

Original Article

## The mediational pathway among parenting styles, attachment styles and self-regulation with addiction susceptibility of adolescents \*

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**Abstract**

**BACKGROUND:** The purpose of present study was to create and test a model that illustrates variables that influence the development of addiction susceptibility and determine how different styles of parenting may indirectly influence the addiction susceptibility of children through the mediators of attachment style and self-regulation.

**METHODS:** Using random cluster sampling, 508 adolescent high school boys and girls aged 14-19 years were enrolled. Data were analyzed using structural equations modeling (path analysis).

**RESULTS:** The results showed that authoritative and permissive parenting styles were associated with secure attachment whereas authoritarian and neglectful parenting styles were associated with insecure attachment. Insecure attachment was associated with a low level of self-regulation whereas secure attachment was associated with a high level of self-regulation. We found that a low level of self-regulation increased the adolescent's addiction susceptibility whereas a high level of self-regulation decreased their addiction susceptibility.

**CONCLUSIONS:** The findings of present study suggest the authoritative and permissive parenting styles as the most efficient styles and authoritarian and neglectful parenting styles as the most inefficient styles in terms of addiction susceptibility. Accordingly, efficient parenting style training to parents should be the main goal of drug demand reduction program.

**KEYWORDS:** Mediational Pathway, Parenting Style, Attachment Style, Self-Regulation, Addiction Susceptibility.

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Substance use and substance use disorders are developmental phenomena that increase from adolescence to young adulthood.<sup>1</sup> There is a steady developmental increase in the use of tobacco, alcohol and marijuana across the adolescent years.<sup>2</sup> However, studies showed that dependence occurs only in a small fraction of the individuals who try an addictive substance. In addition, there is a large variance in individual susceptibility to

dependence.<sup>3</sup> Despite the commonly held belief that the majority of those who try an addictive substance become dependent, most individuals do not develop dependence. However, there is a subpopulation of users that easily becomes dependent on substances.<sup>4</sup>

According to the addict prone theory, certain individuals are at high risk for drug dependency if they are exposed to certain psychoactive drugs as a result of their unhealthy

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personalities.<sup>5</sup> Research findings showed that developmentally unhealthy background and proneness to addiction play a fundamental role in the development of addiction.<sup>6-8</sup> Studies in this field agreed upon the existence of a susceptibility to addiction, but the causes of this susceptibility have been attributed to various factors, such as pre-existing personality traits,<sup>4</sup> psychiatric risk factors,<sup>7</sup> a low level of parental care<sup>6</sup> and pathological psychosocial development.<sup>8</sup> Therefore, the main questions of the present study are as follows: "How might addiction susceptibility develop?" and "How might it relate to various psychological constructs?".

Studies have shown that some psychological constructs may be associated with addiction. Parenting style,<sup>9-14</sup> attachment style<sup>15-17</sup> and self-regulation<sup>18-22</sup> are the most important constructs. The relationship between these constructs and addiction may be mediated by the construct of addiction susceptibility,<sup>3, 4, 6</sup> which has been neglected in these previous studies. Studies are now required to put these constructs together into comprehensive explanatory models for further investigation. By proposing a new model, the present study attempted to show how various parenting styles lead to different attachment styles and consequently to addiction susceptibility in adolescents through the process of self-regulation.

Studies examining parenting styles relied on Baumrind's<sup>23</sup> classic distinction of types of parenting authority and Maccoby and Martin's<sup>24</sup> revision of that model. According to Baumrind,<sup>23</sup> parenting styles can be categorized based on two characteristics: demandingness and responsiveness. Based on these two characteristics, Baumrind<sup>23</sup> identified three parenting styles: authoritarian, authoritative and permissive. In a later extension of the model, Maccoby and Martin<sup>24</sup> added the neglectful parenting style. In this typology, Baumrind<sup>25</sup> characterized parents who operate with an authoritarian style as demonstrating high levels of demandingness coupled with low levels of responsiveness. Authoritative parents are described with both a high level of demanding-

ness and a high level of responsiveness. Permissive parenting results from parents who demonstrate low levels of demandingness and high levels of responsiveness. Finally, neglectful parents are characterized by low levels of both demandingness and responsiveness.

In a summarization, Pellerin<sup>26</sup> described how the individual parenting styles differently affect children. Parental communication patterns influence children's personality.<sup>27</sup> McKinney and Renk<sup>28</sup> showed that adolescents who have at least one authoritative parent show better adjustment than those who do not have this type of parent. Abar et al.<sup>18</sup> found that authoritative parenting is associated with high levels of self-regulation, academic performance and study skills as well as low levels of risky behaviors in children. A permissive parenting style can directly influence the control processes and indirectly influence alcohol use and abuse.<sup>9</sup> Wood et al.<sup>11</sup> found that when parents were more permissive, their adolescents were more likely to engage in heavy binge drinking. Authoritarian parenting was associated with greater adolescent rebelliousness, which in turn was related to alcohol use.<sup>29</sup> Perceptions of having an authoritarian father were positively linked to neuroticism among males. It was also related to drinking and alcohol-related problems.<sup>10</sup> The childhood experience of neglect and poor parent-child attachment may play a crucial role in addictive disorders susceptibility.<sup>12</sup> Children and adolescents who defined parents as neglectful had significantly higher odds of reporting substance use and violence-related behaviors.<sup>30</sup>

The relationship between parenting style and self-regulation, however, may be mediated by the additional variable of attachment. Attachment has been defined as close affectional ties that provide an individual with a sense of security.<sup>31</sup> Bowlby's<sup>32</sup> theoretical model of attachment illustrates how different parenting styles may predict secure and insecure attachments. Secure and insecure forms of attachment can be understood in terms of the internal working models that individuals may develop about themselves and others. As infants

interact with their caregivers, they develop internal working models of themselves and others that they use as a guide for interpreting events and forming expectations about human relationships. Infants with sensitive and responsive caregivers will likely conclude that people are dependable, they are worthy and loveable and they, therefore, develop a positive working model of others and self. Infants with insensitive, neglectful or abusive caregivers will likely conclude that people are not trustworthy and that they are unworthy. Therefore, they develop a negative working model of others and self. Bartholomew and Horowitz<sup>33</sup> have taken Bowlby's<sup>32</sup> concept of working models and applied it to the study of attachment styles in adults. They identified four different attachment styles by crossing the two dimensions of working models of self and others: secure, preoccupied, fearful, and dismissing. Secure individuals are characterized as having positive working models of both self and others. Preoccupied individuals have a negative working model of self, accompanied by a positive working model of others. Fearful individuals have both a negative working model of self and others. Finally, dismissing individuals have a positive working model of self, coupled with a negative working model of others.

The parenting styles described by Baumrind<sup>25</sup> and Maccoby and Martin<sup>24</sup> described above offer an explanation for the development of different attachment styles. Authoritative and permissive parenting styles are characterized by a high degree of responsiveness, which indicates warmth and acceptance of their children. Such responsiveness is more likely to lead to secure attachment as individuals develop a positive working model of self and others. In contrast, neglectful and authoritarian parenting styles, which are characterized by low responsiveness, are more likely to yield insecure attachment styles, as individuals develop a negative working model of self and/or others.<sup>34, 35</sup> Recent longitudinal studies have confirmed the long-term effects of parenting style during the childhood on adult attach-

ment. The stability and continuity of attachment patterns have been reported as moderate (between ages 5-27 years,  $r = 0.55-0.77$ ) between childhood and adulthood.<sup>17</sup> Studies showed that a low level of parental warmth, inconsistent caretaking, rejection and punitive parental beliefs are associated with the insecure attachment of a child,<sup>36, 37</sup> whereas warmth, sensitivity, acceptance and the emotional accessibility of parents are associated with the secure attachment of a child.<sup>38</sup>

Studies revealed that there may be a relationship between attachment dimensions and self-regulation factors.<sup>39, 17</sup> Mikulincer and Shaver<sup>17</sup> proposed a model of attachment in which processes of self-regulation affect the accomplishment of personal projects and life tasks. In this model, attachment security allows a person to maintain a calm, coherent, and confident state of mind while dealing with threats and challenges and to devote cognitive resources to important projects and tasks. In contrast, attachment insecurities motivate defensive distortions of perception, helpless or unrealistically confident stances toward problem solving, and a feeling of being threatened and endangered that interfere with realistic planning and effective action. Over time, these insecurities impair self-regulation and interfere in close relationships, important life projects and personal growth.

Self-regulation is a multidimensional construct that encompasses cognitive, motivational, affective, social, and physiological processes involved in the control of goal-directed actions.<sup>40</sup> Self-regulation skills subsume goal-directed behavior and allow a person to delay gratification in the short-term to achieve desired outcomes in the future.<sup>41</sup> Kanfer<sup>42</sup> was the first to propose the three phase theory of self-regulation. In this view, self-regulation is the ability to develop, implement and flexibly maintain planned behavior to achieve one's goals. Building on the foundational work of Kanfer,<sup>42</sup> Miller and Brown<sup>43</sup> formulated a seven-step model of self-regulation. Brown and colleagues<sup>44</sup> further developed this model more specifically for the field of substance

abuse. One important protective factor that may help to prevent youth from engaging in risky behaviors or help adolescents avoid the outcomes associated with risky behavior is self-regulation. High levels of self-regulation have been linked to well-adjusted behaviors in children, adolescents and adults. Low levels of self-regulation have typically been connected to higher levels of antisocial behaviors, substance use and aggression.<sup>20</sup> Dishion and Connell<sup>45</sup> suggested that self-regulation operates as a moderator of environmental risk experiences, helping to explain the inter-individual differences in responses to drug use risks. Self-regulation is clearly involved in substance use initiation.<sup>21</sup> Children who are poor self-regulators may become adolescents with self-regulatory deficits who are vulnerable to risky behaviors, including early substance use.<sup>46</sup> Poor self-regulation is a predictor of long-term alcohol- and drug-related problems.<sup>22</sup> On the other hand, Keypour et al.<sup>47</sup> found that Stress management training is effective in improving family function and social interaction among adolescents.

As noted, the studies mentioned above separately determined the relationship of these constructs with each other and with substance abuse/dependency. In these studies, the mediator between the mentioned constructs and substance abuse/dependency (addiction susceptibility) was not investigated. In addition, the indirect relationship between these constructs and addiction susceptibility was not studied. Most importantly, these variables have not been proposed in a comprehensive model. The purpose of the present study was to create and test a model that (a) illustrates the variables that influence the development of addiction susceptibility and (b) demonstrates how different styles of parenting may indirectly influence the addiction susceptibility of children through attachment style and self-regulation.

Based on the literature summarized above and the challenges offered in this field of study, we hypothesized that parenting style<sup>23, 24</sup> is linked to attachment style.<sup>33</sup> Authoritative

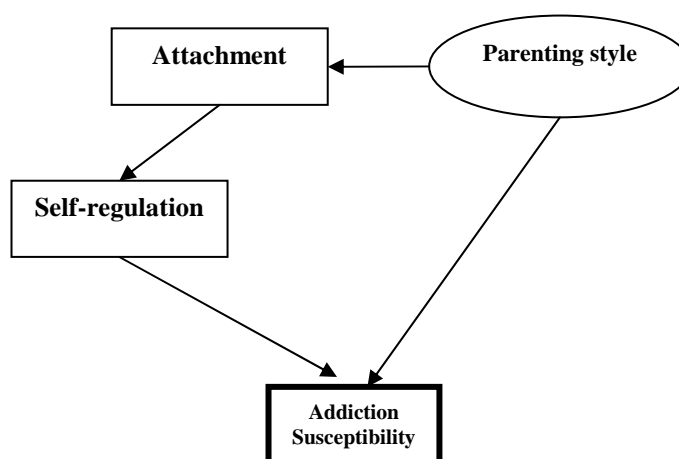
and permissive parenting styles were thought to be associated with secure attachment because both of them are rooted in responsiveness, a necessary precursor to secure attachment. Moreover, because authoritarian and neglectful parenting styles are defined by a lack of responsiveness, they are thought to be associated with insecure attachment styles.<sup>35</sup> In this model, the attachment styles are grouped as secure versus the three forms of insecure attachment. Attachment, in turn, is thought to be related to self-regulation. Insecure attachment is associated with a low level of self-regulation and secure attachment is associated with a high level of self-regulation.<sup>17</sup> The model also indicated that self-regulation would influence the addiction susceptibility of children.<sup>45, 46</sup> This hypothesized model is shown in Figure 1. We named this model the theoretical model of psychosocial addiction susceptibility (P-SAS).

## Methods

### *Participants*

A total of 508 Iranian (Uremia) adolescent high school boys (56.3%) and girls (43.7%) aged 14 to 19 years participated in this study. Based on grade and gender, the sampling was performed using a random cluster method (a total of 24 classes: 12 boys' classes and 12 girls' classes). The Participants were chosen based on sample size calculations and by referring to class rosters. A total of 526 questionnaires were returned, 18 of which were incomplete and, therefore, were excluded from the study. Ultimately, 508 questionnaires were analyzed (286 male students, 222 female students; 195 first grade, 172 second grade and 141 third grade high school students). Before data collection, institutional ethical committee approval was granted and the nature of the questionnaires was explained to the students. After declaration, each student signed an informed consent.

The instruments for measuring the variables included the Addiction Susceptibility Questionnaire-Adolescent Version (ASQ-AV),<sup>48</sup> the Parental Authority Questionnaire (PAQ),<sup>49</sup> the Attachment Style Questionnaire<sup>50</sup> and the



**Figure 1.** The general model (P-SAS) proposed in the present study

*Note.* In this model parenting style would relate to attachment style. Attachment, in turn, was thought to relate to self-regulation. Self-regulation would influence the addiction susceptibility of children.

Short Self-regulation Questionnaire,<sup>41</sup> which are described in the following paragraphs.

The ASQ-AV was developed by Vahdat and Zeinali<sup>48</sup> and includes 50 items and 10 factors (internal dissatisfaction, risky behavior, non-reliability, self-exhibition, positive thoughts toward drugs, dissatisfaction with family, poor faith and spirituality, deviation from norms, self-centeredness and risky relationships with friends). It is scored using a 3-point Likert-type scale (1 = disagree, 2 = slightly agree and 3 = strongly agree). The items with factor loadings between  $\beta = 0.30$  to 0.81 were properly loaded on 10 factors. Also, the criterion validity of the original ASQ was determined through simultaneous implementation with the Addiction Potential Scale (APS, one of the three subscales of MMPI-2 developed by Weed et al.<sup>51</sup>) and was estimated as 0.62.<sup>8</sup> The reliability of the ASQ-AV, using the Cronbach's alpha and Guttman's split-halves method, was estimated as 0.87 and 0.82, respectively.<sup>48</sup>

The PAQ was developed by Buri.<sup>49</sup> It is a 30-item questionnaire with items rated on a 5-point Likert-type scale (1 = strongly disagree, 5 = strongly agree) which was used to assess the mothers' and fathers' authoritative, authoritarian, and permissive parenting styles. The PAQ appeared to have good internal consistency (range = 0.74–0.87) and test-retest reliability (ranged from 0.77 to 0.92).<sup>49</sup> In this study, we

attempted to translate and validate the questionnaire to provide an Iranian version of the instrument. Since the PAQ does not measure the fourth parenting style (the neglectful style), five items of the neglectful subscale of the parenting-style orientation scale (P-SOS) provided by Shaffer<sup>52</sup> were added after translation to measure the fourth subscale. Ultimately, the questionnaire was altered to include 35 items. At this stage, both parents were targeted by the questionnaire, thus two questionnaires each containing 35 items were prepared for each parent. The prepared questionnaires of 205 Iranian (Uremia) student participants were analyzed using confirmatory factor analysis, and reliability was then estimated. As a result of factor analysis, a new version of the parenting style questionnaire was developed that included 25 items for the mother and 27 items for the father. Fit indices of the questionnaires were optimal [Father: mean square error of approximation (RMSEA) = 0.05, normed fit index (NFI) = 0.89, comparative fit index (CFI) = 0.90, chi-square statistics (CMIN) = 399.68 and chi-square value to the degree of freedom (CMIN/DF) = 1.49; Mother: RMSEA = 0.06, NFI = 0.90, CFI = 0.93, CMIN = 592.85 and CMIN/DF = 1.86]. Regarding the four parenting styles, the items of both questionnaires were well-loaded within the range of  $\beta = 0.30$  to 0.81. The internal consistency (Cronbach's

alpha) for the fathers' authoritative, authoritarian, permissive and neglectful parenting styles were 0.89, 0.78, 0.73 and 0.80 and 0.84, 0.70, 0.73 and 0.77 for the mothers' parenting styles, respectively.

The Attachment Style Questionnaire (ASQ) was developed by Van Oudenhoven et al.<sup>50</sup> The ASQ is a 22-item questionnaire, with items rated on a 5-point Likert-type scale (1 = strongly disagree, 5 = strongly agree). It measures the four dimensions of the attachment styles (secure, preoccupied, fearful and dismissing) based on the theoretical model of Bowlby<sup>32</sup> and Bartholomew and Horowitz.<sup>33</sup> The ASQ separately assesses attachment through multiple scores on each dimension. In the study of Hofstra et al.,<sup>53</sup> the construct validity and the stability of the ASQ, measured after 1 year by Pearson correlation analysis, was also proved to be satisfactory: values were 0.63 for the secure style, 0.60 for the fearful style, 0.69 for the preoccupied style, and 0.63 for the dismissing style. The alpha coefficients of the secure, fearful, preoccupied and dismissing scales were 0.73, 0.80, 0.78 and 0.65 in a Hungarian sample, respectively.<sup>54</sup> In this study, the ASQ was translated and validated to prepare an Iranian version of the instrument. The ASQ was analyzed using confirmatory factor analysis for the 205 Iranian (Uremia) student participants, and its reliability was estimated. As a result of the factor analysis, a new version of the ASQ that included 19 items was developed. Fit indices of the questionnaire were optimal (RMSEA = 0.07, NFI = 0.90, CFI = 0.91, CMIN = 291.75 and CMIN/DF = 1.99), and its items were well-loaded within the range of  $\beta = 0.36$  to 0.81 for the four attachment styles. The alpha coefficients of the secure, preoccupied, fearful and dismissing scales were 0.74, 0.71, 0.70 and 0.69, respectively.

The Short Self-Regulation Questionnaire (SSRQ)<sup>41</sup> is a 31-item questionnaire based on the Self-Regulation Questionnaire (SRQ)<sup>44</sup> that was designed to assess self-regulation capacity across the seven processes of Miller and Brown's<sup>43</sup> self-regulation theoretical model. Carey et al.<sup>41</sup> indicated that the SSRQ has a

single factor that represents overall self-regulation capacity. The items are scored on a Likert 5-point scale (1 = strongly disagree, 5 = strongly agree) and can be summed to create a total score. This questionnaire was generated to study addictive behavior and substance-related problems. The internal consistency of the SSRQ was reported as 0.92, and the correlation between the SRQ and the SSRQ was found to be 0.96.<sup>41</sup> The present study attempted to translate and validate the SSRQ to make an Iranian version of the instrument. For these purposes, the SSRQ was analyzed using confirmatory factor analysis of the 205 Iranian (Uremia) student participants, and the instrument's reliability was estimated. As a result of factor analysis, a new version of the SSRQ that included 28 items was developed. The questionnaire's fit indices were optimal (RMSEA = 0.06, NFI = 0.92, CFI = 0.94, CMIN = 888.91 and CMIN/DF = 2.54), and its items were well-loaded within the range of  $\beta = 0.30$  to 0.60. The alpha coefficient of the SSRQ was 0.88. The prepared questionnaires were then given to the participants.

The questionnaires were translated into the Persian language and then independently back-translated into English by a professional translator. Subsequently, another independent reviewer compared both the forward and back-translated versions with the original English version to review any discrepancies in conceptual equivalence. Finally, the translators and the reviewer met with the first author to discuss the discrepancies. Decisions on wording and corrections were made by consensus. A total of 157 items related to the demographic characteristics of the students were included in the questionnaires. To prevent the students from becoming bored upon answering this number of questions, the surveys were conducted in two stages. The assessment sessions lasted approximately 60 minutes. Participants were informed about how to fill in the questionnaires, the importance of the research and the students' honesty in answering the questions, the confidentiality of the students' personal information and the anonymity of their

answers. The questionnaires were also administered at an appropriate time to avoid damaging the curriculum. The students were required to communicate any problems they encountered with the questionnaires at the time they completed the questionnaires. The data obtained were analyzed using the statistical methods of correlation and path analysis (structural equations modeling).

## Results

A total of 508 participants were included in the analysis (286 males and 222 females). The means and standard deviations of the subjects' parenting style scores (mother and father), attachment style scores, self-regulation scores and addiction susceptibility scores are shown in Table 1. To achieve the overall goal outlined in the present study, four models were created and tested. The path coefficients given in model 1 are shown in Table 2. In model 1, an authoritative parenting style had a positive significant relationship with secure attachment ( $\beta = 0.45$ ) and a negative significant relationship with addiction susceptibility ( $\beta = -0.46$ ). Secure attachment had a positive significant relationship with self-regulation ( $\beta = 0.35$ ). Self-regulation had a negative significant relationship with addiction susceptibility ( $\beta = -0.39$ ).

In this model, 0.20 of the variance of secure attachment was explained by an authoritative parenting style, 0.12 of the self-regulation variance was explained by an authoritative parenting style and secure attachment and 0.38 of the addiction susceptibility variance was explained by an authoritative parenting style, secure attachment and self-regulation (Table 2).

As there were two mediators in the first model and the relationship was considered a complex relationship of indirect effects, the test of the statistical significance of indirect effects through two or more mediators could be used following Cohen and Cohen's suggestion.<sup>55</sup> Accordingly, if all of the path coefficients are statistically significant, then the whole indirect effect can also be taken as statistically significant. In case that one of the path coefficients is not significant; significance of the whole indirect effect can be rejected. According to Table 2, all path coefficients of the variables in the first model were significant. Therefore, we verified that an authoritative parenting style had a negative significant relationship with addiction susceptibility through secure attachment and self-regulation. An authoritative parenting style, through mediators such as secure attachment and self-regulation, had an indirect effect of -0.06 on addiction susceptibility and a

**Table 1.** Parenting style scores of mothers and fathers and attachment style scores, self-regulation score and addiction susceptibility scores of adolescents

Variables	Mean	Standard Deviation
Authoritative Parenting Style-m	33.78	7.04
Authoritarian Parenting Style-m	18.76	4.96
Permissive Parenting Style-m	14.42	3.56
Neglectful Parenting Style-m	7.65	3.50
Authoritative Parenting Style-f	32.67	7.31
Authoritarian Parenting Style-f	27.43	6.56
Permissive Parenting Style-f	14.35	3.66
Neglectful Parenting style-f	8.64	3.72
Secure Attachment	21.98	4.08
Fearful Attachment	12.65	2.47
Preoccupied Attachment	20.96	4.52
Dismissing Attachment	10.63	2.59
Self-Regulation	97.16	15.10
Addiction Susceptibility	79.52	12.32

*Note.* The mean and standard deviation of the subjects' parenting style scores (mother and father), attachment style scores, self-regulation score and addiction susceptibility scores.

**Table 2.** Direct and indirect pathways and multiple correlations of variables in model 1

Variables	$\beta$	P-value	Variables	R <sup>2</sup>
Authoritative → Addiction Susceptibility.	-.46	.001		
Authoritative → Secure Attachment.	.45	.001	Secure A.	.20
Secure Attachment. → Self-regulation	.35	.001	Self-regulation	.12
Self-regulation → Addiction Susceptibility	-.39	.001	Addiction S.	.38

direct effect of -0.43, for a total effect of -0.49. Therefore, its negative significant effect on addiction susceptibility increased comparing to indirect and direct effects in this model. In model 1, chi-square statistics (CMIN), degree of freedom (df), the ratio of the chi-square value to the degree of freedom (CMIN/DF), p, the Tucker-Lewis index (TLI), the goodness of fit index (GFI), the comparative fit index (CFI), Bentler-Bonett normed fit index (NFI) and root mean square error of approximation (RMSEA) were estimated as 4.09, 4, 1.02, 0.304, 0.997, 0.934, 0.995, 0.845 and 0.032, respectively. All of these indices, except for TLI, optimally verified the model-data fitness.

The path coefficients given in model 2 are shown in Table 3. In model 2, an authoritarian parenting style had a positive significant relationship with insecure attachment and addiction susceptibility ( $\beta = 0.41$  and  $\beta = 0.22$ , respectively). Insecure attachment had a negative significant relationship with self-regulation ( $\beta = -0.42$ ). Self-regulation had a negative significant relationship with addiction susceptibility ( $\beta = -0.50$ ). In this model, 0.09 of the insecure attachment variance was explained by an authoritarian parenting style, 0.17 of the self-regulation variance was explained by an authoritarian parenting style and insecure attachment and 0.34 of the addiction susceptibility variance was explained by an authoritarian parenting style, insecure attachment and self-regulation (Table 3).

As there were two mediators in the second model, the method of Cohen and Cohen was used to test the statistical significance of the indirect effects. According to Table 3, the path coefficients of the second model were significant. Therefore, we verified that an authoritarian parenting style had a positive significant relationship with addiction susceptibility through an insecure attachment style and self-regulation. An authoritarian parenting style had a 0.31 total effect on addiction susceptibility based on its 0.09 direct effect and 0.22 indirect effects through the mediators of insecure attachment and self-regulation. Thereby, its positive significant effect on addiction susceptibility was increased to compare indirect and direct effects in this model. In model 2, CMIN, df, CMIN/DF, p, TLI, GFI, CFI, NFI and RMSEA were estimated as 18.11, 11, 1.64, 0.079, 0.991, 0.997, 0.995, 0.989 and 0.064, respectively. All of these indices optimally verify the model-data fitness.

Model 3 is shown in Figure 4. The path coefficients given in model 3 are shown in Table 4. In model 3, a permissive parenting style had no significant relationship with addiction susceptibility ( $\beta = -0.06$ ) whereas it had a positive significant relationship with secure attachment ( $\beta = 0.15$ ). Secure attachment had a positive significant relationship with self-regulation ( $\beta = 0.35$ ). Self-regulation had a negative significant relationship with addiction susceptibility ( $\beta = -0.54$ ). In this model,

**Table 3.** Direct and indirect pathways and multiple correlations of variables in model 2\*

Variables	$\beta$	P-value	Variables	R <sup>2</sup>
Authoritarian → Addiction Susceptibility.	.22	.012		
Authoritarian → Secure Attachment.	.41	.001	Insecure A.	.09
Insecure Attachment → Self-regulation	-.42	.001	Self-regulation	.17
Self-regulation → Addiction Susceptibility	-.50	.001	Addiction S.	.37

\* It is noteworthy that making one modification (e3→ e5) in model 2 resulted in the improvement of the model.



**Table 4.** Direct and indirect pathways and multiple correlations of variables in model 3

Variables	$\beta$	P-value	Variables	R <sup>2</sup>
Permissive → Addiction Susceptibility.	-.06	.264		
Permissive → Secure Attachment.	.15	.014	Secure A.	.02
Secure Attachment → Self-regulation	.35	.001	Self-regulation	.12
Self-regulation → Addiction Susceptibility	-.54	.001	Addiction S.	.30

0.02 of the secure attachment variance was explained by a permissive parenting style, 0.12 of the self-regulation variance was explained by a permissive parenting style and secure attachment and 0.30 of the addiction susceptibility variance was explained by permissive parenting style, secure attachment and self-regulation (Table 4).

As there were two mediators in model 3, the method of Cohen and Cohen was used to test the statistical significance of the indirect effects. According to Table 4, the path coefficients of the third model were significant. Therefore, we verified that a permissive parenting style had a negative significant relationship with addiction susceptibility through secure attachment and self-regulation. Permissive parenting style had an indirect effect of -0.03 on addiction susceptibility through the mediators of secure attachment and self-regulation and a -0.06 direct effect, for a total effect of -0.09. Thereby, its negative effect on addiction susceptibility was increased and became significant. In model 3, CMIN, df, CMIN/DF, p, TLI, GFI, CFI, NFI and RMSEA were estimated as 8.97, 4, 2.24, 0.062, 0.915, 0.983, 0.966, 0.994 and 0.077, respectively. All of these indices optimally verified the fitness of the model to the data.

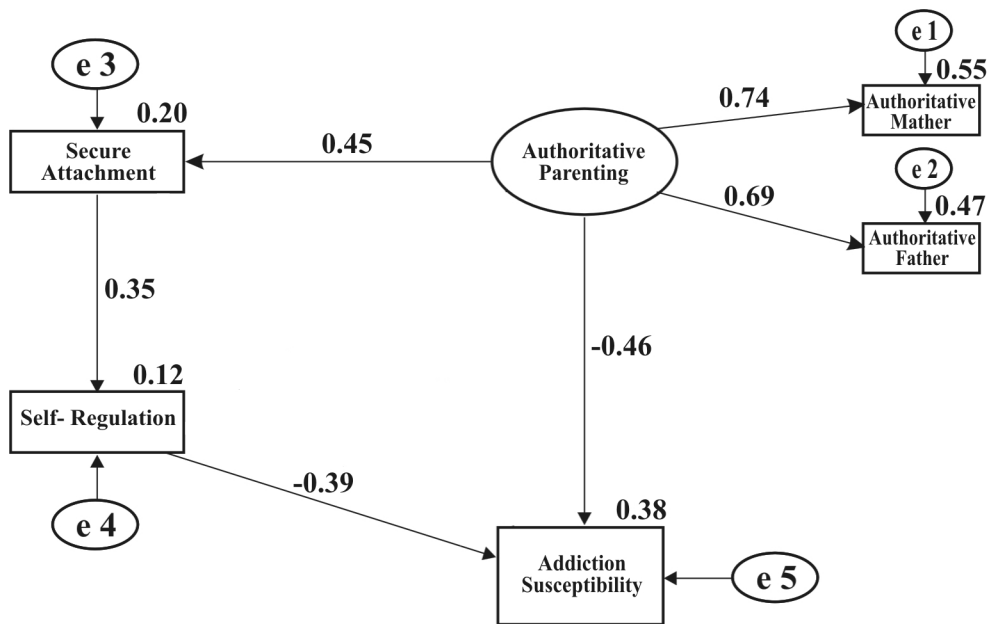
The path coefficients of model 4 are shown in Table 5. In model 4, a neglectful parenting style had a positive significant relationship with both insecure attachment and addiction

susceptibility ( $\beta = 0.61$  and  $\beta = 0.39$ , respectively). Insecure attachment had a negative significant relationship with self-regulation ( $\beta = -0.59$ ). Self-regulation had a negative significant relationship with addiction susceptibility ( $\beta = -0.39$ ). In this model, 0.37 of the insecure attachment variance was explained by a neglectful parenting style, 0.34 of the self-regulation variance was explained by a neglectful parenting style and insecure attachment and 0.42 of the addiction susceptibility variance was explained by a neglectful parenting style, insecure attachment and self-regulation (Table 5).

As there were two mediators in model 4, the method of Cohen and Cohen was used to test the statistical significance of the indirect effects. As shown in Table 5, the path coefficients of the fourth model were significant. Therefore, we verified that a neglectful parenting style has a positive significant relationship with addiction susceptibility through insecure attachment and self-regulation. A neglectful parenting style had a 0.54 total effect on addiction susceptibility, including its 0.39 direct effect and the 0.15 contribution of indirect effects through the mediators of insecure attachment and self-regulation. In model 4, CMIN, df, CMIN/DF, p, TLI, GFI, CFI, NFI and RMSEA were estimated as 15.84, 12, 1.32, 0.199, 0.901, 0.941, 0.943, 0.821, 0.064, respectively. All of these indices, except for TLI, optimally verified the model-data fitness.

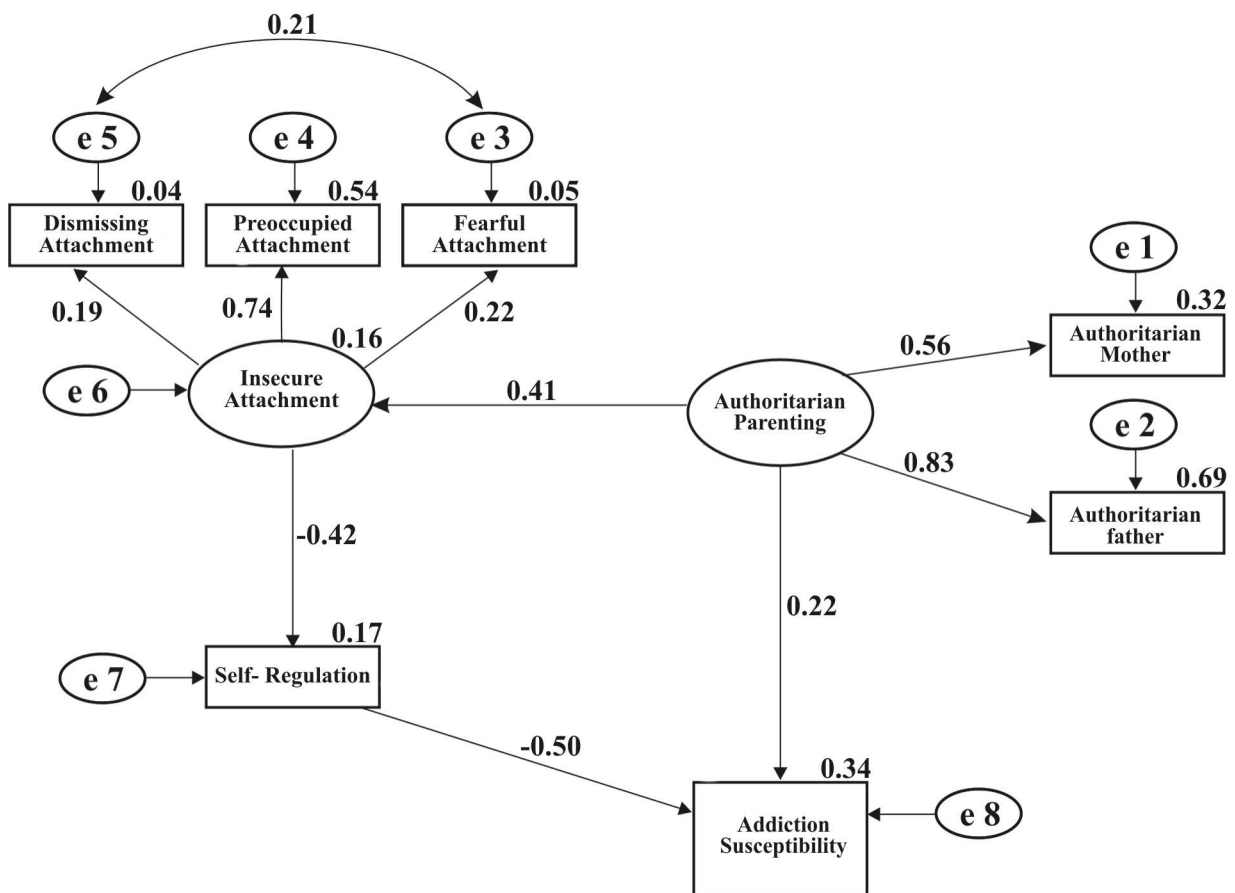
**Table 5.** Direct and indirect pathways and multiple correlations of variables in model 4

Variables	$\beta$	P-value	Variables	R <sup>2</sup>
Neglectful → Addiction Susceptibility.	.39	.001		
Neglectful → Secure Attachment.	.61	.001	Insecure A.	.37
Insecure Attachment → Self-regulation	-.59	.001	Self-regulation	.43
Self-regulation → Addiction Susceptibility	-.39	.001	Addiction S.	.42



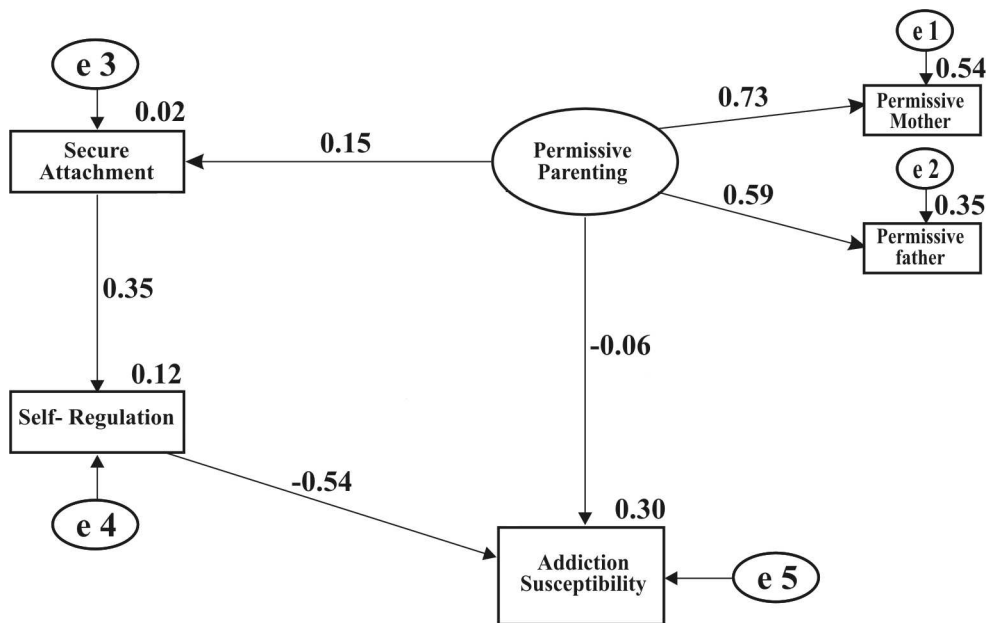
**Figure 2.** Model 1, authoritative parenting Style

Note. In this model, authoritative parenting style through secure attachment and self-regulation had a negative significant relationship with addiction susceptibility.



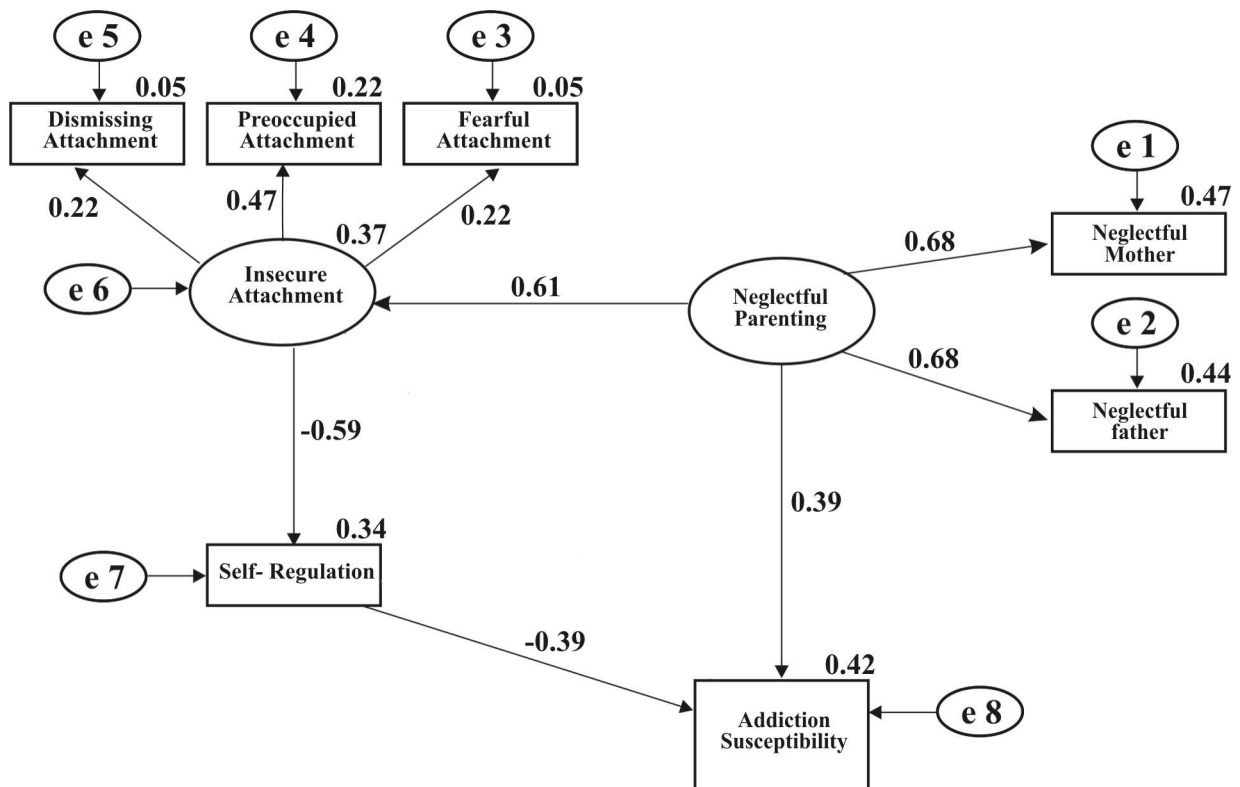
**Figure 3.** Model 2, authoritarian parenting style

Note. In this model, authoritarian parenting style had a positive significant relationship with addiction susceptibility through insecure attachment style and self-regulation.



**Figure 4.** Model 3, permissive parenting style

Note. In this model, permissive parenting style has a negative significant relationship with addiction susceptibility through secure attachment and self-regulation.



**Figure 5.** Model 4, neglectful parenting style

Note. In this model, neglectful parenting style had a positive significant relationship with addiction susceptibility through insecure attachment and self-regulation.

## Discussion

The purpose of the present study was to determine if various parenting styles lead to different attachment styles. The study was additionally aimed to determine if attachment dimensions lead to the development of different addiction susceptibility in children through their interaction with self-regulation. To achieve this goal, we provided a comprehensive, explanatory model; the variables that influence the development of addiction susceptibility were analyzed.

Model 1 showed that an authoritative parenting style contributes to the development of a high level of self-regulation through the development of secure attachment. This, in turn, helps reduce the children's addiction susceptibility. This path, by giving the large beta (-0.49) to self, was the effective path toward the reduction of addiction susceptibility and the development of psychological health in children. Studies showed that an authoritative parenting style results in the development of secure attachment.<sup>32, 33</sup> Affective warmth, sensitivity, acceptance and the emotional accessibility of parents were associated with secure attachment.<sup>38</sup> Secure attachment allows a person to maintain a calm, coherent and confident state of mind while dealing with threats and challenges and allows the individual to devote cognitive resources to important projects and tasks. This type of self-regulation process is effective in executing personal plans and life responsibilities.<sup>17</sup> Self-regulation is also an important factor in helping to prevent the youth from engaging in risky behaviors or helping the adolescents to avoid the outcomes associated with risky behaviors. It is also clearly involved in substance use initiation and substance-related problems.<sup>20-22, 56</sup> The findings demonstrated by model 1 were consistent with these findings.

Model 2 showed that authoritarian parenting results in the development of insecure attachment. Insecure attachment leads to the development of a low level of self-regulation, which makes an individual susceptible to addiction (vulnerable to drug abuse). This path

resulted in a total effect gain of 0.31 in the model. Studies revealed that authoritarian parenting styles were defined by a lack of responsiveness associated with insecure attachment styles.<sup>32, 35</sup> A low level of parental warmth, inconsistent caretaking, rejection and punitive parental beliefs are associated with the insecure attachment of a child.<sup>36</sup> Insecure attachment (anxiety, avoidant and fearful) has a negative relationship with self-regulation skills.<sup>17</sup> Poor self-regulation is an indicator of lasting problems related to drug and alcohol use.<sup>22</sup> The findings of model 2 were consistent with these results and confirmed them.

Model 3 showed that a permissive parenting style contributes to the creation of a high level of self-regulation through the development of secure attachment, which in turn, effectively reduces the children's addiction susceptibility. The path of permissive parenting style to secure attachment, secure attachment to self-regulation and self-regulation to addiction susceptibility carried a relatively low beta ( $\beta = -0.09$ ) and was the only significant path in model 3. This path was the only path through which a permissive parenting style became effective in the reduction of the children's addiction susceptibility. Studies in this field showed that a permissive parenting style, along with high levels of responsiveness (including affection and acceptance of children), results in the development of secure attachment.<sup>32, 35</sup> Parental affection, sensitivity, acceptance and emotional stability are associated with secure attachment.<sup>38</sup> Secure attachment allows a person to maintain a calm, coherent and confident state of mind when dealing with threats and challenges. It also allows one to be effective in personal projects and life tasks.<sup>17</sup> One of the important protective factors that prevent adolescents and young adults from engaging in risky behaviors is self-regulation.<sup>20</sup> The findings of model 3 were consistent with the studies mentioned above.

Model 4 showed that neglectful parenting results in the formation of insecure attachment in children. Dimensions of insecure attachment make a person susceptible to addiction by

weakening self-regulation. This path, by giving the largest total effect (0.54) to self, not only in model 4 but also in comparison to other models, was the most effective path toward the increase of addiction susceptibility and the development of poorer psychological well-being in children. Studies showed that a neglectful parenting style with low levels of responsiveness leads to insecure attachment.<sup>32, 35</sup> The low self concept had high correlation with smoking, alcohol and drugs use<sup>57</sup> and also low levels of parental warmth, inconsistent caretaking, rejection and punitive parental beliefs are associated with insecure attachment.<sup>36</sup> Insecure attachment dimensions (anxiety, avoidant and fearful) have a negative relationship with self-regulation skills.<sup>17</sup> Poor self-regulation skills are a risk factor for alcohol consumption among adolescents.<sup>58</sup> A low level of self-regulation predicts long lasting problems related to alcohol and drug use.<sup>22</sup> The findings of model 4 were consistent with these findings and confirmed them.

The four models reported in the present study showed that both authoritative and permissive parenting styles create secure attachment and a high level of self-regulation, which will have an effect on the reduction of childhood addiction susceptibility and will result in a healthy life. However, a permissive parenting style, as compared to an authoritative parenting style, has a relatively low level of total effect. Authoritarian and neglectful parenting styles will lead to insecure attachment, resulting in the development of a low level of self-regulation, which in turn increases the children's addiction susceptibility. Due to these findings, the formulation proposed in the introduction section was confirmed and, therefore, the psychosocial model of addiction susceptibility introduced in this study is assumed true.

According to the addiction prone theory, certain individuals are at high risk for drug dependency if they are exposed to certain psychoactive drugs as a result of unhealthy personalities.<sup>5</sup> Consistent with this theory, studies in this field put emphasis on addiction suscep-

tibility before the individual become addicted.<sup>6-8</sup>

According to classic studies performed by Baumrind<sup>23</sup> and Maccoby and Martin,<sup>24</sup> the theoretical model of Baumrind's prototype identified four parenting styles (authoritarian, authoritative, permissive and neglectful), which have different effects on children. Many studies reported findings that were consistent with this theoretical model.<sup>12-14, 25, 26</sup>

The ethological theory of attachment<sup>31</sup> emphasizes the importance of the child's emotional ties with caregivers as a base for a child's future interactions during his/her life. Bartholomew and Horowitz<sup>33</sup> took Bowlby's concept<sup>32</sup> on working models and introduced four adult attachment styles: secure, preoccupied, fearful and dismissing. Subsequent studies showed that not only different parenting styles result in different attachment styles,<sup>35</sup> but also childhood attachment continues throughout adolescence and adulthood.<sup>17</sup>

Kanfer<sup>42</sup> proposed his three-phase self-regulation theory. Miller and Brown<sup>43</sup> developed this theory into seven steps and Brown et al.<sup>44</sup> expanded it specifically for the field of substance abuse. Further studies showed that not only poor self-regulation cause vulnerability to risky behaviors including substance abuse, but it may also persist from childhood to adolescence.<sup>46</sup>

The psychosocial model of addiction susceptibility offered in the present study is consistent with the addiction prone theory. In the proposed model, it was confirmed that psychosocial variables make individuals prone to addiction before addiction happens. This model is also consistent with the theoretical model of parenting styles and their subsequent effect on children. The proposed model confirmed that authoritative and permissive parenting styles create a secure attachment style and that authoritarian and neglectful parenting styles create an insecure attachment style in children. On the other hand, the proposed model is consistent with the attachment theory and with the four attachment styles that result from

parenting styles that contribute to the formation of both high and low levels of self-regulation. In the proposed model, it was confirmed that a secure attachment style contributes to the development of high levels of self-regulation and insecure attachment contributes to the development of low levels of self-regulation. In addition, the proposed model is consistent with the self-regulation theory and its effects on one's vulnerability to risky behaviors, such as drug use. The proposed model also confirmed that low levels of self-regulation make individuals susceptible to addiction.

Parents who apply high levels of responsiveness and low or high levels of demandingness while nurturing their children provide a positive working model in children to love one's self and be trusting of others. This upbringing allows them to maintain a calm, coherent, and confident state of mind when dealing with threats and challenges and also to stop tendencies related to risky behaviors. Parents who apply high or low levels of demandingness coupled with low levels of responsiveness encourage the development of a negative working model in children by demonstrating that people are not trustworthy and that they are not loveable. These insecurities impair self-regulation and interfere with close relationships, important life projects and personal growth that make an individual susceptible to addiction.

As such, the psychosocial addiction susceptibility model is summarized as follows: authoritative and permissive parenting styles lead to secure attachment in children whereas authoritarian and neglectful parenting styles lead to insecure attachment in children. Secure attachment results in high levels of self-regulation, which in turn, help reduce addiction susceptibility and cause an individual to have a healthy life. In contrast, insecure attachment increases addiction susceptibility by causing low levels of self-regulation that, in turn, result in increased addiction susceptibility, according to the literature review, ultimately

leading to addiction.

One limitation of the present study was the grouping all three forms of insecure attachment together. This grouping was necessary to summarize the illustrations; however, it limits the interpretation of the findings because the analysis cannot indicate if certain forms of insecure attachment are more likely to lead to poor self-regulation than other forms. Future studies are needed to examine the relationship between the four types of attachment and self-regulation. Another limitation was that the children's temperament characteristics as a mediator variable were studied. Addiction is a complex and multifactor disease that is affected by numerous factors such as parental separation, the socioeconomic status of family and parental education levels. In this study, these variables were investigated.

Further studies are recommended to investigate the effects of both parenting styles and children's temperament characteristics on addiction susceptibility. These studies may also investigate the relationship between addiction susceptibility and its related psychological constructs such as spiritual intelligence, emotional intelligence and identity style.

## Conclusion

The present study introduced authoritative and permissive parenting styles as the most efficient styles in terms of the reduction of addiction susceptibility and the fostering of psychosocial well-being. Authoritarian and neglectful parenting styles were found to be the most inefficient styles in terms of the increased addiction susceptibility and the poorer psychosocial well-being that may result. Thus, providing efficient parenting style training to parents should be the main goal of any drug demand reduction program.

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## Conflict of Interests

Authors have no conflict of interests.

## Authors' Contributions

AZ prepared the proposal, carried out the study and wrote the manuscript. HS helped in methodology, reviewed the proposal and manuscript and offered valuable suggestions in the process of study. ME, PA and GP had valuable suggestions in the study process.

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