




# Examining the Role of Stressful Events, Behavioral Brain Systems, and Ego Strength with the Mediating Role of Impulsivity in the Tendency Toward Addiction Among Youth in Yasuj

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### ABSTRACT

**Objective:** The present study aimed to determine the mediating role of impulsivity in the relationship between stressful events, behavioral brain systems, and ego strength with the tendency toward addiction among the youth in Yasuj.

**Methods and Materials:** This study employed a descriptive-correlational design and used structural equation modeling. The statistical population comprised all youths aged 18 to 30 years in Yasuj in 2022. Based on the Krejcie and Morgan (1987) table and using multi-stage cluster random sampling, 384 youths from Yasuj were selected for the study. Data were collected using the Holmes and Rahe (1960) Life Stress Events Questionnaire, the Markstrom et al. (1997) Ego Strength Psychosocial Scale, the Barratt Impulsiveness Scale (1950), the Carver and White (1994) Behavioral Inhibition/Activation Systems Scale, and the Waid and Butcher (1992) Addiction Proneness Scale. After data collection and extraction, participants' scores were analyzed using Pearson's correlation coefficient, multiple regression, and path analysis via SPSS-24 and AMOS software.

**Findings:** Pearson's correlation coefficient results showed a significant positive relationship between life stress events and the tendency toward addiction among the youth in Yasuj ( $P < 0.01$ ). There was a significant negative relationship between the behavioral inhibition system and the tendency toward addiction among the youth in Yasuj ( $P < 0.01$ ). There was a significant positive relationship between ego strength and its components and the tendency toward addiction among the youth in Yasuj ( $P < 0.01$ ). There was a significant positive relationship between the behavioral activation system and the tendency toward addiction among the youth in Yasuj ( $P < 0.01$ ). There was a significant positive relationship between impulsivity and the tendency toward addiction among the youth in Yasuj ( $P < 0.01$ ). Additionally, the results of the path analysis for the study's indirect hypothesis indicated that the mediating role of impulsivity in the relationship

between the independent variables (stressful events, behavioral brain systems, and ego strength) and the dependent variable (tendency toward addiction) was confirmed.

**Conclusion:** Based on the obtained results, strategies can be developed to prevent the youth from tending toward addiction by enhancing ego strength and identifying life stressors and behavioral activation systems.

**Keywords:** *Impulsivity, Stressful Events, Behavioral Brain Systems, Ego Strength, Tendency Toward Addiction.*

## 1. Introduction

The quality of human resources is the most critical factor influencing the productivity of a society. A young, efficient, healthy, and motivated workforce is one of the most important national assets for the development and growth of any country (Jibir et al., 2022; Parsakia et al., 2022). Social problems are an inseparable part of any nation and have existed throughout history. Each country must devise rational and effective strategies to address these issues and prevent social harms (Mohammadnejad & Soleimani, 2019). Addiction is one of these problems, which has now become one of the most significant and complex social phenomena in every human society (Shearer et al., 2022). Substance abuse is a pathological dependency on the use of one or more drugs, leading to drug-seeking behaviors. In cases where the substance is unavailable, withdrawal symptoms emerge in the addicted individual (Goel et al., 2018). Today, addiction is considered a biopsychosocial disease, with multiple factors contributing to the tendency toward substance abuse (Dopeikar, 2021).

Given that opioid addiction is the most prevalent global problem, it has become a priority for the World Health Organization (WHO). Despite the growing awareness of the detrimental effects of drugs, there is still an increase in substance abuse, particularly in the use of methamphetamine and its derivatives (Xia et al., 2015). Amphetamines, fenmetrazine, cocaine, and methamphetamine (crystal meth) are synthetic drugs, while heroin, alcohol, cannabis, opium, and hashish are traditional drugs (Mohammadnejad & Soleimani, 2019). In the 21st century, the WHO has classified drugs alongside weapons of mass destruction, environmental pollution, and social inequality as one of the four major global catastrophes (Houlihan, 2022). Addiction is a tragic issue facing contemporary human societies worldwide, drawing the attention of governments across different countries (Simmons & Suarez, 2016).

Substance abuse is a global problem. In 2016, 5.6% of the world's population aged 15 to 64 used drugs at least once (Ritchie & Roser, 2019). Research indicates that drug use is more prevalent among youth than older adults. Substance

abuse is also on the rise in many ASEAN (Association of Southeast Asian Nations) countries, particularly among young men aged 15 to 30 years (Holm et al., 2014). The 2013 Global Burden of Disease study shows that substance abuse is highly prevalent among adolescents and young adults (Degenhardt et al., 2016). About 14% of all health problems among youth are due to drug use, and the likelihood of death from substance use disorders is higher in young people (Ritchie & Roser, 2019).

In 2017, the U.S. Department of Health and Human Services declared the opioid epidemic a public health emergency following the rise in opioid overdoses, which accounted for over 42,000 deaths in 2016 (Ruchkin et al., 2020). The opioid crisis, drug overdose deaths, and health consequences of substance use, particularly opioid use, continue to rise sharply as synthetic opioids flood the illegal drug market. The COVID-19 pandemic, which brought additional challenges, has further highlighted the vulnerabilities of those using these substances and impacted the healthcare system (Ignaszewski, 2021).

A 2020 report from the United Nations Office on Drugs and Crime stated that the consequences of substance use are multifaceted, complex, and so comprehensive that classifying their effects is challenging. Substance use can affect physical health, emotional well-being, family and other relationships, education, career advancement, financial and criminal involvement, and spiritual health. Untangling the effects of systemic inequalities in healthcare and the health status of minority communities is impossible, and individuals with substance use disorders are often stigmatized (Zvolensky et al., 2020). The dual nature of substance use's impact further complicates the issue: socio-economic inequalities may exacerbate the consequences of substance use, and substance and alcohol use, along with psychosocial and environmental consequences, may increase vulnerability to inequalities in social determinants of health. Individuals with substance use disorders may experience lower levels of personal growth and stable employment and are more exposed to adverse life events and stressors, including interpersonal violence, which are risk

factors associated with mental health development (Tirado-Munoz, 2018).

Identifying the causes or contributing factors for individuals' tendencies toward substance use has become a research priority for prevention and treatment programs (Harris et al., 2021). Research assessing the role of environment and genetics in the propensity for substance use has estimated that genetics account for 40% of the risk of substance abuse (Nahid, 2019). Previous research has shown that individuals who experience various personal, socio-economic, and stressful life events are more likely to develop a dependency on drugs (Azimi & Connolly, 2015). Stressful events refer to situations that force individuals to make changes in their ongoing life patterns (A. Holmes & R. Rahe, 1967; Holmes & Rahe, 2017). A substantial body of literature exists on the relationship between stressful events and their negative outcomes (Surkan et al., 2018). The range of causes for substance use and its consequences is extensive and widespread, involving numerous social, economic, interpersonal, and individual factors, making it difficult to identify the primary cause (Nahid, 2019). Many unpleasant and stressful events occur throughout individuals' lives, which can be facilitators of substance use (Bouri & Mansouri, 2022).

Stressful life events are relatively unexpected and unpredictable incidents that have irreparable effects on individuals' personal and social lives (Buccheri et al., 2018). Holmes and Rahe (1967) were the first to develop the Life Events Rating Scale in an effort to measure the level of stress individuals experience. These researchers believed that any change in life, whether positive or negative, requiring a readjustment of one's lifestyle, could be considered stressful. In their most recent review in 2017, they listed 18 stressful events. Psychophysiological research has explained that stress from life events may lead to increased activation of the locus coeruleus-norepinephrine system and the hypothalamic-pituitary-adrenal axis, which can increase irritability and exacerbate problems (A. Holmes & R. Rahe, 1967; Holmes & Rahe, 2017; T. Holmes & R. Rahe, 1967). The relationship between a wide range of stressful life events and subsequent psychopathology, including problematic substance use, is well-established (Hoyland & Latendresse, 2018; Keyes et al., 2011; Moody et al., 2020). Research by Wingo et al. (2014) has shown that life stressors are associated with substance use problems. Additionally, the results indicate a significant relationship between stressful events, distress, and substance use (Shearer et al., 2022). However, a substantial body of literature shows that many

individuals cope well with life stressors and exhibit resilience in the face of stressful events. In other words, a factor may cause pressure and tension in one person but may have no effect on another (Lodge Li et al., 2023).

In recent years, the role of biological foundations (behavioral brain systems) as precursors to addiction has garnered significant attention (Esmaeili, 2020). According to cognitive theories related to substance use, various psychotic disorders, risky sexual behaviors, and tendencies toward substance use are linked to the functioning of individuals' brain systems (Banerjee et al., 2019). Behavioral brain systems, one of the neuropsychological models of personality, are based on Reinforcement Sensitivity Theory, which posits that individual differences in response to punishing (BIS) and rewarding (BAS) stimuli underlie behavior (Aghaziarati et al., 2023; Banerjee et al., 2019). The adolescent and young adult brain is often likened to a car with a fully functioning gas pedal (dopamine reward system) but weak brakes (prefrontal cortex). Adolescents are highly motivated to pursue pleasurable rewards and avoid pain, but their judgment and decision-making skills are still developing and limited, impacting their ability to accurately assess risks and make sound decisions, including those related to substance use (Garofoli, 2020). Therefore, addiction is often referred to as a brain disease in many studies (Azadfalsh et al., 2017; Parvaz et al., 2022).

Functional brain imaging using functional magnetic resonance imaging (fMRI) indicates that the severity of the tendency toward substance use in young people is related to the brain's neural response to negative and unpredictable social feedback (Smith et al., 2020). Overreactivity in the amygdala in these individuals is specific to certain stimuli. The Reinforcement Sensitivity Theory, which posits that hypothetical neural systems determine individuals' personality dimensions, holds a prominent position in explaining the biological factors contributing to addiction (Kouhestani et al., 2021). According to this theory, the Behavioral Activation System (BAS) increases the tendency toward behavioral approach in response to appetitive cues, while the Behavioral Inhibition System (BIS) is responsible for controlling behavior and properly addressing conflicting goals when appetitive and punitive cues occur simultaneously (Masters et al., 2023). When brain system activity becomes dysregulated, it can lead to a range of psychiatric symptoms, particularly during adolescence, which is characterized by significant changes in behavioral inhibition and activation systems and increased propensity for substance use (Melo et al., 2023). Researchers have

found that a hypersensitive BIS to threats and a hyposensitive BAS to rewards limit adaptive emotional regulation efforts and, through excessive rumination and emotion suppression, contribute to the persistence of substance use tendencies (O'Shannessy & Donovan, 2022).

The activity model related to brain systems is highly correlated with impulsivity and the propensity for risk-taking among youth. How parents respond to children and the methods they use to satisfy their needs contribute to the development of various capabilities, enabling children to react differently to life challenges. One of these capabilities is ego strength, which significantly impacts an individual's mental health. Ego strength is a pattern of self-influence in fulfilling responsibilities according to actual needs (Abood & Idri, 2020). According to researchers, ego strength is one of the factors that needs to be examined in individuals with a tendency toward substance use. It refers to the ego's capacity to manage the conflicting demands of the id, superego, and external reality. If the ego cannot establish functional balance, the individual's personality will be disrupted, leading to a tendency toward substance use (Lee & Jin, 2022). Assessing the reality of needs and demands and observing individuals' needs in a framework of ego tasks are essential. In a more comprehensive definition, ego strength can be described as the internal psychological equipment or capacities individuals bring to their interactions with others and the social environment. When the ego is strong, it correctly manages the psychological system, but if the ego fails to fulfill its responsibilities, the likelihood of psychological problems increases. Therefore, an individual's ability to cope with life, that is, psychological balance, depends on the ego's capacity and strength to overcome various pressures (De Carvalho & Veiga, 2022). Inadequate development and lack of ego strength affect all dimensions of an individual's personality and can expose them to any psychological disorder or substance dependency. In this regard, researchers have explored and examined the role of the ego in adolescents' propensity for substance use. They concluded that those with substance dependency scored low on all ego components, indicating delayed ego formation and development (Abood & Idri, 2020).

The continued use of substances over time and the long-term toxic effects on brain function lead to a wide range of behavioral, psychological, social, and physiological dysfunctions that hinder normal behavior and functioning in addicts' family, work, and broader societal contexts (Cosenza et al., 2019). Numerous studies on the relationship

between impulsivity and substance use disorder indicate that impulsive behaviors are considered a predisposing and sustaining factor for this disorder and may sometimes determine the type of substance used, such as a tendency toward stimulants (Malesza & Kaczmarek, 2018). Impulsivity involves behaviors that are less thought out, immaturely expressed in pursuit of reward or pleasure, carry high risk, and often result in significant unintended consequences (Clay et al., 2018). Impulsive behaviors are often considered risky, encompassing a wide range of behaviors that involve little thought, are immature and occur spontaneously, without adequate planning, and carry a high clinical risk (Waxman, 2011). Research on substance abuse indicates that the rate of relapse is directly related to the level and intensity of impulsivity, with individuals scoring high on impulsivity scales having poor outcomes in quitting substances (Mahmoudi, 2016). Individuals with a propensity for substance use tend to have a low threshold for distraction by external stimuli and lack a strong inhibitory control system to prevent distraction and ignore irrelevant information, making them more prone to impulsive behaviors and impulsivity (Dawe et al., 2012). In this context, impulsivity can be considered an important mediating or moderating factor in various relationships and outcomes between variables (Vergés et al., 2019). Given the above, the present study aims to answer whether there is a significant relationship between the role of stressful events, behavioral brain systems, and ego strength with the mediating role of impulsivity in the tendency toward addiction among the youth of Yasuj, using a structural equation modeling approach.

## 2. Methods and Materials

### 2.1. Study Design and Participants

The present study is applied in its objective and employs a descriptive-correlational methodology, specifically using structural equation modeling. The statistical population of this study consists of all youths aged 18 to 30 years in Yasuj in 2022, with an estimated population of around 100,000 based on the 2016 census. The sample size was determined to be 384 individuals, calculated using the Krejcie and Morgan (1987) table. A multi-stage cluster random sampling method was used to select the sample. Specifically, several educational, administrative, and medical centers in Yasuj were randomly selected (including Yasuj Azad University, Yasuj State University, Imam Sajjad Hospital, Shahid Jalil Hospital, the Department of Education, and secondary

schools). From these centers, young individuals who met the study's inclusion criteria (residency in Yasuj and other criteria) were identified through a diagnostic interview and asked to respond to the scales on stressful events, behavioral brain systems, ego strength, impulsivity, and tendency toward addiction.

The inclusion criteria for the study were as follows: not receiving psychiatric medications, no diagnosis of personality disorders or severe clinical disorders in the sample group (youths in Yasuj, determined through diagnostic interviews and direct questioning), willingness and voluntary participation in the study, a minimum age of 18 years, and literacy in reading and writing. The exclusion criteria included receiving psychiatric medications, diagnosis of personality disorders or severe clinical disorders in the sample group, and unwillingness to participate in the study.

## 2.2. Measures

### 2.2.1. Stressful Events

This questionnaire, developed by Holmes and Rahe (1960), includes 43 life stress events. Each significant event is scored according to its severity, with the highest score assigned to the death of a spouse. Thus, each individual's total score on stressful events is calculated based on the type of events they have experienced. The score on this scale indicates the level of stress the individual has experienced over the past year. The developers of this scale believe that individuals with high scores are more likely to develop stress-related illnesses in the future. The reliability and validity of this tool for stressful events have been confirmed in various studies. In a preliminary study, the reliability of this scale across its three sections ranged from 0.69 to 0.84 (Dehghanzadeh et al., 2012). In the present study, the reliability of the scale was determined using Cronbach's alpha, yielding a value of 0.86.

### 2.2.2. Psychosocial Ego Strength

The Psychological Ego Strength Scale (PIES) was developed by Markstrom, Sabino, Turner, and Berman (1997) and assesses 8 ego strengths (competence, hope, will, purpose, love, fidelity, care, and wisdom) through 64 items. The developers examined the validity and reliability of the scale. They confirmed the face, content, and construct validity of the scale and reported a reliability of 0.68 using Cronbach's alpha. Alftati (2009) also reported a Cronbach's

alpha of 0.91 for Iranian samples and a split-half reliability of 0.77. The scale uses a 5-point Likert format, with options ranging from "completely describes me" (5 points) to "does not describe me at all" (1 point), and the score range is 64 to 320. A high score indicates good psychosocial health, while a low score indicates poor psychosocial health (Abood & Idri, 2020). In the present study, the reliability of the Ego Strength Scale was 0.83 using Cronbach's alpha.

### 2.2.3. Behavioral Brain Systems

This scale, developed by Carver and White, consists of 24 self-report items and two subscales. The Behavioral Inhibition subscale includes 7 items, while the Behavioral Activation subscale includes 13 items. Scoring is done on a 4-point Likert scale ranging from "strongly agree" (4 points) to "strongly disagree" (1 point). Four items are not included in the scoring. High and low scores, respectively, indicate disagreement and agreement with the characteristic in the individual (Carver & White, 1994). In Carver and White's (1994) study, test-retest reliability for the two subscales ranged from 0.59 to 0.66, indicating good reliability. The construct validity of the scale was confirmed through factor analysis, and the content validity of this tool in Iran was validated by experts, with Cronbach's alpha values ranging from 0.68 to 0.72 (Aghayusefi et al., 2015). In the present study, the reliability of the entire scale was 0.83, with 0.81 and 0.85 for the Behavioral Inhibition and Behavioral Activation subscales, respectively.

### 2.2.4. Tendency Toward Addiction

This scale, originally developed by Waid and Butcher (1992), was adapted for the psychological and social conditions of Iran by Zargar, Naei, and Najarian (2008). It consists of 36 items and includes 5 lie scale items. The scale assesses two subscales: Active Proneness and Passive Proneness to addiction. The Passive Proneness subscale items are mostly related to depression and lack of assertiveness, while the Active Proneness subscale items primarily relate to antisocial behaviors, drug use tendencies, positive attitudes toward drugs, depression, and sensation seeking. Zargar et al. (2008) calculated the validity of this scale in two ways: criterion validity, where the scale successfully distinguished between addicted and non-addicted groups, and construct validity, showing a significant correlation with the 25-item Clinical Symptoms List. The scale's reliability was reported as 0.90 using Cronbach's alpha. Scoring is done on a continuum from 0

(completely disagree) to 3 (completely agree), with items 12, 15, 21, and 33 reverse scored. The total score on the questionnaire is calculated by summing the scores, excluding the lie scale items. The score range is from 0 to 108, with higher scores indicating a greater proneness to addiction (Zargar et al., 2008). In the present study, the reliability of the Addiction Proneness Scale was 0.81 using Cronbach's alpha.

2.2.5. *Impulsiveness*

Initially developed in 1959 as a brief scale, this scale was revised by Patton, Stanford, and Barratt (1995) to improve it, and it has since been widely used across cultures. The primary goal of this scale is to assess impulsivity in both clinical and research settings (Stanford et al., 2009). Various clinical and non-clinical studies have confirmed the psychometric adequacy of this scale. For example, Fossati et al. (2001) conducted a study on a sample of 763 individuals and found that the scale demonstrated adequate psychometric properties (Fossati et al., 2001). The scale contains 30 items scored on a four-point Likert scale ranging from 1 (never) to 4 (always). Scores above 64 indicate high impulsivity, and the scale includes three subscales: motor impulsivity, cognitive impulsivity, and non-planning impulsivity. Javid et al. (2012) reported a reliability of 0.81

for the total score using Cronbach's alpha and a test-retest reliability of 0.77 (Khoda Panah et al., 2018). In the present study, the reliability of the Barratt Impulsiveness Scale was 0.81 using Cronbach's alpha.

2.3. *Data analysis*

After data collection and extraction, participants' scores were analyzed using Pearson's correlation coefficient, multiple regression, and path analysis via SPSS-24 and AMOS software.

3. **Findings and Results**

In any research, descriptive statistics and the examination of demographic variables are crucial components of the process, holding significant importance. Therefore, analyzing this section of data is beneficial and effective in the research process. In this study, the selected sample consisted of 384 individuals, with participants aged between 18 to 20 years (135 participants), 20 to 30 years (146 participants), and 30 to 35 years (103 participants). Regarding marital status, the participants included 258 single, 108 married, and 18 divorced individuals.

To describe the research data, some descriptive statistical measures of the research variables are presented in Table 1.

**Table 1**

*Means, Standard Deviations, Maximum, and Minimum Scores of Participants on Behavioral Systems, Ego Strength, Addiction Tendency, Impulsivity, and Stressful Events*

Variable	Component	Minimum	Maximum	Mean	SD
Behavioral Systems	Behavioral Inhibition	11	27	16.71	2.85
	Behavioral Activation	22	43	30.67	4.18
	Total Behavioral System	37	58	47.40	4.11
Ego Strength	Hope	9	39	18.46	7.95
	Will	10	39	18.19	7.82
	Purpose	8	40	18.08	8.19
	Competence	10	39	17.90	7.44
	Fidelity	10	40	18.15	7.84
	Love	9	34	16.77	6.45
	Care	9	40	18.00	7.65
	Wisdom	9	35	16.95	6.96
	Total Ego Strength	97	276	142.48	57.80
Addiction Tendency		24	101	63.28	22.69
Impulsivity		41	109	71.97	17.01
Stressful Events		191	649	264.36	49.91

As shown in the results in Table 1, the descriptive statistics for the Behavioral Inhibition component had a mean of 16.71 and a standard deviation of 2.85. The

Behavioral Activation component had a mean of 30.67 and a standard deviation of 4.18. The total Behavioral System had a mean of 47.40 and a standard deviation of 4.11. The

mean and standard deviation for Ego Strength were 142.48 and 57.80, respectively. Among the components of Ego Strength, the highest mean and standard deviation were related to the Hope component (mean = 18.46, SD = 7.95), and the lowest were related to the Love component (mean =

16.77, SD = 6.45). The mean and standard deviation for Addiction Tendency were 63.28 and 22.69, respectively. The mean and standard deviation for Impulsivity were 71.97 and 17.01, and for Stressful Events, they were 264.36 and 49.91, respectively.

**Table 2**

*Pearson Correlation Coefficients Matrix between Research Variables*

Variable	Addiction Tendency	Ego Strength	Behavioral Inhibition	Behavioral Activation	Behavioral Systems	Impulsivity	Stressful Events
Addiction Tendency	Pearson's r	1	-.226**	.363**	-.405**	-.163**	.307**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
Ego Strength	Pearson's r	-.226**	1	-.027	.191**	.181**	-.134**
	Sig. (2-tailed)	.000		.591	.000	.000	.008
Behavioral Inhibition	Pearson's r	-.363**	-.027	1	-.363**	.322**	.102*
	Sig. (2-tailed)	.000	.591		.000	.000	.046
Behavioral Activation	Pearson's r	.405**	.191**	-.363**	1	.764**	-.163**
	Sig. (2-tailed)	.000	.000	.000		.000	.001
Behavioral Systems	Pearson's r	-.163**	.181**	.322**	.764**	1	-.100*
	Sig. (2-tailed)	.001	.000	.000	.000		.049
Impulsivity	Pearson's r	.307**	-.134**	.102*	-.163**	-.100*	1
	Sig. (2-tailed)	.000	.008	.046	.001	.049	
Stressful Events	Pearson's r	.353**	-.135**	.077	-.091	-.038	.141**
	Sig. (2-tailed)	.000	.008	.130	.076	.458	.006

\*p < .05, \*\*p < .01.

Based on Table 2, there is a significant negative correlation between Addiction Tendency and the components of Ego Strength. The highest correlation between Addiction Tendency and the components of Ego Strength is related to the Wisdom component. There is a significant negative correlation between Addiction Tendency and the total score of Behavioral Brain Systems. There is a significant positive correlation between Addiction Tendency and Behavioral Inhibition, a component of Behavioral Brain Systems. Additionally, there is a significant negative correlation between Addiction Tendency and Behavioral Activation, a component of Behavioral Brain Systems. There is a significant positive correlation between Addiction Tendency and Impulsivity, and a significant positive correlation between Addiction Tendency and Stressful Events.

In the present study, due to the existence of criterion, predictor, and mediator variables, path analysis was used. Path analysis is an advanced statistical method that, in addition to examining direct effects, can also examine the indirect effects of each independent variable on the

dependent variable. Path analysis is essentially an extension of multiple regression used in the development of causal models. The proposed initial model is presented below. In the conceptual model, Stressful Events, Behavioral Inhibition, Behavioral Activation, and Ego Strength are considered predictor variables, Impulsivity is considered a mediator variable, and Addiction Tendency is considered a criterion variable.

The model analysis results indicated that the degree of freedom was equal to zero. When the degree of freedom is zero, the implemented model is a saturated model. A model is saturated when the number of free parameters equals the number of variances and covariances. In this case, the implemented model is the only identified model; thus, no other model exists, and no fit indices are provided. Since the path between Behavioral Inhibition and Impulsivity ( $p > .05$ ,  $\beta = .05$ ) and the path between Ego Strength and Impulsivity ( $p > .05$ ,  $\beta = -.10$ ) were not significant, these two paths were removed, and the new model was executed. The fit indices of the modified model are presented in Table 3.

**Table 3**

*Fit Indices of the Modified Model*

Fit Index	Abbreviation	Index Value	Acceptable Range
Root Mean Square Error of Approximation	RMSEA	.056	Below .08
Goodness of Fit Index	GFI	1.00	Above .90
Adjusted Goodness of Fit Index	AGFI	.96	Above .90
Non-Normed Fit Index	NNFI	.94	Above .90
Comparative Fit Index	CFI	.99	Above .90

Given the results in Table 3, the chi-square statistic of the final model was not significant ( $p < .05$ , Chi-Square = 4.39), and the non-significance of this index indicates that the

modified model fits the data well. Additionally, the other fit indices are within acceptable ranges. Therefore, it can be claimed that the modified model fits the research data well.

**Table 4**

*Standardized Path Coefficients, Path Coefficients, and t-Statistics of the Final Model*

Predictor Variable	Criterion Variable	Type of Effect	Standardized Coefficient	t-Statistic
Stressful Events	Impulsivity	Direct	.12	2.45
		Indirect	.02	2.20
	Addiction Tendency	Direct	.27	6.47
		Total	.30	6.92
Behavioral Inhibition	Addiction Tendency	Direct	-.23	-5.23
Behavioral Activation	Impulsivity	Direct	.15	2.92
		Indirect	.03	2.50
	Addiction Tendency	Direct	.25	5.39
		Total	.27	5.95
Ego Strength	Addiction Tendency	Direct	-.11	-2.63
Impulsivity	Addiction Tendency	Direct	.20	4.67

Stressful Events have a significant relationship with Impulsivity and Addiction Tendency ( $t > 1.96$ ); the sign of the path coefficients indicates that an increase in Stressful Events increases Impulsivity and Addiction Tendency. Given the significance of the indirect effect of Stressful Events ( $t > 1.96$ ), Impulsivity can mediate the relationship between Stressful Events and Addiction Tendency ( $t > 1.96$ ).

Behavioral Activation also has a significant relationship with Addiction Tendency ( $t > 1.96$ ). The positive sign of this path indicates that increased Behavioral Activation may increase Addiction Tendency. Since the indirect effect of this variable on Addiction Tendency is significant ( $t > 1.96$ ), it can be claimed that Impulsivity mediates the relationship between these two variables.

The relationship between Behavioral Inhibition and Addiction Tendency is negative and significant ( $t > 1.96$ ); thus, increased Behavioral Inhibition is associated with decreased Addiction Tendency. Given the removal of the path between Behavioral Inhibition and Impulsivity due to non-significance in the initial model, the relationship between Behavioral Inhibition and Addiction Tendency is

inverse, with no mediator variable between these two variables. Additionally, the relationship between Ego Strength and Addiction Tendency is negative and significant ( $t > 1.96$ ); thus, increased Ego Strength is associated with decreased Addiction Tendency. Given the removal of the path between Ego Strength and Impulsivity due to non-significance in the initial model, the relationship between Ego Strength and Addiction Tendency is direct, with no mediator variable between these two variables. Finally, the relationship between Impulsivity and Addiction Tendency is positive and significant ( $t > 1.96$ ); thus, increased Impulsivity is associated with increased Addiction Tendency.

**4. Discussion and Conclusion**

Drug use, as a socially unacceptable habit, has affected countless individuals, particularly from adolescence and young adulthood to middle age, across all human societies. The present study aimed to determine the mediating role of impulsivity in the relationship between stressful events,



behavioral brain systems, and ego strength with the tendency toward addiction among the youth in Yasuj. The results indicated that impulsivity plays a significant mediating role in the relationship between stressful events, behavioral brain systems, and ego strength with the tendency toward addiction among the youth in Yasuj. Based on these findings, strategies can be developed to prevent the youth from gravitating toward addiction by identifying life stressors and the behavioral activation system.

As the results of the path analysis showed, the mediating role of impulsivity in the relationship between the independent variables (stressful events, behavioral brain systems, and ego strength) and the dependent variable (tendency toward addiction) was confirmed. Impulsivity plays a significant mediating role in the relationship between stressful events, behavioral brain systems, and ego strength with the tendency toward addiction among the youth in Yasuj.

These results are consistent with the prior findings {Dejkam, 2022 #51077}{Dopeikar, 2021 #51078}{Shirin Kam, 2019 #51125}{Darre Kardi, 2009 #51072}{Anderson, 2014 #51063}. Similarly, in line with the results of the present study, Dejkam et al. (2022) demonstrated that part of the influence of distress tolerance and difficulty in emotion regulation on addiction tendency, without the significant influence of differentiation, is dependent on the presence of impulsivity {Dejkam, 2022 #51077}.

The study also showed that impulsivity has a direct and positive effect on the construct of addiction tendency. The findings are in line with prior studies {Cosenza, 2019 #51071;Dejkam, 2022 #51077;Doran, 2006 #51079;Vergés, 2019 #51134} which also support the alignment of these results with other research. Furthermore, part of the effect of stressful events and behavioral inhibition systems on addiction tendency is contingent upon the presence of impulsivity. In explaining the conceptual framework of addictive tendencies within the acquired readiness model, the role of impulsivity in predisposition to gain positive experiences, along with biased learning, should be noted {Jibir, 2022 #51093}. Impulsivity, as a psychological construct with a complex and multifaceted structure based on multiple neural processes within cognitive and motor processes, leads to behaviors lacking inhibitory characteristics, which, in turn, fosters addictive tendencies and behaviors.

Extensive research on drug use and various addictive tendencies highlights the significant role of impulsivity in this context. Impulsivity is one of the personality traits that

predisposes individuals to react quickly and without planning to internal or external stimuli, without considering the negative consequences of these reactions for oneself or others {Cosenza, 2019 #51071}. The relationship between addiction tendencies and impulsivity traits can be examined from multiple perspectives, where sometimes impulsivity traits lead to addiction, and at other times, addiction leads to the emergence of impulsivity traits. The lack of inhibitory control, as the core of impulsivity, combined with the dysfunction of behavioral inhibition and activation systems, leads to risky behaviors. This process indicates the predisposition of certain individuals to various addictive tendencies, which has been confirmed in comparative studies of individuals with substance use disorders and even smokers compared to healthy individuals.

In explaining the results obtained, it should be noted that one of the main and determining features of substance use disorder and the tendency toward substance abuse is impulsivity and behaviors related to impulsivity. In fact, impulsive behaviors can act as triggers, creating cravings and urges to use drugs in patients, and their inability to resist these urges ultimately sets the stage for relapse. The role that the impulsive trait plays in the tendency to use drugs can be examined and explained from multiple angles {Khoda Panah, 2018 #51095;Mahmoudi, 2016 #51101}. In this multifaceted, cause-and-effect relationship, sometimes impulsive personality traits lead to drug use, and sometimes drug addiction leads to the formation of impulsive traits in individuals. In a third aspect of this relationship, the link between the tendency to use drugs and impulsivity traits may be explained by a common third factor, such as stressful life events or ego-related strengths.

Additionally, it should be noted that the impulsive personality trait is recognized as a necessity in daily life, as it plays a significant role in daily decision-making processes and in many psychiatric conditions. Some personality researchers define impulsivity as the inability to delay gratification and as the opposite of self-control. Given this definition, impulsive behavior is a diagnostic criterion for several personality disorders, such as borderline personality disorder, antisocial personality disorder, substance use disorders, and alcohol use disorders or issues related to attention and inactivity {Dawe, 2012 #51073;Dejkam, 2022 #51077}.

Since the present study demonstrated the predictive role of impulsivity as an endogenous variable influenced by three constructs: stressful events, ego strength, and behavioral brain systems, it is recommended that this causal model be

applied in healthcare services, mental health, and executive policy strategies for addiction prevention, particularly among the educated segment of the Iranian population. This group faces various issues, such as inflation, unemployment, and rapid, unplanned adjustments to changes in university education processes, leading to an increase in hidden addictive tendencies, particularly in the use of non-prescribed drugs, without fully understanding the consumption patterns. This issue has significantly impacted the vitality of this group at the level of social behavior patterns and requires special attention alongside the impulsivity construct within the biological and psychological models.

Moreover, in explaining the direct and negative relationship between ego strength and addiction tendency, it should be noted that one of the most important and primary features of ego strength is the ability to align needs and desires with existing realities, which can distinguish psychotic individuals from non-psychotic ones. Aligning needs and desires with existing realities refers to the individual's ability to distinguish and evaluate inner fantasies from external realities. This feature of ego strength gradually develops as the reality principle increasingly dominates the pleasure principle. Therefore, when the self has strong capabilities in dealing with arbitrary desires of the id, it can satisfy desires based on the reality principle, use adaptive defense mechanisms to effectively cope with the anxiety generated, and thereby promote mental health and reduce addiction tendencies in the individual. Additionally, one of the functions closely related to ego is judgment. This function refers to the individual's ability to predict the consequences of their actions. With the control and regulation of instinctual drives, judgment develops alongside the growth of secondary process thinking. The ability to think logically allows the individual to evaluate the consequences of their actions and avoid impulsive behaviors (such as drug use) that lead to anxiety, stress, and depression.

## 5. Limitations & Suggestions

In the present study, one of the limitations was the use of a correlational research method and self-report scales. In correlational research, the discovered relationships between variables cannot be assumed to be causal, and in self-report scales, there is a possibility that participants may lack sufficient self-awareness or may not answer the questionnaire items responsibly. Additionally, the lack of control over confounding variables such as the socio-

economic status of the youth in Yasuj was another limitation of the study. Given that the results showed that impulsivity and the activity of brain activation and inhibition systems are related to addiction tendencies among the youth, attention to these factors is of considerable importance and necessity in preventing drug addiction.

In line with the results of this study, novel educational interventions and strategies can be proposed for preventing life stress events and predisposing psychological and social factors, as well as for preventing addiction and drug use among the youth. Additionally, based on the findings of this research, counselors and psychologists in addiction treatment and rehabilitation centers can provide the necessary and sufficient strategies for improving mental health to addicts and their families to prevent relapse. As a research suggestion, it is recommended that future studies conduct qualitative research to explore the lived experiences of youth with tendencies toward drug use and develop an educational-therapeutic model based on these experiences.

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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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