severity, 10–14 indicate moderate severity, and scores from 15–30 indicate high somatization. The tool captures over 90% of physical symptoms commonly presented in primary care settings and is often used in conjunction with other modules of the PHQ. Kroenke et al. (2002) reported a Cronbach's alpha of 0.82 for the PHQ-15, demonstrating its internal consistency. In a validation study conducted in Iran by Abdolmohammadi et al. (2017), the instrument achieved a Cronbach's alpha of 0.76, affirming its reliability for use within Iranian populations (Saeed et al., 2021; Sharifi et al., 2022). In the present study, the internal consistency of the PHQ-15, as measured by Cronbach's alpha, was found to be 0.77, further supporting its suitability as a somatization screening tool.

2.3. Data Analysis

For data analysis, descriptive statistics were first used to summarize and describe demographic characteristics of the sample, including gender, age, education level, etc. At the inferential level, to test the hypotheses and examine the relationships between the research variables, the normality of the data was first assessed. Then, multiple regression analysis was conducted using SPSS version 26.

3. Findings and Results

Among the 300 participants, 55% were women and 45% were men. Regarding age distribution, the highest percentage of participants fell within the 30–40 age group, followed by the 20–30 age group. In terms of marital status, 54% of the sample were single, while 46% were married. Concerning educational attainment, 50% held a master's degree and 42% held a bachelor's degree. Regarding employment status, 58% of participants were employed and 42% were unemployed.

Table 1

Descriptive Statistics for Main Study Variables

Variable	Number of Items	Possible Range	Mean (M)	Standard Deviation (SD)
Psychosomatic Symptoms (PHQ-15)	15	0 – 30	10.46	5.28
Adverse Childhood Experiences (ACE)	10	0 – 10	3.21	2.37
Adaptive Cognitive Emotion Regulation (CERQ)	10	10 – 50	36.84	6.75
Maladaptive Cognitive Emotion Regulation (CERQ)	8	8 – 40	23.59	5.42

Descriptive statistics were computed to summarize the central tendency and variability of the key study variables. As shown in Table 1, the mean score for psychosomatic symptoms, as measured by the PHQ-15, was 10.46 (SD = 5.28), indicating a moderate level of somatization symptoms among participants. The Adverse Childhood Experiences

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(ACE) questionnaire yielded a mean of 3.21 (SD = 2.37), suggesting that on average, participants reported exposure to approximately three types of adverse experiences before the age of 18. Regarding cognitive emotion regulation, the mean score for adaptive strategies (e.g., acceptance, positive refocusing) was 36.84 (SD = 6.75), which reflects relatively frequent use of constructive cognitive approaches to emotional regulation. In contrast, the mean score for maladaptive strategies (e.g., rumination, catastrophizing) was 23.59 (SD = 5.42), indicating a moderate reliance on less effective cognitive strategies in managing distress. These descriptive findings provide insight into the psychological profiles of the sample and support the inferential analyses conducted later in the study.

To assess the normality of the data distribution, the Kolmogorov–Smirnov test was employed. The null hypothesis—that the data are normally distributed—was tested at a 5% significance level. If the test statistic (sig value) is greater than or equal to 0.05, the null hypothesis cannot be rejected, indicating normal distribution of the data. Based on the results shown in Table 2, the sig values for all variables exceed 0.05, confirming the normality of the data distributions.

Table 2

Results of Kolmogorov–Smirnov Normality Test

Variable	Sig
Psychosomatic Symptoms	0.200
Adverse Childhood Experiences	0.120
Adaptive Cognitive Emotion Regulation	0.200
Maladaptive Cognitive Emotion Regulation	0.200

To examine the contribution of the independent variables in predicting psychosomatic symptoms, a stepwise multiple regression analysis was conducted, as shown in Table 3.

Table 3

Model Fit for Regression Hypotheses

Dependent Variable	Independent Variables	Sum of Squares	df	Mean Square	F	Sig
Psychosomatic Symptoms	Adverse Childhood Experiences Adaptive Cognitive Emotion Regulation Maladaptive Cognitive Emotion Regulation	1958.823	3	652.941	22.517	0.000

Given the significance level (Sig = 0.000), which is less than 0.05, the regression model is statistically significant.

Table 4

Coefficient of Determination (R^2) for Regression Model

Dependent Variable	Independent Variables	R	R^2	Adjusted R^2
Psychosomatic Symptoms	Adverse Childhood Experiences Adaptive Cognitive Emotion Regulation Maladaptive Cognitive Emotion Regulation	0.431	0.186	0.178

As shown in Table 4, the adjusted R^2 value is 0.178, indicating that the three independent variables (adverse childhood experiences, adaptive cognitive emotion regulation, and maladaptive cognitive emotion regulation) together explain approximately 17.8% of the variance in psychosomatic symptoms.

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Table 5

Regression Coefficients for Hypotheses

Dependent Variable	Independent Variables	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig
Psychosomatic Symptoms	Intercept	3.348	1.663		2.013	0.045
	Adverse Childhood Experiences (D)	-0.004	0.240	-0.001	-0.017	0.986
	Adaptive Cognitive Emotion Regulation (T)	-0.091	0.046	-0.107	-1.986	0.048
	Maladaptive Cognitive Emotion Regulation (K)	0.443	0.060	0.440	7.433	0.000

Table 5 presents the regression coefficients (parameter estimates). The constant (intercept) is 3.348, while the unstandardized regression slopes for the predictors are -0.004 for adverse childhood experiences, -0.091 for adaptive cognitive emotion regulation, and 0.443 for maladaptive cognitive emotion regulation. Accordingly, the regression equation, based on the 95% confidence level and using abbreviated variable names, is expressed as:

$$E = 3.348 + T(-0.091) + K(0.443)$$

The significance level (Sig = 0.045) for the intercept is less than 0.05, indicating its statistical significance. Among the predictors, the significance level for adaptive cognitive emotion regulation (T) is 0.048, which is also below the 0.05 threshold, confirming its significant role in predicting psychosomatic symptoms. The variable maladaptive cognitive emotion regulation (K) also shows a significant predictive relationship (Sig = 0.000). However, the slope for adverse childhood experiences (D) is -0.004 with a significance level of 0.986, which is greater than 0.05, indicating that this predictor is not statistically significant. Therefore, the hypothesis that adverse childhood experiences predict psychosomatic symptoms is rejected. In contrast, both adaptive and maladaptive cognitive emotion regulation strategies significantly predict psychosomatic symptoms.

4. Discussion and Conclusion

This study aimed to examine the relationship between adverse childhood experiences and cognitive emotion regulation with psychosomatic symptoms in adults. The findings indicated that adverse childhood experiences did not predict psychosomatic symptoms in adults, while cognitive emotion regulation significantly predicted these symptoms. The result that adverse childhood experiences were not predictive is inconsistent with the findings of Sharifi et al. (2022), which may be attributed to methodological differences; this study used multiple regression analysis, while Sharifi and colleagues employed structural equation modeling, in which psychological capital played a mediating role between adverse childhood experiences and psychosomatic symptoms (Sharifi et al., 2022). In other words, adverse childhood experiences may only predict psychosomatic symptoms when mediated by a variable such as psychological capital.

To interpret these findings, it is important to note that individuals with psychosomatic symptoms often rely on emotion-focused and maladaptive coping strategies, frequently characterized by avoidance as a response to psychological distress. Psychosomatic symptoms are psychological conditions that manifest through physical symptoms without an identifiable medical cause. Affected individuals tend to have excessive thoughts, feelings, or worries about their symptoms, which interfere with their ability to function properly. Rather than acknowledging psychological distress, they often attribute their issues solely to physical illness and repeatedly seek medical consultations, which typically fail to provide a clear diagnosis and can lead to frustration and psychological discomfort (Anda et al., 2020; Ebrahimi et al., 2023). Conversely, individuals with adverse childhood experiences often suffer from psychological pain that primarily affects mental health rather than physical functioning. These experiences include emotional, physical, or sexual abuse; emotional or physical neglect; living in households with domestic violence, parental substance use, mental illness, incarceration, or divorce. Such individuals are more prone to psychological disorders such as mood disorders, personality disorders, or delusional disorders, with fewer symptoms manifesting physically.

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Moreover, the study found that adaptive cognitive emotion regulation significantly predicted psychosomatic symptoms, aligning with prior findings (Abbasi et al., 2022; Saeed et al., 2021; Yıldız & Duy, 2019). Theoretically, not all individuals exposed to adverse circumstances experience health consequences. Emotion regulation is considered a key protective factor for psychological well-being and an essential component for optimal psychological functioning. It refers to the processes by which individuals influence the emotions they experience, the timing of these emotions, and how they are expressed. Garnefski et al. (2001) conceptualized emotion regulation as a cognitive process that manages emotionally arousing input and reflects cognitive coping mechanisms (Garnefski & Kraaij, 2019). They proposed nine regulation strategies, categorized as either adaptive (e.g., acceptance, positive reappraisal, refocus on planning, positive refocusing, putting into perspective) or maladaptive (e.g., rumination, catastrophizing, self-blame, other-blame). Adaptive strategies are associated with better mental and physical health outcomes. Recent research has established links between these cognitive emotion regulation strategies and psychosomatic symptoms. A greater tendency to use adaptive strategies in stressful situations contributes to psychological and physical well-being by reducing the experience of negative affect, stress, and anxiety—key precursors of psychosomatic symptoms (Yıldız & Duy, 2019). These findings support the importance of incorporating emotion regulation into interventions aiming to prevent psychosomatic conditions and highlight how adaptive strategies enable individuals to handle stress more healthily. Empirical evidence suggests that promoting adaptive regulation can provide individuals with more effective coping resources, thereby reducing vulnerability to somatic problems.

Finally, the results showed that maladaptive cognitive emotion regulation was also a significant predictor of psychosomatic symptoms in adults, consistent with previous research (Abbasi et al., 2022; Saeed et al., 2021; Yıldız & Duy, 2019). Individuals with maladaptive emotion regulation abilities may struggle to manage distressing emotions due to difficulties in identifying internal emotional states and limited ability to communicate these emotions to others. Consequently, they are less likely to receive emotional support or comfort from others. Their poor regulation skills may also prevent them from using cognitive distractions such as imagination or positive visualization. Instead, they may rely on compulsive behaviors to regulate emotional states. One defining trait of such individuals is alexithymia—a personality characteristic marked by difficulties in identifying and describing emotions and a tendency toward externally oriented thinking. The prevalence of alexithymia and emotion regulation difficulties often leads to social isolation and loneliness, which exacerbates psychosomatic symptoms. Due to their inability to recognize their own or others' emotions, they struggle to seek social support in times of emotional distress, which often results in depression and anxiety—conditions that heighten vulnerability to stress and, in turn, increase the likelihood of psychosomatic symptom expression (Yıldız & Duy, 2019). In fact, stress is a fundamental contributing factor in both the onset and exacerbation of psychosomatic and physical disorders. Chronic stress, in particular, induces significant physiological changes such as immune suppression, increased serum cholesterol, cardiovascular risk, hypertension, migraines, digestive disorders, and numerous other conditions linked to somatization. Psychosomatic disorders typically do not emerge abruptly but develop gradually through a series of physiological responses like vomiting, heart palpitations, or pallor, which accumulate as the individual experiences recurring psychological trauma and stress. If such individuals persist in using maladaptive regulation strategies, they are less capable of coping with stress, and their symptoms worsen (Abbasi et al., 2022).

Therefore, based on the findings, it can be concluded that cognitive emotion regulation significantly predicts psychosomatic symptoms in adults. This supports the perspective of Garnefski and Kraaij (2019), who asserted that impaired emotion regulation compromises both psychological and physical well-being (Garnefski & Kraaij, 2019). A limitation of the present study was its geographic scope, as it was conducted exclusively in Shiraz. Due to time constraints, it was not feasible to conduct interviews, and the online nature of data collection precluded the use of random sampling. It is recommended that future studies employ randomized sampling methods to enhance the validity of research samples and avoid bias in findings. Furthermore, such studies should be replicated in different cities and age groups to improve generalizability.

Authors' Contributions

All authors significantly contributed to this study.

Declaration

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In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the study and participated in the research with informed consent.

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