BMC Psychology

RESEARCH

Open Access

The impact of attachment styles and traumatic experiences on maladaptive daydreaming among Iranian population: the mediating role of shame and emotion dysregulation"

Maryam Pourmoazzen[1], Hoda Doosalivand[1*] and Amir Sam Kianimoghadam[1]

Abstract

Maladaptive daydreaming (MD) is a pathological form of fantasy that can lead to distress, replace human interaction, and/or interfere with academic, interpersonal, or vocational functioning, affecting approximately two and a half percent of the general population. previous studies have typically examined individual antecedents of MD in isolation, without exploring potential mediating or interacting mechanisms among psychological variables. a comprehensive understanding of the underlying mechanisms requires a systematic approach capable of assessing the complex interplay among multiple variables. This cross-sectional study investigated the relationships between traumatic experiences, attachment styles, and MD, with shame and emotion dysregulation as mediating factors. A community-based sample of just over four hundred Iranian adults (Mean age = 29.47 years, *SD* = 9.61, age range = 18–60), with nearly two-thirds identified as female, was recruited via online convenience sampling. Participants completed the Maladaptive Daydreaming Scale (MDS-16), the Revised Experiences in Close Relationships Questionnaire (ECR-R), the Traumatic Experiences Checklist (TEC), the Difficulties in Emotion Regulation Scale (DERS), and the Internalized Shame Scale (ISS). Structural equation modeling (SEM) with maximum likelihood estimation was employed to examine mediating relationships among the study variables. Findings indicated that anxious attachment and emotion dysregulation were significant antecedents of MD, while avoidant attachment and shame did not exhibit significant effects. Emotion dysregulation emerged as a key mediator between anxious attachment and MD, highlighting the role of impaired emotional coping in excessive daydreaming. Conversely, the hypothesized mediating role of shame was not supported. Traumatic experiences were directly associated with MD, but this relationship was not mediated by shame or emotion dysregulation. Overall, attachment styles and traumatic experiences accounted for significant variation in MD, with emotion dysregulation serving as a key mediator. In terms of clinical practice, the findings suggest that interventions

*Correspondence:
Hoda Doosalivand
doosalivand.h@sbmu.ac.ir

Full list of author information is available at the end of the article

focusing on enhancing emotional regulation skills and addressing insecure attachment patterns may help reduce excessive daydreaming and improve overall functioning in affected individuals.

Keywords Attachment styles, Maladaptive daydreaming, Trauma, Shame, Emotion dysregulation

Introduction

Daydreaming is characterized by disengagement from present and external tasks, redirecting attention towards introspective and internal thoughts [1]. As a fundamental cognitive process, daydreaming is not inherently pathologic unless it becomes excessive and interferes with the demands of daily life [1, 2]. Somer defined maladaptive daydreaming (MD) as a "pathological form of fantasy that can lead to distress and replaces human interaction and/or interferes with academic, interpersonal or vocational functioning" [3]. A multinational online study involving 2,250 Maladaptive Daydreamers (MDers) revealed that, on average, participants spend 47% of their waking hours daydreaming [1]. The pervasiveness of MD is further demonstrated by a 2022 epidemiological study, which revealed prevalence rates of 2.4% in the general population, increasing to 5.5%–8.5% among younger people [4]. Maladaptive daydreamers often encounter numerous difficulties in various areas of life, including social relationships, work, and education, prompting them to seek treatment [5]. The lived experiences of MDers reflect significant subjective distress associated with the condition [6]. MD is often theorized as a dissociative disorder, as it shares key features with dissociation, including a retreat from reality and detachment from the external world or one's present circumstances [7]. Although not officially recognized in the DSM-5 or ICD-11, MD is a proposed formal syndrome in psychiatric taxonomies. MD involves significant dissociative aspects, such as a disconnection from perception, behavior, and sense of self, and shares some commonalities with, but is not subsumed under, existing dissociative disorders. Thus, it has been suggested that it be positioned within the dissociative disorders category in a recent article by Soffer-Dudek et al. (2025) [8].

Early adverse experiences, particularly trauma, are thought to be foundational risk factors for the development of MD. Trauma refers to experiences that cause intense physical and psychological stress reactions. Trauma results from an event, series of events, or set of circumstances that is experienced by an individual as physically or emotionally harmful or threatening and that has lasting adverse effects on the individual's functioning and physical, social, emotional, or spiritual well-being [9]. Previous studies indicate that excessive imaginative involvement is indeed linked with exposure to aversive childhood experiences, including severe physical and sexual abuse [10]. Somer's (2002) pioneering study on MD involved six patients with trauma-related childhood experiences who coped by immersing themselves in elaborate fantasies, often accompanied by repetitive movements [2]. These fantasies serve to alleviate pain and anxiety, providing a sense of emotional fulfillment and compensating for unmet needs for intimacy, friendship, and positive experiences. While heightened fantasy activity is typical during youth, in the context of MD, it persists and becomes a primary "coping" mechanism [11, 12]. Clinical evidence suggests that MD may evolve as an adaptive response in imaginative children exposed to stress, evolving into a maladaptive pattern over time [13]. However, Recent data on the role of trauma in MD is inconclusive [14]. While some studies have indicated a correlation between childhood traumatic experiences and MD [15], other research suggests that although 27% of maladaptive daydreamers report a history of physical, sexual, or emotional abuse, a substantial proportion of individuals with this condition do not report traumatic experiences [16]. This variability suggests that although childhood trauma is a potential contributor to MD, the prevalence of MD among individuals without such experiences warrants further exploration [13, 16]. Traumatic experiences, particularly interpersonal in nature, undermine self-worth and foster shame [17, 18] while also disrupting affect regulation capacities, leading to emotion dysregulation [19, 20].

In addition to trauma, attachment theory also provides a compelling framework for understanding MD, as the content and emotional significance of fantasies are deeply rooted in an individual's attachment history [21, 22]. Attachment is an irreplaceable affective bond between two organisms, which accompanies human life: provides security, closeness, and protection in emergencies, as well as comfort and support [23]. Early attachment experiences shape the Internal Working Models (IWM) through which individuals shape cognitions, perceptions, emotions, attitudes, and behaviors toward the self, others, and the world more generally [24]. Over time, these internal models become more elaborate and important, eventually developing into adult attachment orientations, which include anxiety, avoidance, and disorganization (with low scores on these dimensions representing security) [21]. These "attachment style" refers to the observable manifestations of attachment behaviors, shaped by subjective processing strategies that integrate internal and external perceptions [25] while the IWM shaping the internal world reflects the attachment pattern. As adults, individuals with insecure attachment patterns often perceive the world as unpredictable and view others as

unreliable and unsupportive [26, 27]. For instance, anxiously attached individuals, who expect that partners will not be as available or as responsive as they desire, rely on hyperactivating strategies leading them to be vigilant in detecting potential threats, to persistently signal their distress, and to seek excessive reassurance/support [28]. Avoidantly attached individuals, who expect that others will not be responsive, rely on deactivating strategies leading them to minimize distress and distance themselves from others [29, 30]. For anxiously attached individuals, MD might serve as a hyperactivating strategy, providing a sense of control and imagined reassurance in a fantasy world where their emotional needs are met [28]. Conversely, for avoidantly attached individuals, MD could function as a deactivating strategy, serving as a tool to minimize emotional distress and distance themselves from real-world interpersonal relationships and their associated difficulties [29, 30]. Furthermore, Sándor A et al. found a specific attachment style among maladaptive daydreamers, characterized by ambivalent-fearful attachment characteristics, while normal daydreamers exhibited secure-independent attachment styles [31]. Further research has shown that the "anxious attachment" style is prevalent among maladaptive daydreamers [32]. While empirical research on the connection between attachment and MD remains limited, the theoretical overlap is compelling. Attachment theory suggests that insecure attachment may lead to maladaptive coping mechanisms, such as excessive reliance on fantasy [33]. Similarly, MD is characterized by immersive daydreaming as a compensatory mechanism to fulfill unmet emotional needs, provide a sense of control, and alleviate distress [34]. This shared focus on unmet relational needs, supports the idea that insecure attachment may underlie the development of MD, offering a foundation for the present research [35]. Both anxious and avoidant attachment styles have been associated with heightened shame—anxious attachment through fears of rejection and abandonment, and avoidant attachment through the suppression of intimacy needs [36, 37].

Shame, a self-conscious and debilitating emotion rooted in the perception of personal defectiveness, inadequacy, and unworthiness [38], is frequently reported by MDers [34, 39]. Many maladaptive daydreamers feel ashamed of their daydreaming and are often embarrassed and reluctant to discuss their condition with their therapist (e.g., see Somer et al., 2016b, p. 475). Shame is not only a consequence of MD but also a potential contributor to its persistence as the pleasurable nature of daydreaming temporarily helps to withdraw from overwhelming feelings of shame [40]. Many daydreamers create scenarios of success, fame, and superiority to compensate for feelings of inferiority and shame [6]. Recent studies in different fields have shown that the excessive daydreaming activity might be a dysfunctional emotion regulation strategy that provides the individual with a sort of illusion to manage painful feelings, and in particular shame turns out to be an experience closely associated with maladaptive daydreaming [17, 41]. Attachment patterns shape the perception of shame through the dynamics between a child and their caregivers [42]. Secure attachment fosters emotional resilience because caregivers are responsive and attuned to the child's needs. In such relationships, moments of disconnection are brief and followed by repair, helping the child integrate both positive and negative experiences into a unified emotional identity [43]. In contrast, insecure attachment pattern arises when caregivers are inconsistent, unresponsive, or unattuned to the child's needs. This inconsistency forces the child to suppress their own needs to align with the caregiver's cues, to maintain the relationship, leading to an internalization of shame [44]. Shame emerges as the child begins to view their own needs as flawed or problematic. Over time, this internalized shame becomes a defining aspect of their identity, reflecting the insecure attachment pattern and influencing how they perceive themselves and their relationships. As children develop, attachment-related functions gradually shift from parents to peers. By adulthood, many individuals organize their attachment behavior around friends and romantic partners [45]. A secure attachment enables an individual to navigate feelings of shame without lasting harm, while an insecure attachment fosters a cycle of shame and self-doubt [36]. Moreover, shame often originates from trauma, particularly adverse childhood experiences, which can foster shame-proneness by instilling feelings of worthlessness and unlovability [46, 47]. These experiences may lead individuals to internalize a sense of incompleteness, ultimately predisposing them to the emotional distress that drives MD as a form of retreat from shame [18]. Since disengagement from stress and pain is one of the main maladaptive daydreaming functions, MD might represent a strategy with which to regulate their feelings of shame caused both by traumatic experiences and/or insecure attachment. Accordingly, it is plausible that shame mediates the relationship between insecure attachment and MD, as well as between traumatic experiences and MD.

Emotion dysregulation, another factor contributing to MD, is closely linked to both attachment and trauma [48–50]. emotion regulation is a multifaceted construct involving (a) awareness and understanding of emotions, (b) acceptance of emotions, (c) ability to control impulsive behaviors and behave in accordance with desired goals when experiencing negative emotions, and (d) ability to use situationally appropriate emotion regulation strategies flexibly to modulate emotional responses as desired in order to meet individual goals and situational

demands. The relative absence of any or all of these abilities would indicate the presence of difficulties in emotion regulation, or emotion dysregulation [51]. Poorer emotion regulation strategies are associated with more intense daydreaming [52]. Maladaptive daydreamers frequently struggle with emotion regulation, particularly expressing limited access to effective emotion regulation strategies and difficulties in controlling impulsive behaviors [52]. The development of emotion regulation strategies is significantly influenced by attachment patterns [53]. Individuals with insecure attachment patterns often struggle with identifying and understanding emotions due to insufficient parental support and validation compared to those with secure attachment styles, rendering them more susceptible to emotion dysregulation [48]. Individuals with avoidant attachment often exhibit limited awareness of their emotional state and reduced emotional reactivity, while those with anxious attachment have increased emotional awareness, but struggle in both identifying their feelings and managing impulses [54]. On the other hand, survivors of early-onset interpersonal trauma frequently manifest significant problems in emotion regulation [55]. Exposure to traumatic events in childhood is associated with a wide range of psychological problems, and emotional dysregulation is one of the core mediating factors that can help explain the increased risk of developing various disorders [19]. Recurrent traumatic experiences, such as child maltreatment, can disrupt the acquisition of appropriate emotion regulation and interpersonal skills, increasing the risk of psychological conditions, including MD [20, 56]. Similarly, it is plausible that emotion regulation, like shame, also mediates the relationship between insecure attachment and MD, as well as the relationship between traumatic experiences and MD.

This study Extends current understanding of maladaptive daydreaming (MD) by examining its underlying mechanisms in a non-clinical Iranian population. While prior research has explored individual antecedents [15, 17, 52], a comprehensive understanding of its underlying mechanisms remains limited. To address this gap, this study employed Structural Equation Modeling (SEM) to propose and evaluate a model where insecure attachment and traumatic experiences are primary antecedents that influence MD through the mediating roles of emotion dysregulation and shame. The use of a general, non-clinical population helps to distinguish MD as an independent psychopathology, separate from clinical features of other psychiatric disorders. Moreover, research on MD in Iran remains scarce, hindering a comprehensive understanding of the phenomenon within this cultural context. In this regard, the present study aimed to examine a hypothesized model in which shame and emotion dysregulation mediate the relationship between traumatic experiences, attachment styles, and MD in a sample of the Iranian general population. The decision to include this set of relationship variables was based on the assumption that all of these variables represent distinct but interconnected aspects of how early adverse experiences shape emotional processes and, in turn, influence later outcomes. Traumatic experiences, particularly in childhood, can disrupt emotional regulation, leading to maladaptive behaviors, such as MD. Moreover, the nature of early experiences can significantly shape attachment styles, which influence how individuals cope with stress and potentially rely on MD as a coping mechanism in adulthood. Emotion dysregulation and shame, as mediators, further illustrate how early adversity can create enduring psychological patterns that contribute to excessive daydreaming. Examining these meditational relations and incorporating them into an elaborated model would provide researchers with a more comprehensive understanding of the psychological processes underlying MD; By identifying specific psychological mechanisms that mediate the relationship between risk factors and MD, this research provides a framework for developing targeted, early-intervention programs. this is the focus of the present research and is depicted in Fig. 1.

This study was partially inspired by the work of Ferrante & Marino (2022), who examined the mediating role of shame and dissociation between emotional trauma and MD [17]. While Ferrante & Marino focused on emotional trauma, the present study expanded their approach by considering a broader range of trauma types as potential contributors to the development of MD. Additionally, the same scales for trauma and shame were used to allow for direct comparison of findings. This study also aimed to explore some of these dynamics in a different cultural context, providing a more comprehensive understanding of MD.

Based on the above literature, the hypotheses for the proposed structural model were as follows:

H 1: Shame will mediate the relationship between anxious attachment and MD [32, 41].

H 2: Shame will mediate the relationship between avoidant attachment and MD [32, 41].

H 3: Shame will mediate the relationship between traumatic experiences and MD [17, 18].

H 4: Emotion dysregulation will mediate the relationship between anxious attachment and MD [32, 52].

H 5: Emotion dysregulation will mediate the relationship between avoidant attachment and MD [32, 52].

H 6: Emotion dysregulation will mediate the relationship between traumatic experiences and MD [13, 19].

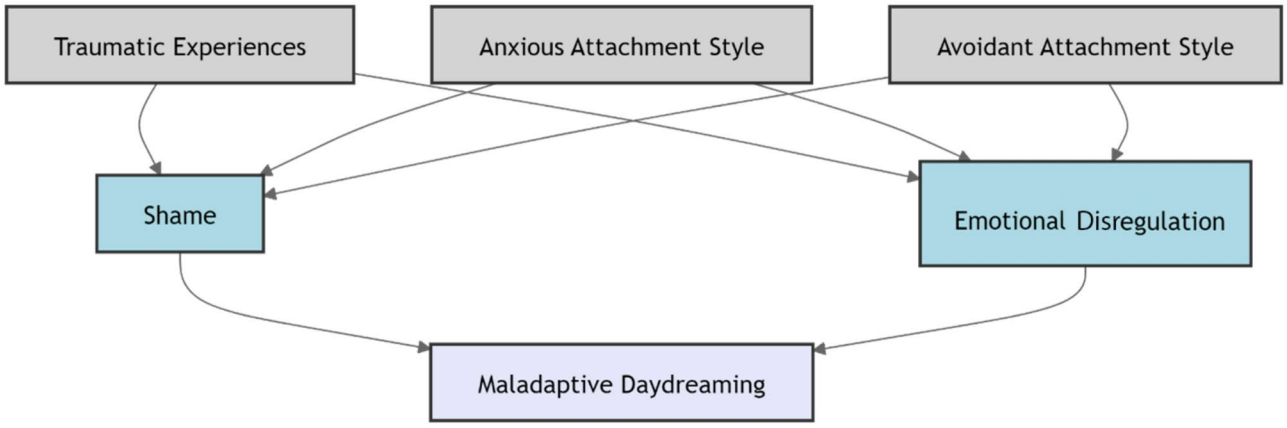

Fig. 1 Proposed Structural Model. The proposed structural model shows association pathways between independent variables (traumatic experiences and attachment styles) and MD, through mediator variables (emotion regulation difficulties and shame)

Methods

Participants

The sample comprised 255 females (62.04%) and 156 males (37.96%). The majority of participants were aged 18–28 years (298; 72.5%), followed by 29–39 years (62; 15.1%), 40–50 years (37; 9.0%), and over 51 years (14; 3.41%). Regarding educational level, 6 participants (1.46%) had completed middle school, 135 (32.85%) had a high school diploma, 12 (2.92%) held an associate degree, 148 (36.01%) held a bachelor's degree, 59 (14.36%) held a master's degree, and 51 participants (12.41%) had a Ph.D. In terms of marital status, most participants were single (315; 76.63%), while 96 (23.36%) were married.

Measures

Demographic information

Participants provided information on general demographic characteristics such as age, gender, education, and marital status.

The 16-item maladaptive daydreaming scale (MDS-16)

The MDS is a 16-item self-report scale designed to measure the severity of MD. The final version of this scale comprises 16 items and 4 factors. Craving: Refers to the extent to which an individual constantly feels drawn towards daydreaming and has a strong, addictive desire to daydream. Impairment: Indicates the degree to which an individual feels that engagement in daydreaming disrupts their functioning in social, academic, and occupational domains, as well as interferes with achieving broad life goals and completing specific daily tasks. Movement: Relates to the extent to which an individual involves themselves in physical movements associated with daydreaming, such as facial expressions, lip-syncing words, moving back and forth, and pacing while daydreaming. Music: Measures the extent to which an individual uses music to initiate or maintain daydreaming. MD. Responses are rated on an 11-point Likert scale with 10-point intervals (0, 10, 20, …) ranging from 0% to 100%, where higher scores indicate higher levels of MD. A score of 50 is recommended as a cutoff for a diagnosis of MD. Cronbach's alpha for the total score of the MDS has been reported to be 0.95 [57]. The Persian version of MDS achieved a Cronbach's alpha coefficient of 0.93 [58]. The Cronbach's alpha coefficient for the current sample was calculated to be 0.92.

Experiences in close relationships Questionnaire-revised (ECR-R)

The Revised Experiences in Close Relationships Questionnaire, developed by Waller and Fraley in 2000, is designed to assess various attachment styles in adults. This questionnaire consists of 36 items and measures three attachment styles—secure, anxious, and avoidant—on a 7-point Likert scale. Eighteen items in this questionnaire assess the avoidant attachment dimension, and eighteen items assess the anxious attachment dimension. Secure attachment is characterized by low scores on both avoidance and anxiety. The Cronbach's alpha coefficients for this questionnaire were 0.94 for the overall scale, 0.92 for the anxious subscale, and 0.91 for the avoidant subscale [59]. The Persian version of the ECR-R yielded Cronbach's alpha coefficients of 0.92, 0.68, and 0.84 for the secure, avoidant, and anxious groups, respectively [60]. The Cronbach's alpha values for the current sample were 0.77 for avoidant attachment style and 0.65 for anxious attachment style.

Traumatic experiences checklist (TEC)

The Traumatic Experiences Checklist is a self-report measure that evaluates the lifetime presence of 29 types of potentially traumatic experiences during childhood and adolescence (e.g., "Loss of a family member when you were a child") [61]. The TEC allows for calculating

trauma area presence scores for emotional neglect, emotional abuse, bodily threat (which includes physical abuse and life threat/pain/bizarre punishment), sexual harassment, and sexual abuse. The total score for the TEC is the sum of the presence of all traumatic events ranging from 0 to 29. The TEC format also allows for calculating trauma area severity scores across four variables (including onset, duration, and subjective response). These scores are calculated across developmental levels (ages 0–6, 7–12, 13–18), with composite scores derived for each trauma area [62]. The TEC has shown adequate reliability and good convergent and predictive validity (Nijenhuis et al., 2002), even at the item level (Schimmenti, 2018). In the present study, only presence scores (0–29) were used, and severity or developmental considerations were excluded. The Persian version of the TEC demonstrated a reliability of 0.91 as assessed by Cronbach's alpha [63]. The Cronbach's alpha value calculated for the current sample was 0.84.

Difficulties in emotion regulation scale (DERS)

The DERS is a 36-item self-report measure of six facets of emotion regulation: (1) non-acceptance of emotional responses; (2) Difficulty engaging in goal-directed behavior; (3) Impulse control difficulties; (4) Lack of emotional awareness; (5) Limited access to emotion regulation strategies; (6) and Lack of emotional clarity. Responses are rated on a 5-point ordinal Likert-type scale (1 = rarely; 5 = almost always), with some items reverse-scored. Higher scores on the DERS suggest more impairment in emotion regulation [51]. In this study, only the total score of the (DERS) scale was utilized. The psychometric properties of the Emotion Regulation Difficulty Scale were confirmed with a Cronbach's alpha of 0.93. Psychometric properties of the Persian version of the DERS have been examined in both clinical and non-clinical samples, with Cronbach's alpha coefficients for the total scale score ranging from 0.79 to 0.92 [64]. The value of Cronbach's alpha for the current sample was found to be 0.91.

Internalized shame scale (ISS)

The Internalized Shame Scale was developed by Cook to measure internalized shame. ISS includes 30 items with two subscales: shame (24 items) and self-esteem (6 items). The ISS shame score is derived from the 24 negatively worded items. The six positively worded self-esteem items are not used to arrive at the total shame score. Instead, these six items may be scored separately and used as an indication of positive self-esteem. The main purpose of these six items is to lessen the tendency for a response set to develop when all items are worded in the same direction [65]. This scale is scored on a five-point Likert scale (Never = 0, Very Rarely = 1, Sometimes = 2, Often = 3, Always = 4). A high score on ISS indicates feelings of worthlessness, incompetence, inferiority, emptiness, and loneliness, while a low score reflects high self-esteem. Cook (1993) reported Cronbach's alpha coefficients of 0.94 for the shame subscale and 0.90 for the self-esteem subscale of the ISS [66]. Cronbach's alpha coefficient for the Persian version of the shame subscale was 0.90 in a non-clinical sample [67]. In this study, only the shame subscale was utilized. The In the current sample, the Cronbach's alpha coefficient for the shame subscale was 0.93.

Procedure

This cross-sectional study utilized a convenience sampling method to investigate the relationships between traumatic experiences, attachment styles, and maladaptive daydreaming, with shame and emotion dysregulation as mediating factors, in a sample of Iranian adults. The recruitment process was conducted entirely online via the platform www.porsline.ir, ensuring convenient access for all participants. To ensure the recruitment of a diverse and representative sample, a multi-platform social media strategy was employed. Participants were invited to complete an online questionnaire, which was shared on widely used social media platforms in Iran (i.e., Instagram, Telegram, and Eita). 78.5% of the Iranian population use at least one social media or messaging platform [68]. Instagram is one of the most popular apps in Iran, with 46.5% of respondents reporting its use, followed by WhatsApp (35.3%), Telegram (34.6%), and Eita (25.2%) [69]. this method was chosen for its practicality and its ability to access a large and varied cross-section of the Iranian population, given the platforms' high penetration rates and broad use across different age groups and demographics in Iran.

The study was approved by the Research Ethics Committee of Shahid Beheshti University of Medical Sciences (ethical approval code: IR.SBMU.MSP.REC.1401.670). Following Somer et al. (2016), this study adopted the same procedure by providing participants with the questionnaires along with a brief text on maladaptive daydreaming (Appendix One). Participants who self-identified with the description and provided informed consent were then directed to complete the questionnaire. In this study, no missing data were observed. This was achieved through careful data collection procedures, including a pilot test to refine the questionnaire and ensure its clarity, along with providing clear instructions to participants. Furthermore, to minimize accidental omissions, respondents received a soft reminder when a question was left unanswered; but the respondents then had the possibility to continue without being forced to answer. Participants were included if they fell within the 18 to 60 age range, demonstrated proficiency in Persian (Farsi), and provided informed consent. Participants who

did not provide complete responses to the questionnaire were excluded from the study. The inclusion criteria of 18–60 years were selected because most of psychometric scales used in this study have been validated within the adult population in Iran, aged 18–60 years, ensuring the reliability and accuracy of the measurements for the target demographic. Additionally, Setting the upper limit at 60 helps ensure that the sample reflects participants who are more likely to be in similar stages of cognitive functioning, which reduces potential confounding variables. Older adults, who may experience different psychological or health-related changes, could be influenced by additional factors that are outside the scope of this study [70]. The sample size was estimated using the Free Statistics Calculators software, version 4, recommending 364 participants based on an effect size of 0.03, a power of 0.80, five independent variables, and an alpha of 0.5 [71, 72]. Finally, a total of 411 participants completed the questionnaire, with all meeting the established inclusion criteria.

Statistical analysis

To examine the mediating role of shame and emotion dysregulation in the relationship between childhood maltreatment and anxious and avoidant attachment styles (as independent variables) and MD (as the dependent variable), Structural Equation Modeling (SEM) was used. Before running the model, multivariate assumptions, including data normality, linearity of relationships, and multicollinearity, were assessed. To identify multivariate outliers, the Mahalanobis distance statistic was used. Pearson correlations were conducted to assess relationships between variables, with a significance level set at $p < 0.05$ for all tests. According to Cohen's guidelines for correlation coefficients (r) and the adapted thresholds for SEM path coefficients (β), effect sizes are classified as small ($r = 0.10–0.29$) medium ($r = 0.30–0.49$) and large ($r \geq 0.50$), representing weak, moderate, and strong relationships, respectively [73]. Indicators of latent variables were selected based on having significant relationship with their corresponding latent variable within confirmatory factor analysis (Fig. 2). The subscales of the TEC and DERS were used as indicators. In the absence of predefined indicators for latent factors, item parceling was applied to the scales for anxious attachment, avoidant attachment, shame, and MD. Parceling refers to the practice of aggregating individual items into a smaller number of parcels, which are then used as manifest indicators of the latent construct in structural equation modeling (Little et al., 2002). This approach is particularly useful when constructs are measured with a large number of items, as it can improve the variable-to-sample size ratio, reduce random error, and yield more stable parameter estimates [74]. Following common recommendations [74, 75], three parcels per factor were employed, which strikes a balance between efficiency and theoretical rigor [76]. Using three indicators per latent construct ensures the respective measurement model is just identified, providing stable parameter estimation [77]. To form the parcels, the random algorithm method assigned items to parcels without replacement, ensuring each item belonged to only one parcel. Random parceling is a widely used technique when no strong theoretical or empirical justification exists for creating parcels based on content or facets. While parceling reduces item-level information, it is considered an appropriate strategy in confirmatory factor analysis when the focus is on relations among latent constructs rather than item-level properties [74].

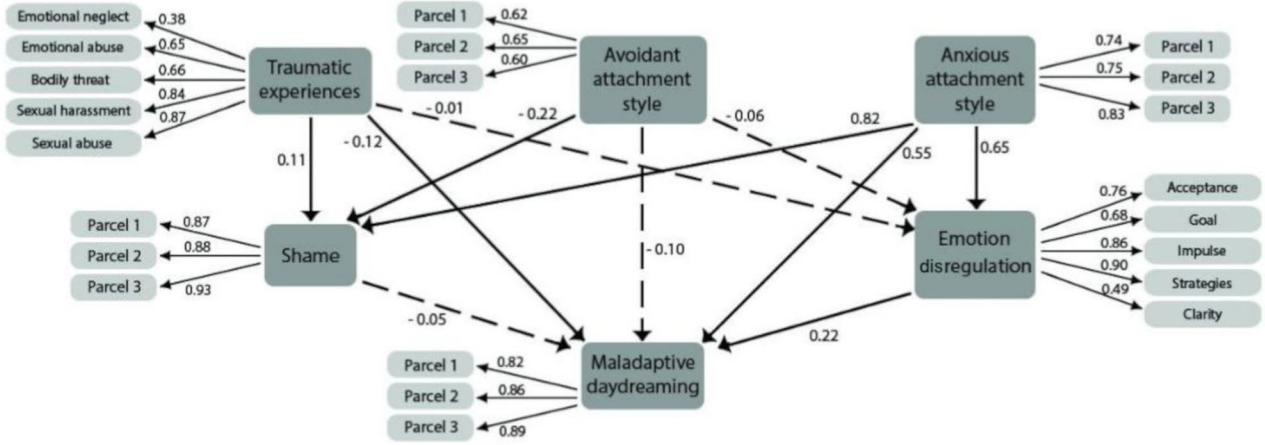

Fig. 2 Structural Model. The final structural equation model showing direct pathway coefficients between independent variables, mediator variables, and outcome variable. In this figure, significant paths are shown as solid lines and non-significant paths are represented as dashed lines
Note: This figure displays direct effects only. A comprehensive breakdown of the standardized mediating effects is presented in Table 7
$^{*}p < 0.05$. $^{**}p < 0.01$

Table 1 Sociodemographic characteristics of participants

Variable	Frequency	Percentage (%)
Gender		
Female	255	62.04
Male	156	37.95
Age		
18 to 28 years	298	70.31
29 to 39 years	62	15.08
40 to 50 years	37	9.00
Over 51 years	14	3.40
Educational Level		
Middle School	6	1.45
High School	135	32.84
Associate Degree	12	2.91
Bachelor's Degree	148	36.00
Master's Degree	59	14.35
Ph.D.	51	12.40
Marital Status		
Single	315	76.64
Married	96	23.35

Initially, a model was tested in which age and gender were included as covariates to control for potential confounding effects. However, neither age nor gender demonstrated any significant associations with the variables of interest. Given that their inclusion did not alter the relationships or outcomes under investigation, these covariates were excluded from the model. In the first step, Confirmatory Factor Analysis (CFA) was performed to evaluate the construct validity and the fit of the measurement model. Once the measurement model was confirmed, the structural model was estimated using Maximum Likelihood (ML) estimation to assess the direct effect of childhood maltreatment and anxious and avoidant attachment styles on MD, as well as their indirect effects through the mediating variables (shame and emotion dysregulation). Model fit indices (CFI, TLI, RMSEA, SRMR) were reported, and the significance of the indirect effects was tested using the bootstrap method. All data analyses were performed using SPSS-21 and AMOS-24 software.

Results

The participants' ages ranged from 18 to 60 years (62% male; Mean age = 26.47 years, SD = 9.61). A significant majority of them completed high school (98.5%), and over half had attained a college degree or higher (65.7%). Most participants were single during data collection (76.6%), with 23.4% reporting being married. Sociodemographic characteristics of the participants are presented in Table 1.

Table 2 Descriptive characteristics of continuous variables

Variable	Mean	Standard Deviation	skewness	kurtosis
age	29.47	9.61	1.59	1.71
Attachment styles				
Anxious Attachment	69.62	16.64	-0.073	0.008
Avoidant Attachment	76.00	11.58	-0.489	3.384
Traumatic Experiences				
emotional neglect	0.63	0.74	1.22	0.473
emotional abuse	0.46	0.74	1.593	1.843
bodily threat	0.33	0.70	2.615	7.877
sexual harassment	0.22	0.53	2.526	6.302
sexual abuse	0.22	0.58	3.031	9.288
Shame				
Total shame score	51.31	20.30	-0.062	-0.475
Emotion Dysregulation				
nonacceptance of negative emotions	16.09	5.88	0.078	-0.622
Difficulties engaging in goal-directed behaviors	15.60	4.18	-0.068	-0.133
difficulties controlling impulsive behaviors	16.51	5.02	0.078	-0.4
lack of emotional awareness	14.69	3.60	0.036	-0.041
limited access to effective emotion regulation strategies	22.30	5.86	5.86	-0.496
lack of emotional clarity	12.06	3.96	3.96	-0.376
MD				
MD total score	69.18	29.20	-0.096	-0.32

Preliminary analysis

The assumptions of structural equation modeling, such as normality, multicollinearity, and assessment of outliers and invalid data, were examined. According to Chou and Bentler, a skewness value within the range of ± 3 is acceptable [78] and for the kurtosis, values greater than ± 10 are generally considered problematic in structural equation modeling [79]. As shown in Table 2, while the data were not perfectly normally distributed, most variables in the study exhibited skewness and kurtosis values consistent with acceptable range for structural equation modeling, except for one related to sexual abuse. Given the deviation from normality in this variable, a square root transformation was applied. Following this transformation, skewness and kurtosis values of 2.24 and 3.61 were respectively obtained, confirming adherence to the normality assumption for this variable. As shown in Table 3, the correlation matrix analysis revealed no significant multicollinearity among the observable variables, with correlation coefficients in the hypothesized research model below 0.80. Inflation variance and tolerance index statistics were also employed to test for non-linearity. With all tolerance index values above 0.40 and inflation variance factor values below 10, there is confidence in assuming non-linearity among the variables. Univariate

Table 3 Correlations among the measured variables ($N=411$)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1														
2	0.283**	1													
3	0.190**	0.013	1												
4	0.186**	0.024	0.540**	1											
5	0.073	0.021	0.404**	0.582**	1										
6	0.092	0.033	0.297**	0.490**	0.528**	1									
7	0.072	0.003	0.279**	0.527**	0.519**	0.707**	1								
8	0.609**	0.036	0.214**	0.274**	0.150**	0.129**	0.110*	1							
9	0.455**	0.126*	0.099*	0.136**	0.067	0.032	0.031	0.609**	1						
10	0.330**	0.156**	0.142**	0.149**	0.124*	0.065	0.026	0.471**	0.441**	1					
11	0.476**	0.172**	0.097*	0.124*	0.140**	-0.014	0.019	0.559**	0.616**	0.666**	1				
12	-0.130**	-0.285**	-0.104*	-0.078	-0.079	-0.088	-0.060	0.039	-0.016	-0.123*	-0.082	1			
13	0.501**	0.177**	0.690	088/0	0.940	0.002	0.005	0.634**	0.690**	0.607**	0.783**	0.151**	1		
14	0.381**	-0.061	0.018	0.121*	0.046	-0.018	0.002	0.503**	0.495**	0.265**	0.383**	0.369**	0.394**	1	
15	0.493**	0.144**	001	0.190	0.012	-0.077	-0.064	0.410**	0.352**	0.256**	0.413**	-0.054	0.396**	0.339**	1

Note. (1) Anxious, (2) Avoidant, (3) Emotional neglect, (4) Emotional abuse, (5) Physical abuse, (6) Sexual harassment, (7) Sexual abuse, (8) Shame, (9) Non-acceptance of emotional responses, (10) Difficulty engaging in goal-directed behavior, 11. Impulse control difficulties, 12. Lack of emotional awareness, 13. Limited access to emotion regulation strategies, 14. Lack of emotional clarity, 15. MD

*$p<0.05$. **$p<0.01$

outliers for the observable variables were identified using frequency tables and box plots. For identifying multivariate outliers, Mahalanobis distances were computed for each individual. The results indicated that none of the participants' data were invalid or outliers.

The measurement model

Since all variables in the current study are treated as latent variables in the model, the measurement model of these variables was evaluated through confirmatory factor analysis to ensure the adequacy of their observed variables for measuring the underlying latent variables. Indicators that demonstrated a significant relationship with their corresponding latent variable within the context of confirmatory factor analysis were included in the final model. The 'Lack of Emotional Awareness' variable was excluded from the final measurement model due to its low factor loading. Indices of absolute fit (e.g., Chi-square, Chi-square/degrees of freedom ratio, RMSEA, and SRMR) and comparative fit (e.g., CFI and IFI) were used to assess the fit of the hypothesized model (See Table 4 for full confirmatory analysis results). Although the Chi-square index was used to assess the overall fit, it is sensitive to sample size and works best in large sample sizes. To mitigate the impact of sample size on the Chi-square index, the Chi-square to degrees of freedom ratio was also examined, with values less than 3 [51] or 5 [52] often indicating good model fit. Additionally, other fit indices such as RMSEA and SRMR were considered. Therefore, the model demonstrates a good fit, indicating that the observable variables adequately measure the latent variables of interest. Also, standardized path coefficients range from 0.38 to 0.90, and all paths from the latent variables to their observed variables (Lack of Emotional Awareness excluded) are significant at the 0.01 level, indicating that the observed variables are appropriate for measuring the latent variables. Indicators that demonstrated a significant relationship with their corresponding latent variable within the context of confirmatory factor analysis were included in the final model. The 'Lack of Emotional Awareness' subscale of emotion regulation was excluded from the final measurement model due to its low factor loading.

The structural model

A diagrammatic representation of the structural model is presented in Fig. 2. The fit indices demonstrate a good fit for the structural model, with all indices within the acceptable range, confirming the hypothetical research model (See Table 5 for full confirmatory analysis results).

The results of the initial hypotheses tests for each path in the structural model are summarized in Table 6. Hypotheses 1, 3, 5, 6, 7, 8, and 9 were significant and

Table 4 The fit indices of the measurement model

Fitness index	χ2	χ2/df	CFI	IFI	GFI	RMSEA	SRMR
Calculated values	338/549	861/2	930/0	930/0	889/0	067/0	066/0
Accepted values	-	< 5	> 90	> 90	> 90	< 0.08	< 0.08

Table 5 The fit indices of the structural model

Fitness index	χ2	χ2/df	CFI	IFI	GFI	RMSEA	SRMR
Calculated values	578.427	2.997	0.924	0.925	0.881	0.070	0.067
Accepted values	-	< 5	> 90	> 90	> 90	< 0.08	< 0.08

Table 6 Path coefficients of direct effects of latent variables and significance of estimated parameters

Hypothesized path	Unstandardized Coefficient	Standardized Coefficient (β)	Standard Error (SE)	t-value	*p*-value	Hypothesis
Anxious Attachment → MD	1.043	0.545	0.21	4.965	0.001	Supported
Avoidant Attachment → MD	-0.347	-0.099	0.282	-1.229	0.219	Not supported
Traumatic Experiences → MD	-2.539	-0.121	1.039	-2.444	0.015	Supported
Shame → MD	-0.085	-0.052	0.177	-0.479	0.632	Not supported
Emotion Dysregulation → MD	0.521	0.219	0.195	2.669	0.008	Supported
H6 Anxious Attachment → Shame	0.964	0.82	0.084	11.502	0.001	Supported
Avoidant Attachment → Shame	-0.689	-0.319	0.147	-4.685	0.001	Supported
Traumatic Experiences → Shame	1.378	0.107	0.582	2.368	0.018	Supported
Anxious Attachment → Emotion Dysregulation	0.524	0.652	0.058	9.083	0.001	Supported
Avoidant Attachment → Emotion Dysregulation	-0.088	-0.059	0.097	-0.908	0.364	Not supported
Traumatic Experiences → Emotion Dysregulation	-0.085	-0.01	0.423	-0.2	0.841	Not supported

Table 7 Mediating effect of emotion dysregulation and shame

Independent Variable	Mediating Variable	Dependent Variable	Coefficient (b)	Lower Bound	Upper Bound	*p*-value
H1: Anxious Attachment	Shame	MD	-0.082	-0.502	0.308	0.701
H2: Avoidant Attachment	Shame	MD	0.059	-0.243	0.418	0.684
H3: Traumatic Experiences	Shame	MD	-0.117	-1.052	0.336	0.544
H4: Anxious Attachment	Emotion Dysregulation	MD	0.273	0.013	0.554	0.037
H5: Avoidant Attachment	Emotion Dysregulation	MD	-0.046	-0.280	0.056	0.321
H6: Traumatic Experiences	Emotion Dysregulation	MD	-0.044	-0.695	0.429	0.722

therefore supported. However, hypotheses 2, 4, 10, and 11, were insignificant and unsupported.

Measurement of mediating effects

To identify the presence of mediation, bootstrapping was used to calculate the effects of emotion dysregulation and shame on the relationship between attachment styles and traumatic experiences with MD. The bootstrap method employed 2000 resampling iterations and a 95% confidence interval (Table 7).

The indirect effect of anxious attachment on MD through shame is not statistically significant *(b = -0.082,p > 0.05).* Similarly, avoidant attachment does not have a significant indirect effect on MD through shame *(b = 0.059, p > 0.05).* Furthermore, traumatic experiences also do not exert a significant indirect effect on MD via shame *(b = -0.117, p > 0.05).* In contrast, the indirect effect of anxious attachment on MD through emotion dysregulation is significant *(b = 0.273, p < 0.05)*, indicating that emotion dysregulation act as a mediator in this relationship. However, the indirect effects of avoidant attachment *(b = -0.046, p > 0.05)* and traumatic experiences *(b = -0.044, p > 0.05)* on MD through emotion regulation are not statistically significant.

Discussion

The present study examined the potential mediating roles of shame and emotion dysregulation in the relation between attachment styles and traumatic experiences with MD. Results indicated that emotion dysregulation mediated the relation between the anxious attachment style and MD. However, contrary to the hypotheses, shame did not mediate the relation between either attachment styles or traumatic experiences with MD.

Associations between attachment styles and MD

Consistent with previous studies, the findings revealed a significant association between anxious attachment

style and MD, whereas avoidant attachment style showed no such correlation [31, 32]. Emotional ambivalence in individuals with anxious attachment style impedes their ability to form or maintain meaningful interpersonal relationships. Consequently, they invest less effort in real-world relationships, which often remain superficial. To compensate, they create idealized relationships within the safe and controllable realm of their fantasies. Conversely, individuals with an avoidant attachment style are generally disinclined to form close relationships, suggesting they may not engage in MD to create idealized fantasies [23, 31]. However, MD is not just about compensating for close relationships, but also about the satisfaction of emotional needs more broadly. As such, given that people with an avoidant attachment tend to suppress/detach themselves/avoid their emotional needs, they might feel to a lesser degree the need to compensate for it by fantasizing, while among people with anxious attachment, it becomes a further context in which to experience and compensate for their emotional needs [80, 81].

The role of traumatic experiences in MD

In addition, the findings indicated a significant, direct link between traumatic experiences and MD. This aligns with previous studies showing that Individuals who engage in excessive daydreaming have frequently suffered from emotional isolation during childhood and continue to struggle with social relationships in adulthood [14, 82]. Through their fantasies, they create idealized worlds with supportive figures to compensate for the emotional and psychological deficits caused by their past traumatic experiences [2, 11].

Emotion dysregulation: direct effects

Consistent with previous studies [52], a significant association was found between emotion dysregulation and MD. Struggling with emotional regulation, maladaptive daydreamers feel overwhelmed and turn to fantasies for escape [31]. By constructing elaborate fantasy worlds, maladaptive daydreamers can temporarily escape aversive emotional states, which has a potential role in reducing negative affect [6, 83]. Moreover, daydreaming may offer a means to experience positive emotions, particularly when individuals are unable to elicit them through real-world experiences [84]. However, excessive immersion in fantasy can hinder effective emotion regulation, as it prevents the processing of underlying emotional triggers. This emotional avoidance may contribute to emotion dysregulation over time [85]. In general, MD can be viewed as an inefficient emotion regulation strategy and a potential barrier to healthy emotion regulation [49].

The direct impact of shame on MD

No significant association was found between shame and MD. This finding is inconsistent with previous studies that found individuals with MD often experience high levels of shame [6, 34, 39]. The implications of shame for psychopathology research can be explored by examining it as both a predictor and an outcome [86]. External shame is focused on the experience feeling judged by others, whereas internal shame is conceptualized as self-focused negative evaluations [87]. Accordingly, shame that arises from the belief that others would view one's maladaptive daydreams negatively can be categorized as contextual shame. In contrast, shame tied to perceiving oneself as inherently flawed or inferior— driving a compensatory pursuit of glory and success within one's dreams—can be categorized as internalized shame, which may serve as an antecedent to MD and was the focus of this study. The absence of a significant association between shame and MD in the findings might be partially attributable to shame measurement. It may have been that the sensitive nature of internal shame can bias self-report measures, as acknowledging shame in oneself can evoke a profound sense of shame [36]. Since the self is inherently fragmented, individuals experiencing shame, rely on their grandiose self-structures to keep their shameful selves outside of their awareness [43] which may make them reluctant to acknowledge such feelings [38]. Consequently, self-report measures of shame might not accurately reflect the depth of the internal shame experienced, which could be revealed through confidential disclosure in an empathetic interview. In addition, cultural variations in the conceptualization and expression of shame can influence research outcomes [88, 89]. For instance, in Middle Eastern cultures where shame is prominently viewed positively, self-report measures may not accurately capture shame intensity or prevalence [90]. On this account, further research with diverse assessment tools is suggested.

The mediating role of emotion dysregulation between anxious attachment and MD

Emotion dysregulation mediated the link between anxious attachment and MD, while it did not serve as a mediator in the relationship between avoidant attachment and MD. This may be attributed to the role of caregivers in shaping emotional regulation strategies. Caregivers who are responsive and validating to their child's emotional needs help their child to recognize, process, and express their emotions adaptively [26, 44]. Whereas, neglectful or rejecting caregivers impede the development of effective emotional coping strategies [53, 91]. Individuals with insecure attachment styles often struggle with intense relationship worries and loneliness, therefore engage less in constructive problem-solving, and avoid

seeking support during distress, all of which results in lack of emotional openness, inefficient emotional expression, catastrophizing, reduced confidence in coping with threats, and superficial transformation of problems [27, 48]. Maladaptive daydreamers' fantasy world often replaces real life interactions and interpersonal experiences, causing severe functional impairment. Excessive daydreaming activity might only provide temporary relief from negative emotions, but it cannot be considered as a healthy and mature coping mechanism.

The non-significant role of shame as a mediator

Consistent with previous research, both anxious and avoidant attachment styles were directly linked to increased shame [37, 92]. However, the indirect effects of these attachment styles on MD through shame were not significant. It appears that in this model poor emotion regulation strategies, rather than shame, may better explain the link between insecure attachment and MD. In addition, no mediating role was found for shame in the relationship between traumatic experiences and MD, contradicting the findings of the only previous study on this topic, put forth by Frante and Marino [17]; This might be attributed to differences in assessment of traumatic experiences in these two studies. While both studies used Traumatic Experiences Checklist (TEC), Frante and Marino specifically examined emotional trauma, whereas the present study adopted a broader perspective by including all subtypes of trauma. This comprehensive approach might have diluted the specific effects of emotional trauma. Given Frante and Marino's results, it is plausible that emotional trauma, rather than other trauma types may be more strongly linked to MD through the mediating role of shame. This suggests that the impact of non-emotional traumas on MD might be mediated through different mechanisms.

The mediating role of emotion dysregulation between traumatic experiences and MD

Traumatic experiences did not significantly impact emotion dysregulation, and consequently, had no significant indirect effect on MD through this pathway. While childhood traumatic experiences are often linked to subsequent psychological harm, previous studies reveal a significant degree of individual differences in resilience against the psychological effects of trauma among those with such a history [93, 94]. This suggests that people react differently to trauma. Consequently, it is crucial to consider factors that contribute to resilience following childhood traumatic experiences, and attachment style appears to be one such factor [95, 96]. Attachment patterns can influence the psychological impact of negative experiences, by playing a crucial role in regulating emotions during stressful situations [93, 94]. Consistent with a large body of research [13, 15, 31], the findings of this study suggests that insecure attachment patterns may increase the risk of maladaptive coping mechanisms, such as MD particularly following traumatic experiences. It is likely that secure attachment formed prior to onset of childhood trauma may reduce the likelihood of developing MD. This suggests that a shift in research and clinical attention toward the broader impact of early-life adversities on attachment styles rather than solely on specific traumatic events could also be beneficial.

In exploring the complex relationship between trauma and MD, an ongoing debate persists about whether childhood traumatic experiences are necessary for the development of MD. These findings align with studies indicating that trauma may not be an essential Antecedent for the development of pathological daydreaming. Immersive daydreaming is a highly rewarding experience in and of itself. However, when attachment needs are not met and the child is also traumatized, normal imaginative and wish-fulfillment play can turn to MD [15]. In line with the MD literature [22, 31], these findings suggest that childhood adversities may contribute to the development of insecure attachment styles, which disrupt healthy emotion regulation and, in turn, contribute to MD. The outcomes highlight the potential benefits of addressing the unmet attachment needs of individuals with MD by fostering healthier attachment bonds as well as healing early-life attachment wounds. Additionally, clinicians are recommended to evaluate the emotion regulation skills of individuals with MD and, if needed, focus on fostering more effective emotion regulation strategies. Moreover, the sample exhibited notably high levels of MD, suggesting that a significant proportion of individuals in Iran may experience clinically relevant symptoms which underscores the importance of addressing MD as a significant psychological construct with implications for mental health. Moreover, future studies should explore the underlying factors contributing to elevated MD levels in Iran.

Strengths, nosology and clinical application

In terms of strengths, the current study offers a comprehensive perspective beyond single group studies of attachment styles and traumatic experiences by concurrently examining them within a modeling framework. The examination of shame and emotion dysregulation as mediating variables is significant since it follows up on Ferrante E, Marino A (2022) and Sándor A, Bugán (2021) work, by testing key factors that could be targeted in prevention and treatment efforts. Finally, the rigorous mediational analyses (i.e., bootstrapping) enhanced the study's robustness and allowed for a comparison of the mediating roles of different factors.

The nosological inclusion of MD in diagnostic manuals is a significant topic of debate among researchers and clinicians. While not yet an official diagnosis, a growing body of evidence, such as that presented in this study, suggests it meets the criteria for a distinct psychiatric syndrome with important clinical implications. many MDers seek social support and professional help. However, MD is not yet familiar among scholars or mental health professional as much of predated literature on daydreaming tends to refer to it as a secondary symptom of distress. This results in these concerns often being dismissed, thus leading to inadequate treatment and increased feelings of loneliness and distress [97]. The use of a general, non-clinical population helps to distinguish MD as an independent psychopathology, separate from clinical features of other psychiatric disorders.

Emotion dysregulation was found to be a key mediator in the relationship between anxious attachment and MD. This indicates that MD is not merely a generic coping mechanism but is specifically linked to impaired emotional coping. By focusing on anxious attachment and traumatic experiences as specific psychological antecedents—as opposed to general symptoms—our study strengthens the argument for MD as a separate syndrome. This is further supported by the finding that shame was not a significant mediator, which differentiates MD from other shame-based disorders and suggests that shame may be a consequence rather than a direct cause. Additionally, the findings of this study suggests that while trauma is an antecedent, its influence may operate through other, yet-to-be-identified mechanisms.

Ultimately, by documenting the specific features of MD, this research provides a framework for clinicians to more accurately identify the condition. This would reduce the risk of misdiagnosis, and enable the development of more effective, targeted treatments for patients, which is crucial given the high rate of misdiagnosed and dismissed cases. These results imply that therapeutic interventions should focus on enhancing emotional regulation skills and addressing insecure attachment patterns to reduce maladaptive daydreaming. MD is a unique condition that requires its own treatment protocols, separate from those for comorbid disorders.

Limitations and future directions

While findings of the current study extend prior research, there are several limitations that should be addressed in the future. First, the cross-sectional design of this study prohibited the identification of temporal precedence, which is a prerequisite for inferring causation. Consequently, we cannot establish causality in the relationship between the measured variables. Future longitudinal studies, perhaps focusing specifically on children with anxious attachment style and a capacity for vivid fantasy, may shed more light on the developmental trajectory of MD. Second, the participants were a self-selecting convenience sample and the majority of the participants were female, which limits generalizability; it would be helpful for future studies to examine the study mediation models in a more diverse sample integrating sex and gender-based analyses (SGBA) into its design. Additionally, the sample age was heavily skewed, which may further affect the generalizability of the findings. Furthermore, recruiting participants via social media platforms may present self-selection bias and an overrepresentation of the psychological characteristics of social media users. While the sample may not be perfectly representative of the entire Iranian population, the large sample size helps to mitigate some of the risks of bias. Lastly, a limitation of this study is the relatively low internal consistency of the anxious attachment scale ($\alpha = 0.65$). This indicates a degree of measurement error, which could have attenuated the observed relationships observed in the model. This means that the true relationships involving anxious attachment may be stronger than what has been detected. Future research would benefit from using a more reliable measure of this construct. since this study covered a diverse array of traumatic experiences, future studies should investigate whether specific types of traumas (e.g., CPTSD, loneliness, neglect, and manipulation) or their severity are associated with MD. Lastly, future research could benefit from employing ecological momentary assessment (EMA) or daily diary methods to investigate the dynamic interplay between MD, emotional states, and attachment strategies rising from everyday interactions. Such intense data collection methods would likely provide more detailed information on the relations between these constructs (e.g., whether they reciprocally influence one another).

Conclusion

The results reported here provide evidence that emotion regulation mediated the relation between anxious attachment style and MD in a sample of Iranian population. Shame was not a significant mediator in any of hypothesized conditions, suggesting that most daydreamers are not influenced by overwhelming feelings of shame as previously thought. Moreover, while childhood trauma correlated with MD, neither shame nor emotion regulation emerged as specific mediators for this relation. Adverse childhood experiences, which may not be explicitly recalled as traumatic, could be a pathway to MD through unmet attachment needs. The results of the current study offer further insights into how difficulties in developing secure relationships may contribute to an increased reliance on fantasy through emotion dysregulation. To better support those affected, treatment protocols should focus

on addressing emotion regulation, which may be a promising avenue for managing MD.

Abbreviations

MD	Maladaptive Daydreaming
MDers	Maladaptive Daydreamers
MDS	Maladaptive Daydreaming Scale
ECR-R	Experiences in Close Relationships Questionnaire-revised
TEC	Traumatic Experiences Checklist
DERS	Difficulties in Emotion Regulation Scale
ISS	Internalized Shame Scale
RMSEA	Root Mean Square Error of Approximation
SRMR	Standardized Root Mean Square Residual
CFI	Comparative Fit Index
IFI	Incremental Fit Index

Acknowledgements
This research was extracted from the M.S. thesis of the first author, Maryam Pourmoazzen, submitted to Shahid Beheshti University of Medical Sciences, School of Medicine, Department of Clinical Psychology. The authors acknowledge the support and guidance provided by the faculty during the completion of this work.

Author contributions
Maryam Pourmoazzen, as the first author, was responsible for conceptualizing the study, collecting and analyzing the data, and drafting the manuscript. DR. Hoda Doosalivand and Dr. Amir Sam Kianimoghadam supervised the research process, provided critical feedback on the study design and data interpretation, and contributed to the revision and final approval of the manuscript.

Funding
No funding was received for this study.

Data availability
The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
The study was approved by the Research Ethics Committee of Shahid Beheshti University of Medical Sciences (ethical approval code: IR.SBMU.MSP.REC.1401.670). Before participation, informed consent was obtained from all individuals included in the study. The guidelines on research involving the use of human subjects (beneficence, non-maleficence, integrity, confidentiality, and voluntarism) were strictly adhered to according to the Helsinki Declaration. Participants did not incur any cost by participating in this study, and there was no financial inducement.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

Author details
[1]Department of Clinical Psychology, School of Medicine, Shahid Beheshti University of Medical Sciences, 1985711151, Arabi Ave, Daneshjoo Blvd, Velenjak, Tehran, Iran

Received: 15 April 2025 / Accepted: 10 September 2025
Published online: 29 September 2025

References

1. Killingsworth MA, Gilbert DT. A wandering Mind is an unhappy Mind. Science. 2010;330(6006):932.
2. Somer E. Maladaptive daydreaming: A qualitative inquiry. J Contemp Psychother. 2002;32:197–212.
3. Bigelsen J, Lehrfeld JM, Jopp DS, Somer E. Maladaptive daydreaming: evidence for an under-researched mental health disorder. Conscious Cogn. 2016;42:254–66.
4. Soffer-Dudek N, Theodor-Katz N. Maladaptive daydreaming: epidemiological data on a newly identified syndrome. Front Psychiatry. 2022;13:871041.
5. Soffer-Dudek N, Somer E. Trapped in a daydream: daily elevations in maladaptive daydreaming are associated with daily psychopathological symptoms. Front Psychiatry. 2018;9:194.
6. Somer E, Somer L, Jopp DS. Parallel lives: A phenomenological study of the lived experience of maladaptive daydreaming. J Trauma Dissociation. 2016;17(5):561–76.
7. Ross CA, Ridgway J, George N. Maladaptive daydreaming, dissociation, and the dissociative disorders. Psychiatric Res Clin Pract. 2020;2(2):53–61.
8. Soffer-Dudek N, Somer E, Spiegel D, Chefetz R, O'Neil J, Dorahy MJ, et al. Maladaptive daydreaming should be included as a dissociative disorder in psychiatric manuals: position paper. Br J Psychiatry. 2025;226(4):238–42.
9. Abuse S. Mental health services administration. Results the. 2013;2(013):55–68.
10. Rhue JW, Lynn SJ. Fantasy proneness and psychopathology. J Personal Soc Psychol. 1987;53(2):327.
11. Somer E, Somer L, Jopp DS. Childhood antecedents and maintaining factors in maladaptive daydreaming. J Nerv Ment Dis. 2016;204(6):471–8.
12. Singer JL. Daydreaming and fantasy (psychology revivals). Routledge; 2014.
13. Somer E, Herscu O, Childhood, Trauma. Social Anxiety, Absorption and Fantasy Dependence: Two Potential Mediated Pathways to Maladaptive Daydreaming. J Addict Behav Ther Rehabil 6: 3. of. 2017;5:2.
14. Rauschenberger S, Lynn S, Fantasy-Proneness. Negative Affect, and Psychopathology. Imagination, Cognition and Personality. 2003;22:239 – 55.
15. Somer E, Abu-Rayya HM, Brenner R. Childhood trauma and maladaptive daydreaming: fantasy functions and themes in a multi-country sample. J Trauma Dissociation. 2021;22(3):288–303.
16. Bigelsen J, Schupak C. Compulsive fantasy: proposed evidence of an underreported syndrome through a systematic study of 90 self-identified non-normative fantasizers. Conscious Cogn. 2011;20(4):1634–48.
17. Ferrante E, Marino A, Guglielmucci F, Schimmenti A. The mediating role of dissociation and shame in the relationship between emotional trauma and maladaptive daydreaming. Psychology of Consciousness: Theory, Research, and Practice.; 2020.
18. Szentágotai-Tătar A, Miu AC. Individual differences in emotion regulation, childhood trauma and proneness to shame and guilt in adolescence. PLoS ONE. 2016;11(11):e0167299.
19. Dvir Y, Ford JD, Hill M, Frazier JA. Childhood maltreatment, emotional dysregulation, and psychiatric comorbidities. Harv Rev Psychiatry. 2014;22(3):149–61.
20. Ford JD. Treatment implications of altered affect regulation and information processing following child maltreatment. Psychiatric Annals. 2005;35(5):410.
21. Fraley RC. A connectionist approach to the organization and continuity of working models of attachment. J Pers. 2007;75(6):1157–80.
22. Costanzo A, Santoro G, Russo S, Cassarà MS, Midolo LR, Billieux J, et al. Attached to virtual dreams: the mediating role of maladaptive daydreaming in the relationship between attachment styles and problematic social media use. J Nerv Ment Dis. 2021;209(9):656–64.
23. Bowlby J. The Bowlby-Ainsworth attachment theory. Behav Brain Sci. 1979;2(4):637–8.
24. Bowlby J, Holmes J. A secure base: Routledge; 2012.
25. Ross T, Attachment, Representation. Attachment Style or Attachment Pattern? Team LiB. 2003:57.
26. Bowlby J. A secure base: Parent-child attachment and healthy human development. Basic books; 2008.
27. Mikulincer M, Shaver PR. Attachment in adulthood: structure, dynamics, and change. Guilford; 2010.
28. Chris Fraley R, Niedenthal PM, Marks M, Brumbaugh C, Vicary A. Adult attachment and the perception of emotional expressions: probing the hyperactivating strategies underlying anxious attachment. J Pers. 2006;74(4):1163–90.
29. Mikulincer M, Gillath O, Shaver PR. Activation of the attachment system in adulthood: threat-related primes increase the accessibility of mental representations of attachment figures. J Personal Soc Psychol. 2002;83(4):881.
30. Mikulincer M, Birnbaum G, Woddis D, Nachmias O. Stress and accessibility of proximity-related thoughts: exploring the normative and intraindividual components of attachment theory. J Personal Soc Psychol. 2000;78(3):509.

31. Sándor A, Bugán A, Nagy A, Bogdán LS, Molnár J. Attachment characteristics and emotion regulation difficulties among maladaptive and normal daydreamers. Curr Psychol. 2021.
32. Mariani R, Musetti A, Di Monte C, Danskin K, Franceschini C, Christian C. Maladaptive daydreaming in relation to linguistic features and attachment style. Int J Environ Res Public Health. 2021;19(1):386.
33. Cassidy J, Shaver PR. Handbook of attachment: theory, research, and clinical applications. Rough Guides; 1999.
34. Pietkiewicz IJ, Nęcki S, Bańbura A, Tomalski R. Maladaptive daydreaming as a new form of behavioral addiction. J Behav Addictions. 2018;7(3):838–43.
35. Feeney BC, Thrush RL. Relationship influences on exploration in adulthood: the characteristics and function of a secure base. J Personal Soc Psychol. 2010;98(1):57.
36. DeYoung PA. Understanding and treating chronic shame: A relational/neurobiological approach. Routledge; 2015.
37. Gross CA, Hansen NE. Clarifying the experience of shame: the role of attachment style, gender, and investment in relatedness. Pers Indiv Differ. 2000;28(5):897–907.
38. Asgarizadeh A, Ghanbari S. Investigating shame-proneness from the perspectives of attachment and mentalization theories. Rooyesh-e-Ravanshenasi J (RRJ). 2022;11(3):101–14.
39. Schimmenti A, Somer E, Regis M. Maladaptive daydreaming: towards a nosological definition. Annales Médico-psychologiques. Revue Psychiatrique. 2019;177(9):865–74.
40. Schimmenti A, Somer E, Regis M, editors. Maladaptive daydreaming: towards a nosological definition. Annales Médico-psychologiques, revue psychiatrique. Elsevier; 2019.
41. Ghinassi S, Fioravanti G, Casale S. Is shame responsible for maladaptive daydreaming among grandiose and vulnerable narcissists? A general population study. Pers Indiv Differ. 2023;206:112122.
42. Schore AN. Modern attachment theory. 2017.
43. Herman JL. Shattered shame States and their repair. Shattered states: Routledge; 2018. pp. 157–70.
44. Ainsworth MDS, Blehar MC, Waters E, Wall SN. Patterns of attachment: A psychological study of the strange situation. Psychology; 2015.
45. Doherty NA, Feeney JA. The composition of attachment networks throughout the adult years. Personal Relationships. 2004;11(4):469–88.
46. Saraiya T, Lopez-Castro T. Ashamed and afraid: A scoping review of the role of shame in Post-Traumatic stress disorder (PTSD). J Clin Med. 2016;5(11).
47. Weaver MG, Sullins J. The relationship between adverse childhood experience, guilt proneness, and shame-proneness: an exploratory investigation. Mod Psychol Stud. 2022;27(1):10.
48. Mikulincer M, Shaver PR. Attachment orientations and emotion regulation. Curr Opin Psychol. 2019;25:6–10.
49. Sándor A, Bugán A, Nagy A, Bogdán LS, Molnár J. Attachment characteristics and emotion regulation difficulties among maladaptive and normal daydreamers. Curr Psychol. 2021:1–18.
50. Gruhn MA, Compas BE. Effects of maltreatment on coping and emotion regulation in childhood and adolescence: A meta-analytic review. Child Abuse Negl. 2020;103:104446.
51. Gratz KL, Roemer L. Multidimensional assessment of emotion regulation and dysregulation: development, factor structure, and initial validation of the difficulties in emotion regulation scale. J Psychopathol Behav Assess. 2004;26:41–54.
52. Greene T, West M, Somer E. Maladaptive daydreaming and emotional regulation difficulties: A network analysis. Psychiatry Res. 2020;285:112799.
53. Shaver P, Mikulincer M, Chun D. Adult Attachment Theory, Emotion Regulation, and Prosocial Behavior. 2009. pp. 121 – 45.
54. Stevens FL. Affect regulation styles in avoidant and anxious attachment. Individual Differences Res. 2014;12(3).
55. Calkins SD, Hill A. Caregiver influences on emerging emotion regulation. Handb Emot Regul. 2007;229248.
56. Burns EE, Jackson JL, Harding HG. Child maltreatment, emotion regulation, and posttraumatic stress: the impact of emotional abuse. J Aggress Maltreatment Trauma. 2010;19(8):801–19.
57. Somer E, Soffer-Dudek N, Ross CA, Halpern N. Maladaptive daydreaming: proposed diagnostic criteria and their assessment with a structured clinical interview. Psychol Consciousness: Theory Res Pract. 2017;4(2):176.
58. Ahmadi F, Goodarzi M, Kazemi Rezaei SA, Yazdanimehr R. Daydreaming scale (MDS-16) in an Iranian sample. J Clin Psychol. 2022;14(4):53–63.
59. Sibley CG, Liu JH. Short-term Temporal stability and factor structure of the revised experiences in close relationships (ECR-R) measure of adult attachment. Pers Indiv Differ. 2004;36(4):969–75.
60. Predicting Attachment Disorder in. School-age children in respect to parents' attachment style. J Psychol Stud. 2006;2(1):125–46.
61. Nijenhuis E, Van der Hart O, Vanderlinden J. The traumatic experiences checklist (TEC). Somatoform dissociation: Phenomena, measurement, and theoretical issues. 1999:188 – 93.
62. Nijenhuis ER, Van der Hart O, Kruger K. The psychometric characteristics of the traumatic experiences checklist (TEC): first findings among psychiatric outpatients. Clin Psychol Psychotherapy: Int J Theory Pract. 2002;9(3):200–10.
63. Haji Seyed Taghiataghavi Z, Poursharifi H, Meschi F, Hassanabadi HR, Rezaei M. Roles of traumatic childhood experiences in predicting binge eating disorder mediated by early maladaptive schemas. Iran J Nutr Sci Food Technol. 2021;16(2):131–40.
64. Kazemi rezaei Sa MORADIA, Shahgholian M, Abdollahi M, Parhoon H. J Clin Psychol. 2022;14(2):25–37.
65. Cook DR. Internalized shame scale. Multi-Health Systems; 2001.
66. Cook D. The internalized shame scale manual. Menomonie WI: Channel Press(Available from author; 1993.
67. Rajabi G, Abasi G. Examining the relationship between self-criticism, social anxiety and fear of failure with shyness in college students. Res Clin Psychol Couns. 2012;1(2):171–82.
68. (ISPA) ISPA. Results of ISPA survey on the use of social media and messaging apps in Iran Tehran: ISPA. 2022 [Available from: https://www.ispa.ir/Default/Details/fa/3382
69. (ISPA) ISPA. Results of ISPA survey on the use of messaging apps and social networks Tehran: ISPA. 2024 [Available from: https://www.ispa.ir/Default/Details/fa/3434
70. Cruz-Jentoft A, Gutiérrez B. Upper age limits in studies submitted to a research ethics committee. Aging Clin Exp Res. 2010;22:175–8.
71. Soper DS. A-priori sample size calculator for multiple regression [Software]. Avaliable from http://www.danielsoper.com/statcalc (20/11/2017). 2015.
72. Cohen J, Cohen P, West SG, Aiken LS. Applied multiple regression/correlation analysis for the behavioral sciences: Routledge; 2013.
73. Cohen J. Statistical power analysis for the behavioral sciences. routledge; 2013.
74. Little TD, Rhemtulla M, Gibson K, Schoemann AM. Why the items versus parcels controversy needn't be one. Psychol Methods. 2013;18(3):285.
75. Little TD, Cunningham WA, Shahar G, Widaman KF. To parcel or not to parcel: exploring the question, weighing the merits. Struct Equation Modeling: Multidisciplinary J. 2002;9(2):151–73.
76. Matsunaga M. Item parceling in structural equation modeling: A primer. Communication Methods Measures. 2008;2(4):260–93.
77. Rhemtulla M. Population performance of SEM parceling strategies under measurement and structural model misspecification. Psychol Methods. 2016;21(3):348.
78. Chou C. Estimates and tests in structural equation modeling. Structural equation modeling: Concepts, issues, and applications/Sage Publications. 1995.
79. Kline RB. Principles and practice of structural equation modeling. Guilford; 2023.
80. Mikulincer M. The attachment behavioral system in adulthood: activation, psychodynamics, and interpersonal processes. Advances in experimental social psychology/Academic; 2003.
81. Dewitte M, De Houwer J, Buysse A, Koster EH. Proximity seeking in adult attachment: examining the role of automatic approach–avoidance tendencies. Br J Soc Psychol. 2008;47(4):557–73.
82. Sanders B. The imaginary companion experience in multiple personality disorder. Dissociation: Progress in the Dissociative Disorders. 1992.
83. Somer E, Somer L, Halpern N. Representations of maladaptive daydreaming and the self: A qualitative analysis of drawings. Arts Psychother. 2019;63:102–10.
84. Poerio GL, Totterdell P, Emerson L-M, Miles E. Love is the triumph of the imagination: daydreams about significant others are associated with increased happiness, love and connection. Conscious Cogn. 2015;33:135–44.
85. Gratz KL, Tull MT. Emotion regulation as a mechanism of change in acceptance-and mindfulness-based treatments. Assessing mindfulness and acceptance processes in clients: Illuminating the theory and practice of change. 2010;2:107 – 33.
86. Cândea D-M, Szentagotai A. Shame and psychopathology: from research to clinical practice. J Cogn Behav Psychotherapies. 2013;13(1):101–13.

87. Ferreira C, Moura-Ramos M, Matos M, Galhardo A. A new measure to assess external and internal shame: development, factor structure and psychometric properties of the external and internal shame scale. Curr Psychol. 2022;41(4):1892–901.
88. Wierzbicka A. Semantics, culture, and cognition: universal human concepts in culture-specific configurations. Oxford University Press; 1992.
89. Wierzbicka A. Defining emotion concepts. Cogn Sci. 1992;16(4):539–81.
90. Zare S. Self-conscious emotions in virtual communities of Iranian migrants: a cross-cultural examination of Persian lexicon of shame, guilt, and pride. Int J Lang Cult (TIJOLAC). 2023;5(1):1–17.
91. Bowlby JA, Secure Base. Parent-Child Attachment and Healthy Human Development. New York (Basic Books). 1988. 1988.
92. Sedighimornani N, Rimes K, Verplanken B. Factors contributing to the experience of shame and shame management: adverse childhood experiences, peer acceptance, and attachment styles. J Soc Psychol. 2021;161(2):129–45.
93. Collishaw S, Pickles A, Messer J, Rutter M, Shearer C, Maughan B. Resilience to adult psychopathology following childhood maltreatment: evidence from a community sample. Child Abuse Negl. 2007;31(3):211–29.
94. Ohashi K, Anderson CM, Bolger EA, Khan A, McGreenery CE, Teicher MH. Susceptibility or resilience to maltreatment can be explained by specific differences in brain network architecture. Biol Psychiatry. 2019;85(8):690–702.
95. Lim BH, Hodges MA, Lilly MM. The differential effects of insecure attachment on post-traumatic stress: A systematic review of extant findings and explanatory mechanisms. Trauma Violence Abuse. 2020;21(5):1044–60.
96. Mills-Koonce WR, Appleyard K, Barnett M, Deng M, Putallaz M, Cox M. Adult attachment style and stress as risk factors for early maternal sensitivity and negativity. Infant Ment Health J. 2011;32(3):277–85.
97. Nowacki A, Pyszkowska A. The everchanging maladaptive daydreaming–a thematic analysis of lived experiences of Reddit users. Curr Psychol. 2024;43(35):28488–99.

Publisher's note