



# Are Defense Styles Mediators between traumatic Experiences and Maladaptive Daydreaming?

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Accepted: 25 August 2022 / Published online: 28 September 2022  
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## Abstract

Maladaptive daydreaming (MD) is a new proposed mental disorder in which an excessive absorption in vivid, narrative fantasies generates impairments in various life domains. This study aimed to examine the role of traumatic life experiences and immature, neurotic, and mature defense styles in MD. Three hundred and fifty-six Italian adults, ranging in age from 18 to 60 years completed an online survey, including measures of MD, traumatic life events, and defense styles. A multiple mediation model showed that immature, neurotic, and mature defense styles fully mediated the relationship between traumatic life experiences and MD. These findings suggest that clinical interventions for people with a history of traumatic experience who developed MD should aim to help them acquire more adaptive coping strategies to deal with traumatic memories.

**Keywords** Maladaptive daydreaming · Trauma · Defense mechanisms · Mediation

## Introduction

Maladaptive Daydreaming (MD) is a clinical condition, characterized by persistent and recurrent absorption in vivid, detailed fantasies, that interferes with interpersonal, academic or vocational functioning (Somer, 2002). Differently

from MD, daydreaming is a normal and widespread mental activity (Klinger, 1990) characterized by a conscious off-task thought (Smallwood et al., 2003) which an individual can develop as an internalized form of play (Singer, 1975). Moreover, daydreaming may help people by providing calming, exciting, and rewarding experiences (McMillan et al., 2013), whereas MD tends to be a source of distress due to the loss of control over the activity, the negative impact on one's social and academic or working performance, and feelings of shame and social disconnection (Bigelsen et al., 2016; Bigelsen & Schupak, 2011). Thus, MD, represents a more immersive state of imagination, eliciting a pleasurable experience connected with a sense of presence, that is highly associated with several psychopathological features (Somer et al., 2017a).

Although, to date, MD is not recognized as a psychiatric nosology by major psychiatric diagnostic systems, such as the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (American Psychiatric Association, 2013), a growing body of research is demonstrating the clinical validity, reliability, sensitivity, and specificity of this construct (Schimmenti et al., 2019). Moreover, among online communities, there is a growing number of people who self-identify as “maladaptive daydreamers” (MDers), struggling to find adequate support for their condition (Bershtling &

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Somer, 2018; Bigelsen et al., 2016). This constitutes an important clinical issue, since MDers are reportedly prone to engage up to 69% of their waking hours in highly complex and vivid fantasies, typically accompanied by stereotypical movements, limiting their functioning and participation in daily life (Bigelsen et al., 2016). In fact, MDers may create highly structured internal worlds that involve characters interacting with each other as in a game or a novel. People in these internal worlds tend to possess skills, qualities, social success, and other characteristics that are lacking in the real world (Somer, 2017a).

In his first qualitative inquiry on six MDers with a history of traumatic experiences, Somer (2002) found three main issues that capture the MD experience: (a) functions: searching for managing distress and affect regulation; (b) themes such as violence, sexuality, power/control dynamics; (c) sensory, kinesthetic trigger phenomena to initiate daydreaming. Building on these preliminary findings, the author theorized that these traumatized individuals could have developed MD as a coping strategy to deal with negative affect and aversive environmental conditions (Somer, 2002). Consistently, Abu-Rayya et al. (2020) found that survivors of child sexual abuse reported higher levels of MD compared to controls. Noteworthy, the available data show that only 27% of MDers experienced traumatic events in childhood (Bigelsen & Schupak, 2011), and that there are no significant differences in reported traumatic events between MDers and controls (Bigelsen et al., 2016). Taken together, these findings suggest that traumatic experiences, although potential risk factors, are neither necessary nor sufficient to account for the development of MD.

Other studies investigated indirect pathways from traumatic experiences to MD. Somer and Herscu (2017) found that absorption fully mediated the link between childhood trauma and MD in a sample of 315 university students. These findings suggest that MD may act as a negative reinforcement for individuals with a history of childhood trauma who seek to divert themselves from emotional pain. Consistently, Ferrante et al.'s (2022) cross-sectional study on a sample of 162 MDers, revealed that dissociation and shame fully mediated the association between emotional trauma and MD. The authors conclude that individuals with unprocessed trauma might progressively develop MD as a sort of “illusory retreat” from emotional pain linked to unprocessed trauma memories and dysregulated emotions. Overall, this evidence suggests that overuse of dissociation as a primitive defense against feeling and remembering the emotional impact of traumatic experiences may lead to an excessive involvement in MD (Somer et al., 2016b). However, further studies are still needed to elucidate the role of other defense mechanisms, such as denial and splitting, in

the complex and conjoint relationship between traumatic experiences and MD.

Defense mechanisms are unconscious psychological processes which protect an individual from psychological pain and prevent the awareness of internal or external danger and stress (Vaillant, 1971, 1992). Defense mechanisms can be characterized by different degrees of maturity / immaturity and consequently different levels of distortion of perceived reality (Andrews et al., 1993; Jun et al., 2015). Vaillant's (1992) hierarchical model of defense styles distinguishes among immature, neurotic, and mature defense styles. In this classification, *immature and psychotic* defenses imply a severe distortion of external reality and/or an alteration of unpleasant feelings (i.e., passive aggression, denial, distortion autistic fantasy, acting out, dissociation, projection, devaluation, idealization, splitting). *Neurotic* defenses are aimed at keeping potentially threatening feelings, ideas, and memories out of one's awareness (i.e., undoing, intellectualization, isolation, repression, reaction formation, pseudo altruism, displacement, somatization, rationalization); *mature* defenses may increase enjoyment while allowing for a more cognitive understanding of feelings, ideas, and their implications (i.e., humor, sublimation, altruism, and suppression). Although people commonly use a range of defense mechanisms to deal with painful affect, excessive usage of immature and neurotic defense mechanisms can lead to detrimental effects (Cramer, 2015), such as psychological problems and psychopathology (Calati et al., 2010; Lingardi et al., 1999; Perry et al., 2013; Pollock & Andrews, 1989; Somer et al., 2021; Spinhoven & Kooiman, 1997). Specifically, previous studies linked dissociation to MD in a consistent and powerful way (Bigelsen et al., 2016; Ross et al., 2020; Salomon-Small et al., 2021; Soffer-Dudek & Somer, 2018; Somer et al., 2016a). MD, in fact, is characterized by dissociative absorption, or the involuntary limiting of attention at the expense of other internal and external circumstances (Bigelsen et al., 2016; Somer, Somer et al., 2016a; Somer & Herscu 2017). On these bases, Somer et al. (2021), posit that MD could be a means for keeping a distance from a harsh and painful reality.

The association between defense mechanisms and traumatic experiences is extensively studied (Birmes et al., 1999; Gori et al., 2020, 2021). In addition, the mediating role of defense mechanisms between childhood trauma and psychopathology has received increasing attention in literature. For example, immature defenses were found to mediate the relationship between trauma and bipolar disorder (Wang et al., 2021), anxiety and depressive disorder (Bond, 2004; Wang et al., 2021), poor sleep quality and psychotic experiences (Lenzo et al., 2022), substance abuse (Evren et al., 2012), and distress (Fang et al., 2020). However, no

study has still comprehensively examined the role of different defense styles as potential risk factors of MD.

On the basis of the aforementioned literature, in this study, we aimed to extend our understanding of the role played by traumatic experiences and defense styles in MD.

Building upon previous studies that only examined the role of one specific defense mechanism (i.e., dissociation; Ferrante et al., 2022), we predicted that the association between traumatic experiences and MD severity would be mediated by immature, neurotic and immature defense styles. Specifically, our model predicts that traumatic experiences will be positively related with defense styles scores, that immature and neurotic defense styles will increase MD scores, and that mature defense style will reduce MD scores.

## Method

### Participants and Procedure

The sample consisted of 356 Italian adults, 75 men (21.1%) and 281 women (78.9%) with a mean age of 36.10 years ( $SD=11.98$ ; range: 18–60). In terms of marital status, 232 (65.2%) of participants were single, 98 (27.5%) were in a stable relationship, 15 (4.2%) were married, 8 (2.2%) were divorced, and 3 (0.4%) were widowers. The highest educational level attained by the participants was middle school (7%), high school (41%), bachelor's degree (18.3%), master's degree (27.8%), Ph.D. or specialization (5.9%).

The recruitment was conducted from May 15, 2020 to July, 30 2020. A snowball sampling method was adopted as a recruitment strategy. Participants were enrolled through advertisements in Internet groups of Italian university students, and the groups' members were asked, in turn, for dissemination. The data was collected using a Google Form. All participants were informed about the research goals and scopes, as well as the measures that would be utilized to generate the data, before completing the survey. Participation was entirely voluntary, with complete confidentiality and anonymity guaranteed. The participants could withdraw from the study at any time. The current study was conducted in accordance with the 1964 Declaration of Helsinki and its later amendments, and to the Ethical Code of the Italian Association of Psychology (AIP) and the American Psychological Association (APA). The Research Ethics Committee for Psychological Research of the University of Messina approved this study (prot. n. 17,758).

## Measures

### Sociodemographic Information

In this section, information was collected about gender, age, marital status, and level of education.

### Maladaptive daydreaming

The Maladaptive Daydreaming Scale-16 (MDS-16; Somer, Lehrfeld, et al., 2016; Italian version by Schimmenti et al., 2020) was used to assess participants' levels of maladaptive daydreaming. This scale consists of 16 items (e.g., "Some people feel a need to continue a daydream that was interrupted by a real-world event at a later point. When a real-world event has interrupted one of your daydreams, how strong was your need or urge to return to that daydream as soon as possible?"; "When you know you have had something important or challenging to pay attention to or finish, how difficult was it for you to stay on task and complete the goal without daydreaming?"). In this study, we used an adapted version of the MDS-16 (i.e., on a 5-point scale instead of an 11-point scale to make it easier for respondents to understand the rating system). Participants' responses could range from 1 (*never/none of the time*) to 5 (*extremely frequent/all the time*). The average of each item's MDS-16 score determines the overall MDS-16 score, with higher values indicating higher levels of MD. There are no reversed items. The MDS-16 showed excellent psychometric properties in the Italian version. In the present study, Cronbach's alpha of the total scale was 0.90.

### History of traumatic experiences

The Italian translation (Schimmenti, 2018) of the Traumatic Experiences Checklist (TEC) was used to assess lifetime exposure to traumatic events. The TEC (Nijenhuis et al., 2002) is a self-report questionnaire that asks participants about traumatic experiences throughout one's lifetime. It's a valid and reliable self-report tool that can be used in clinical practice and research. TEC consists of 29 items; participants respond if they have experienced any of 29 events, and then how much of an impact these experiences had upon them with a score from 1 (*none*) to 5 (*an extreme amount*). Examples of events are: "Having to look after your parents and/or brothers and sisters when you were a child"; and "Serious bodily injury (e.g., loss of a limb, mutilation, burns)." A cumulative score, as well as scores for emotional neglect, emotional abuse, physical abuse, sexual harassment, sexual assault, and a person's bodily threat, can all be determined. In this research, we only used the total score (Cronbach's alpha=0.75).

**Table 1** Descriptive statistics and gender differences for all investigated variables

	Overall N=356		Males n=75		Females n=281		<i>t</i>	<i>p</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
TEC_Total score	4.30	3.45	3.17	2.88	4.59	3.54	-3.61	<b>0.00</b>	-0.41
MDS-16 Total score	9.50	6.82	8.44	7.09	9.78	6.74	-1.47	0.14	-0.19
Mature defense style (DSQ-40)	42.26	8.94	44.25	7.22	41.73	9.29	2.51	<b>0.01</b>	0.28
Neurotic defense style (DSQ-40)	35.16	10.07	33.25	10.04	35.67	10.04	-1.85	0.06	-0.24
Immature defense style (DSQ-40)	96.24	24.58	98.74	24.22	95.57	24.67	1.00	0.31	0.12

<sup>1</sup>TEC = Traumatic Experiences Checklist; MDS-16 = Maladaptive Daydreaming Scale; DSQ-40 = Defense Style Questionnaire

## Defense Styles

The Defense Style Questionnaire-40 (DSQ-40; Andrews et al., 1993; Italian version Farma & Cortinovis, 2000) was used to investigate participants' defense style mechanisms. The DSQ-40 is a 40-item self-report questionnaire which assesses the use of 20 defenses mechanisms, with two items for each defense. The defenses are organized into three factors or styles: mature (4 defenses: sublimation, humor, anticipation, and suppression), neurotic (4 defenses: undoing, pseudo altruism, idealization, and reaction formation), and immature (12 defenses: projection, passive aggression, acting out, isolation, devaluation, autistic fantasy, denial, displacement, dissociation, splitting, rationalization, and somatization). Each participant was instructed to provide a score on a 9-point Likert scale, from 1 (*strongly disagree*) to 9 (*strongly agree*). Individual defense scores were obtained as the average of the two items corresponding to each defense mechanism, and category scores were calculated as the average of all defense mechanisms scored in that category. In the present study, Cronbach's alpha values were similar to the original version (Andrews et al., 1993) and the Italian version (Farma & Cortinovis, 2000) of the DSQ-40, as follows: mature defense style (Cronbach's alpha = 0.55), neurotic defense style (Cronbach's alpha = 0.60), immature defense style (Cronbach's alpha = 0.80).

## Statistical analysis

Statistical analyses were performed using R 4.1.3 (R Core Team, 2022) and R Studio 2022.2.0.443 (R Studio Team, 2022) with packages lavaan (Rosseel, 2012) and psych (Revelle, 2021). Descriptive statistics were calculated for all the study variables. Independent *t* tests were used to examine gender differences in experiences, defense styles, and MD. Controlling for gender, Pearson's *r* correlation analyses were used to investigate possible correlations between traumatic experiences, defense styles, and MD. A *p* value below 0.05 was deemed significant. A parallel mediation analysis was carried out to verify if defense styles mediate the links between traumatic experiences and MD. To this end, a series of regression steps were performed. In step one,

the total effect in the association between traumatic experiences and MD was evaluated. In step two, the relationships between traumatic experiences and each defense style were investigated. In step three, the relationships between each defense style and MD were explored. In the fourth step, the significance of the direct effect between traumatic experiences and MD after inserting the parallel mediators in the model was explored, to understand if the mediation was total or partial. Further, the Sobel test was used to estimate the stability of the indirect effect.

## Results

### Preliminary Analyses

Descriptive statistics for the whole sample and differentiations by gender are reported in Table 1. As expected for a nonclinical sample, the mean score of the Traumatic Experiences Checklist was in the nonclinical range (Schimmenti, 2018). Independent *t* tests showed significant gender differences in TEC total score and mature defense styles. Specifically, males scored higher than females on mature defense styles, with a moderate effect size. In addition, females reported higher rates of traumatic experiences than males, with a small effect size.

Pearson's *r* correlations analysis was carried out to investigate the relationship between MD, traumatic experiences, and defense styles, controlling for gender. Table 2 shows that MD was significantly and positively associated with all the other variables studied, except mature defense styles.

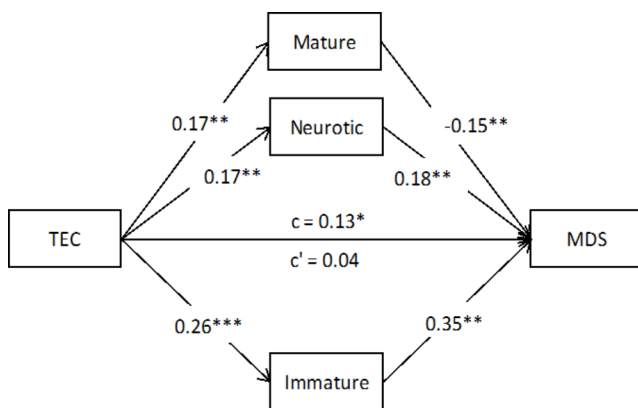
### Mediation analysis

Results of the mediation analyses, testing the significance of the indirect effect of traumatic experiences on maladaptive daydreaming through defense mechanism styles are displayed in Fig. 1. In Step 1 of the mediation model, the regression of TEC on MDS-16, ignoring the mediator, was significant,  $b = 0.260$ ,  $t_{(354)} = 2.492$ ,  $p < 0.05$ . Step 2 showed that the regression of the TEC on the mediator, DSQ-40, was also significant for all three factors,

**Table 2** Correlations between traumatic experiences, maladaptive daydreaming and defense styles, controlling for gender

	TEC Total score	MDS-16 Total score	Mature defense style (DSQ-40)	Neurotic defense style (DSQ-40)
MDS-16 Total score	<b>0.120*</b>	--	--	--
Mature defense style (DSQ-40)	<b>0.191**</b>	0.053	--	--
Neurotic defense style (DSQ-40)	<b>0.156**</b>	<b>0.304***</b>	<b>0.371***</b>	--
Immature defense style (DSQ-40)	<b>0.268***</b>	<b>0.407***</b>	<b>0.347***</b>	<b>0.515***</b>

<sup>1</sup>TEC = Traumatic Experiences Checklist; MDS-16=Maladaptive Daydreaming Scale; DSQ-40=Defense Style Questionnaire; \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$



**Fig. 1** Standardized estimates for the mediation model. Note: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ ; TEC = Traumatic Experiences Checklist; Mature = Mature defense style; Neurotic = Neurotic defense style; Immature = Immature defense style; MDS = Maladaptive Daydreaming Scale.

$b = 0.435$ ,  $t_{(354)} = 3.203$ ,  $p < 0.01$  for the Mature style;  $b = 0.493$ ,  $t_{(354)} = 3.229$ ,  $p < 0.01$  for the Neurotic style and  $b = 1.815$ ,  $t_{(354)} = 4.962$ ,  $p < 0.001$  for the Immature style. Step 3 of the mediation process showed that the mediator (DSQ-40), controlling for TEC, was significant for all three factors,  $b = -0.11$ ,  $t_{(352)} = -2.843$ ,  $p < 0.01$  for the Mature style;  $b = 0.12$ ,  $t_{(352)} = 3.113$ ,  $p < 0.01$  for the Neurotic style;  $b = 0.10$ ,  $t_{(352)} = 6.124$ ,  $p < 0.001$  for the Immature style. Step 4 of the analyses revealed that controlling for the mediator (DSQ-40), TEC was not a significant predictor of MDS-16,  $b = 0.07$ ,  $t_{(351)} = 0.729$ ,  $p = 0.467$ . Sobel tests were conducted and found to fully mediate the model ( $z = -2.070$ ,  $p < 0.05$  for Mature style;  $z = 2.187$ ,  $p < 0.05$  for Neurotic style and  $z = 3.824$ ,  $p < 0.001$  for Immature style). It was found that DSQ-40 fully mediated the relationship between TEC and MDS-16.

## Discussion

This study aimed to advance our understanding of the connection between traumatic life experiences and MD. Our findings enrich existing literature because they reveal the full mediating roles of immature, neurotic, and mature defense styles in this relationship.

Although not the main focus of this study, the observed gender differences were in agreement with previous studies. Specifically, females reported higher levels of traumatic experiences (Nijenhuis et al., 2002) and lower levels of mature defense styles (Granieri et al., 2017) than men, while no significant gender differences were found with respect to MD (Musetti et al., 2021; Schimmenti et al., 2020). These findings resemble the literature showing that females are more vulnerable to traumatic stress than males are (Breslau et al., 1999; Pratchett et al., 2010).

Correlation analyses indicate that MD was more strongly associated with immature and neurotic defense styles and modestly associated with traumatic experiences in our sample. These results are consistent and expand on previous studies showing the strict link between dissociative defense mechanisms and MD (Somer et al., 2016b), as well as the weak but significant role of having a history of traumatic experiences in increasing the risk of MD (Somer et al., 2021). Overall, these results suggest that individuals with MD may adopt a number of maladaptive defense mechanisms in order to modify their current perception of reality. For example, Somer et al.’s findings (2021) showed that some individuals with MD tend to engage in fantasies about idealized families or current relationships, therefore highlighting the role of the neurotic mechanism of idealization in MD.

In addition, consistent with our hypotheses, we also found that the association between traumatic experiences and MD was totally mediated by defense styles, with the mature defenses lessening, and neurotic and immature defenses increasing the severity of MD, in our mediation model. As expected, these results suggest that the relationship between trauma and MD is complex and not linear. Moreover, our findings add to previous studies (e.g., Somer et al., 2021) showing that individuals with MD with a history of traumatic experiences tend to be involved in MD as a means of distracting themselves from emotional pain related to traumatic memories. Interestingly, when an individual adopts some mature defense mechanisms, such as sublimation, to deal with trauma pain, they are less likely to immerse in MD. For example, they can use art (e.g., painting images), instead of withdrawal into mental states, to share their traumatic experience(s) with others (Hall, 2020). This finding is consistent with the literature which highlights the adaptive role of mature defense mechanisms (e.g., Di Giuseppe et al.,



2021), and advances our comprehension of the underlying emotion regulatory process implied in MD.

Overall, our findings expand our understanding on the relationship between traumatic experiences and MD. We suggest that the likelihood of excessively engaging in fantasy relies on a range of defense mechanisms which include, but are not limited to, dissociation. This is consistent with psychoanalytic theory and previous empirical research showing that individuals who experienced traumatic events may develop various conscious and unconscious strategies to decrease their awareness of unpleasant memories and feelings (Fang et al., 2020). Specifically, individuals who rely massively and rigidly on one defense mechanism, such as dissociation, may enter into a vicious cycle in which traumatic memories are not processed adequately, leading to further dysregulated emotion (Schimmenti, 2017). This, in turn, may increase proneness to immerse into “psychic retreats” (i.e., unintegrated mental states; see Schimmenti & Caretti, 2016), as highlighted by literature on online addictive behaviors and MD (Costanzo et al., 2021).

The findings of this study must be considered in light of the following limitations. Most notably, our findings only apply to a subgroup of individuals with MD because only a minority of individuals with this disorder report a history of traumatic experiences. Despite this limitation, our results may help clinicians better understand the factors underlying excessive involvement in fantasy in their traumatized clients with MD in order to create tailored interventions for them. Moreover, the cross-sectional nature of the study design allowed us to test mediation only in the statistical sense and limited our ability to draw causal conclusions. We examined a theory-driven mediation, which does not necessarily exclude reverse causality, although traumatic experiences can theoretically and empirically be assumed to be the antecedent variable. Nonetheless, our findings have laid the groundwork for future longitudinal studies to confirm these associations. Moreover, data collection was exclusively based on self-report measures which could lead to shared method variance and thus, biased estimations. Although the retrospective evaluation of traumatic experiences may be subject to recall bias, the TEC is widely used in the literature on trauma and has demonstrated adequate psychometric properties. In addition, there is a limitation in terms of low Cronbach’s alpha values for the DSQ-40 subscales of mature and neurotic defense styles. Although our findings are consistent with many previous studies (e.g., Giovazolias et al., 2017; Ruuttu et al., 2006), findings from these subscales should be interpreted with caution. Most likely, a multimethod assessment (e.g., combining self-reported measures with clinical interviews, and clinical records) of traumatic experiences, defense styles, and MD, would have led to more valid and reliable findings. In addition, future

studies should use the diagnostic structured clinical interview to assess the severity of MD (Somer et al., 2017b). Another limitation of this study includes using a snowball sampling method, which does not allow to calculate a response rate and limits the representativeness of the sample. Future studies should aim to use probability samples to overcome this limitation. Finally, our findings may be further affected by other factors not examined here, such as insecure attachment, loneliness, and other forms of psychopathology. Future studies on samples of severely traumatized individuals are needed to provide additional support for these findings.

## Conclusion

Notwithstanding its limitations, our study shed new light on the association between traumatic experiences and MD, by showing that this relationship is mediated by defense styles. In fact, maladaptive defense mechanisms developed in response to cumulative traumas may, in turn, decrease the ability to face negative affect, resulting in an excessive involvement in fantasy. On the contrary, individuals who rely on more adaptive strategies (i.e., mature defense mechanisms) to master facing traumatic memories, have less of a need to daydream and retreat into their own fantasy world. Consequently, our findings can help clinicians understand the underlying mechanisms of MD, evaluate the risk for developing an excessive involvement in fantasy, and design tailored interventions. Mentalization-informed interventions could help individuals with MD become more aware of their mental states, develop more effective emotion regulation strategies, and discourage avoidance mechanisms, such as withdrawal into fantasy. Within the context of a safe therapeutic relationship, patients with MD could gain insight the developmental roots of their tendency to distract from unpleasant experiences and develop more flexible and varied strategies to adapt to life’s adversities.

**Funding sources** Open access funding provided by Università degli Studi di Parma within the CRUI-CARE Agreement. No financial support was received for this study.

**Data availability** The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Declarations

**CRedit authorship contribution statement** AM conceived and designed the study, drafted and revised the manuscript, contributed to data analysis and interpretation, AG was involved in the statistical analysis and interpretation of the data, contribute to drafting and revising the manuscript, GM contributed to data analysis and drafting the manuscript, CDM was involved in drafting the manuscript, CF and

RM supervised the manuscript. All authors read and approved the final manuscript.

**Declaration of competing interest** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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## References

- Abu-Rayya, H. M., Somer, E., & Knane, H. (2020). Maladaptive daydreaming is associated with intensified psychosocial problems experienced by female survivors of childhood sexual abuse. *Violence Against Women*, 26(8), 825–837. <https://doi.org/10.1177/1077801219845532>
- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Association. <https://doi.org/10.1176/appi.books.9780890425596>
- Andrews, G., Singh, M., & Bond, M. (1993). The Defense Style Questionnaire. *The Journal of Nervous and Mental Disease*, 181(4), 246–256. <https://doi.org/10.1097/00005053-199304000-00006>
- Bershtling, O., & Somer, E. (2018). The micro-politics of a new mental condition: Legitimization in maladaptive daydreamers' discourse. *The Qualitative Report*, 23(8), 1983–2002. <https://doi.org/10.46743/2160-3715/2018.3466>
- Bigelsen, J., Lehrfeld, J. M., Jopp, D. S., & Somer, E. (2016). Maladaptive daydreaming: Evidence for an under-researched mental health disorder. *Consciousness and Cognition*, 42, 254–266. <https://doi.org/10.1016/j.concog.2016.03.017>
- Bigelsen, J., & Schupak, C. (2011). Compulsive fantasy: Proposed evidence of an under-reported syndrome through a systematic study of 90 self-identified non-normative fantasizers. *Consciousness and Cognition*, 20(4), 1634–1648. <https://doi.org/10.1016/j.concog.2011.08.013>
- Birmes, P., Hazane, F., Calahan, S., Sztulman, H., & Schmitt, L. (1999). Mécanismes de défense et prédiction des états de stress post-traumatiques. *L'Encéphale: Revue de Psychiatrie Clinique Biologique et Thérapeutique*.
- Bond, M. (2004). Empirical studies of defense style: Relationships with psychopathology and change. *Harvard Review of Psychiatry*, 12(5), 263–278. <https://doi.org/10.1080/10673220490886167>
- Breslau, N., Chilcoat, H. D., Kessler, R. C., Peterson, E. L., & Lucia, V. C. (1999). Vulnerability to assaultive violence: Further specification of the sex difference in post-traumatic stress disorder. *Psychological Medicine*, 29(4), 813–821. <https://doi.org/10.1017/S0033291799008612>
- Calati, R., Oasi, O., De Ronchi, D., & Serretti, A. (2010). The use of the defence style questionnaire in major depressive and panic disorders: A comprehensive meta-analysis. *Psychology and Psychotherapy: Theory Research and Practice*, 83(1), 1–13. <https://doi.org/10.1348/147608309X464206>
- Costanzo, A., Santoro, G., Russo, S., Cassarà, M. S., Midolo, L. R., Billieux, J., & Schimmenti, A. (2021). Attached to virtual dreams: The mediating role of maladaptive daydreaming in the relationship between attachment styles and problematic social media use. *The Journal of Nervous and Mental Disease*, 209(9), 656–664. <https://doi.org/10.1097/NMD.0000000000001356>
- Cramer, P. (2015). Defense mechanisms: 40 years of empirical research. *Journal of Personality Assessment*, 97(2), 114–122. <https://doi.org/10.1080/00223891.2014.947997>
- Di Giuseppe, M., Perry, J. C., Prout, T. A., & Conversano, C. (2021). Recent Empirical Research and Methodologies in Defense Mechanisms: Defenses as Fundamental Contributors to Adaptation. *Frontiers in psychology*, 12. <https://doi.org/10.3389/fpsyg.2021.802602>
- Evren, C., Cagil, D., Ulku, M., Ozcetekaya, S., Gokalp, P., Cetin, T., & Yigiter, S. (2012). Relationship between defense styles, alexithymia, and personality in alcohol-dependent inpatients. *Comprehensive Psychiatry*, 53(6), 860–867. <https://doi.org/10.1016/j.comppsy.2012.01.002>
- Fang, S., Chung, M. C., & Wang, Y. (2020). The impact of past trauma on psychological distress: The roles of defense mechanisms and alexithymia. *Frontiers in Psychology*, 11(May), 1–10. <https://doi.org/10.3389/fpsyg.2020.00992>
- Farma, T., & Cortinovic, I. (2000). Misurare i meccanismi di difesa attraverso il Defense Style Questionnaire a 40 item: Attendibilità dello strumento e suo utilizzo nel contesto italiano. *Ricerche Di Psicologia*, 24, 127–144.
- Ferrante, E., Marino, A., Guglielmucci, F., & Schimmenti, A. (2022). The mediating role of dissociation and shame in the relationship between emotional trauma and maladaptive daydreaming. *Psychology of Consciousness: Theory Research and Practice*, 9(1), 27–39. <https://doi.org/10.1037/cns0000253>
- Giovazolias, T., Karagiannopoulou, E., & Mitsopoulou, E. (2017). Can the factor structure of defense style questionnaire (DSQ-40) contribute to our understanding of parental acceptance/rejection, bullying, victimization and perceived well-being in greek early adolescents? *Europe's Journal of Psychology*, 13(2), 269–285. <https://doi.org/10.5964/ejop.v13i2.1090>
- Gori, A., Topino, E., & Di Fabio, A. (2020). The protective role of life satisfaction, coping strategies and defense mechanisms on perceived stress due to COVID-19 emergency: A chained mediation model. *Plos one*, 15(11), e0242402. <https://doi.org/10.1371/journal.pone.0242402>
- Gori, A., Topino, E., Palazzeschi, L., & Di Fabio, A. (2021). Which personality traits can mitigate the impact of the pandemic? Assessment of the relationship between personality traits and traumatic events in the COVID-19 pandemic as mediated by defense mechanisms. *Plos one*, 16(5), e0251984. <https://doi.org/10.1371/journal.pone.0251984>
- Granieri, A., La Marca, L., Mannino, G., Giunta, S., Guglielmucci, F., & Schimmenti, A. (2017). The relationship between defense patterns and DSM-5 maladaptive personality domains. *Frontiers in Psychology*, 8(NOV), 1–12. <https://doi.org/10.3389/fpsyg.2017.01926>
- Hall, J. T. (2020). Burn survivor artist changes artistic approach by sharing how other survivors of traumatic events can use art to heal themselves by helping others heal. *Annals of Plastic Surgery*, 84(3S), S134–S136. <https://doi.org/10.1097/SAP.0000000000002225>
- Jun, J. Y., Lee, Y. J. G., Lee, S. H., Yoo, S. Y., Song, J., & Kim, S. J. (2015). Association between defense mechanisms and psychiatric symptoms in North Korean Refugees. *Comprehensive Psychiatry*, 56, 179–187. <https://doi.org/10.1016/j.comppsy.2014.10.001>

- Klinger, E. (1990). *Daydreaming. Using waking fantasy and imagery for self-knowledge and creativity*. Tarcher.
- Lenzo, V., Franceschini, C., Manari, T., Corsano, P., Quattropiani, M. C., & Musetti, A. (2022). Psychotic Experiences and Sleep Quality in the Emerging Adulthood: The Interplay Between Emotional Neglect, Bodily Threat, and Defense Mechanisms. *The Journal of Nervous and Mental Disease*, 210(5), 365–372. <https://doi.org/10.1097/NMD.0000000000001454>
- Lingiardi, V., Lonati, C., Delucchi, F., Fossati, A., Vanzulli, L., & Maffei, C. (1999). Defense mechanisms and personality disorders. *The Journal of Nervous & Mental Disease*, 187(4), 224–228. <https://doi.org/10.1097/00005053-199904000-00005>
- McMillan, R. L., Kaufman, S. B., & Singer, J. L. (2013). Ode to positive constructive daydreaming. *Frontiers in Psychology*, 4(SEP), 1–9. <https://doi.org/10.3389/fpsyg.2013.00626>
- Musetti, A., Franceschini, C., Pingani, L., Freda, M. F., Saita, E., Vegni, E., Zenesini, C., Quattropiani, M. C., Lenzo, V., Margherita, G., Lemmo, D., Corsano, P., Borghi, L., Cattivelli, R., Plazzi, G., Castelnovo, G., Somer, E., & Schimmenti, A. (2021). Maladaptive daydreaming in an adult Italian population during the COVID-19 lockdown. *Frontiers in Psychology*, 12(March), 1–10. <https://doi.org/10.3389/fpsyg.2021.631979>
- Nijenhuis, E. R. S., Van der Hart, O., & Kruger, K. (2002). The psychometric characteristics of the traumatic experiences checklist (TEC): First findings among psychiatric outpatients. *Clinical Psychology and Psychotherapy*, 9(3), 200–210. <https://doi.org/10.1002/cpp.332>
- Perry, J. C., Presniak, M. D., & Olson, T. R. (2013). Defense mechanisms in schizotypal, borderline, antisocial, and narcissistic personality disorders. *Psychiatry*, 76(1), 32–52. <https://doi.org/10.1521/psyc.2013.76.1.32>
- Pollock, C., & Andrews, G. (1989). Defense styles associated with specific anxiety disorders. *American Journal of Psychiatry*, 146(11), 1500–1502. <https://doi.org/10.1176/ajp.146.11.1500>
- Pratchett, L. C., Pelcovitz, M. R., & Yehuda, R. (2010). Trauma and violence: Are women the weaker sex? *Psychiatric Clinics of North America*, 33(2), 465–474. <https://doi.org/10.1016/j.psc.2010.01.010>
- R Core Team. (2022). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. <http://www.r-project.org/>
- RStudio: *Integrated development environment for R*. R Studio Team, & RStudio (2022). PBC. <http://www.rstudio.com/>
- Revelle, W. R. (2021). *psych: Procedures for personality and psychological research*. <https://cran.r-project.org/package=psych>
- Ross, C. A., Ridgway, J., & George, N. (2020). Maladaptive daydreaming, dissociation, and the dissociative disorders. *Psychiatric Research and Clinical Practice*, 2(2), 53–61. <https://doi.org/10.1176/appi.prcp.20190050>
- Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling and more. *Journal of Statistical Software*, 48(2), 1–36.
- Ruutu, T., Pelkonen, M., Holi, M., Karlsson, L., Kiviruusu, O., Heilä, H., & Marttunen, M. (2006). Psychometric properties of the Defense Style Questionnaire (DSQ-40) in adolescents. *The Journal of Nervous and Mental Disease*, 194(2), 98–105. <https://doi.org/10.1097/01.nmd.00000198141.88926.2e>
- Salomon-Small, G., Somer, E., Harel-Schwarzmann, M., & Soffer-Dudek, N. (2021). Maladaptive daydreaming and obsessive-compulsive symptoms: A confirmatory and exploratory investigation of shared mechanisms. *Journal of Psychiatric Research*, 136(February), 343–350. <https://doi.org/10.1016/j.jpsychires.2021.02.017>
- Schimmenti, A. (2017). The developmental roots of dissociation: A multiple mediation analysis. *Psychoanalytic Psychology*, 34(1), 96–105. <https://doi.org/10.1037/pap0000084>
- Schimmenti, A. (2018). The trauma factor: Examining the relationships among different types of trauma, dissociation, and psychopathology. *Journal of Trauma and Dissociation*, 19(5), 552–571. <https://doi.org/10.1080/15299732.2017.1402400>
- Schimmenti, A., & Caretti, V. (2016). Linking the overwhelming with the unbearable: Developmental trauma, dissociation, and the disconnected Self. *Psychoanalytic Psychology*, 33(1), 106–128. <https://doi.org/10.1037/a0038019>
- Schimmenti, A., Sideli, L., La Marca, L., Gori, A., & Terrone, G. (2020). Reliability, validity, and factor structure of the Maladaptive Daydreaming Scale (MDS-16) in an Italian sample. *Journal of Personality Assessment*, 102(5), 689–701. <https://doi.org/10.1080/00223891.2019.1594240>
- Schimmenti, A., Somer, E., & Regis, M. (2019). Maladaptive daydreaming: Towards a nosological definition. *Annales Médico-Psychologiques Revue Psychiatrique*, 177(9), 865–874. <https://doi.org/10.1016/j.amp.2019.08.014>
- Singer, J. L. (1975). *The inner world of daydreaming*. Harper & Row.
- Smallwood, J., Obonsawin, M., & Heim, D. (2003). Task unrelated thought: The role of distributed processing. *Consciousness and Cognition*, 12(2), 169–189. [https://doi.org/10.1016/S1053-8100\(02\)00003-X](https://doi.org/10.1016/S1053-8100(02)00003-X)
- Soffer-Dudek, N., & Somer, E. (2018). Trapped in a daydream: Daily elevations in maladaptive daydreaming are associated with daily psychopathological symptoms. *Frontiers in Psychiatry*, 9(MAY), 1–14. <https://doi.org/10.3389/fpsyg.2018.00194>
- Somer, E. (2002). Maladaptive daydreaming: A qualitative inquiry. *Journal of Contemporary Psychotherapy*, 32(2), 197–212. <https://doi.org/10.1023/A:1020597026919>
- Somer, E., Abu-Rayya, H. M., & Brenner, R. (2021). Childhood trauma and maladaptive daydreaming: Fantasy functions and themes in a multi-country sample. *Journal of Trauma & Dissociation*, 22(3), 288–303. <https://doi.org/10.1080/15299732.2020.1809599>
- Somer, E., & Herscu, O. (2017). Childhood trauma, social anxiety, absorption and fantasy dependence: Two potential mediated pathways to maladaptive daydreaming. *Journal of Addictive Behaviors Therapy & Rehabilitation*, 06(04), <https://doi.org/10.4172/2324-9005.1000170>
- Somer, E., Lehrfeld, J., Bigelsen, J., & Jopp, D. S. (2016). Development and validation of the Maladaptive Daydreaming Scale (MDS). *Consciousness and Cognition*, 39, 77–91. <https://doi.org/10.1016/j.concog.2015.12.001>
- Somer, E., Soffer-Dudek, N., & Ross, C. A. (2017a). The comorbidity of daydreaming disorder (maladaptive daydreaming). *Journal of Nervous & Mental Disease*, 205(7), 525–530. <https://doi.org/10.1097/NMD.0000000000000685>
- Somer, E., Soffer-Dudek, N., Ross, C. A., & Halpern, N. (2017b). Maladaptive daydreaming: Proposed diagnostic criteria and their assessment with a structured clinical interview. *Psychology of Consciousness: Theory Research and Practice*, 4(2), 176–189. <https://doi.org/10.1037/cns0000114>
- Somer, E., Somer, L., & Jopp, D. S. (2016a). Childhood antecedents and maintaining factors in maladaptive daydreaming. *Journal of Nervous & Mental Disease*, 204(6), 471–478. <https://doi.org/10.1097/NMD.0000000000000507>
- Somer, E., Somer, L., & Jopp, D. S. (2016b). Parallel lives: A phenomenological study of the lived experience of maladaptive daydreaming. *Journal of Trauma & Dissociation*, 17(5), 561–576. <https://doi.org/10.1080/15299732.2016.1160463>
- Spinhoven, P., & Kooiman, C. G. (1997). Defense style in depressed and anxious psychiatric outpatients: An explorative study. *The Journal of Nervous and Mental Disease*, 185(2), 87–94.
- Vaillant, G. E. (1971). Theoretical hierarchy of adaptive ego mechanisms. *Archives of General Psychiatry*, 24(2), 107. <https://doi.org/10.1001/archpsyc.1971.01750080011003>



- Vaillant, G. E. (1992). *Ego mechanisms of defense: A guide for clinicians and researchers*. American Psychiatric Publication.
- Wang, L., Yin, Y., Bian, Q., Zhou, Y., Huang, J., Zhang, P., Chen, S., Fan, H., Cui, Y., Luo, X., Tan, S., Wang, Z., Li, C. S. R., Tian, B., Tian, L., Hong, L. E., & Tan, Y. (2021). Immature defense mechanisms mediate the relationship between childhood trauma and

onset of bipolar disorder. *Journal of Affective Disorders*, 278(May 2020), 672–677. <https://doi.org/10.1016/j.jad.2020.10.029>

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