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Personality traits and maladaptive daydreaming: Fantasy functions and themes in a multi-country sample

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ABSTRACT

In this study, we analyzed the responses of 539 adults who met an evidence-based criterion of probable maladaptive daydreaming (MD) and met the description of at least one of the following personality facets: grandiosity, separation insecurity, and anhedonia. Respondents reporting grandiosity tended to use their fantasies as a means for wish-fulfillment for power and dominance, while respondents characterized by separation insecurity fantasized more about relationships with others. Their fantasies often featured an idealized relationship, sometimes of love, or an idealized version of their own family. Separation-anxious individuals reported fantasies in which they received extra attention on account of illness, vulnerability, or neediness. Respondents who reported characteristics of anhedonia were more likely to use daydreaming as a distraction from an unpleasant reality and gravitated to fantasies experienced as rewarding. The daydreams of respondents with anhedonia tended to feature themes of escape and physical violence. Our data show that particular personality facets can uniquely distinguish the functions and contents of fantasies in MD. Our findings suggest that maladaptive daydreaming may have a compensatory role in regulating unmet personal needs.

1. Introduction

The psychoanalytic literature discusses daydreams as a means of settling internal conflicts between an unconscious wish and either a state of deprivation or societal demand (Freud, 1908, 1962). Jung (1961/1976, p. 258 [CW 18, para. 593]) believed that one becomes acquainted with unconscious processes and emotions through daydreams. The content of daydreams may be more accessible to consciousness than nighttime dreams because the ego is more active. Thus, conscious fantasies may reflect an individual's motives, needs, wishes, desires, or ambitions (Fine, 1983). Later developments in psychoanalysis have emphasized the adaptive aspect of daydreams, conceiving these as internal forms of play in healthy mental development (Winnicott, 1971), conducive to self-relaxation, planning, and problem-solving, and enhanced creativity (Singer, 1971).

In their seminal study, Singer and Antrobus (1963) mapped the content of daydreams in a non-clinical population. Their categorization led to a line of studies that distinguished between three daydreaming styles associated with specific personality traits: positive and constructive daydreaming; guilty and dysphoric daydreaming; and poor attentional control (e.g., Blouin-Hudon & Zelenski, 2016). These findings

suggested that both the presence and themes of daydreaming can reflect personality traits and persons' unmet needs.

1.1. Maladaptive daydreaming

Daydreams vary not only in content but also in the time they take up: For example, some individuals report spending more than half of their waking time in fantasy (Bigelsen et al., 2016). Estimates of the prevalence of this increased tendency to fantasize range from 4% of the population (Lynn & Rhue, 1989) to 6% (Rauschenberger & Lynn, 1995). Maladaptive daydreaming (MD) is a recently identified clinical condition: Subjects fantasize extensively and vividly, developing a compulsive psychological dependence on dreams that can compromise important obligations in life and substitute for human interaction (Somer, 2002). MD is different from the off-task and spontaneous thought characterizing mind wandering, often observed in ADHD (Lanier, Noyes, & Biederman, 2021). In mind wandering the brain is "at rest" and distracted from the external task, unable to stay on a single topic for a long period (Callard, Smallwood, Golchert, & Margulies, 2013). In contrast, MD is a state of deliberate, intense hyper concentration on internally generated content. People who suffer from MD report frequent and intense

fantasies featuring complex scenarios, that appear first in childhood and can be cured by evocative music and stereotypical movement (Somer, Somer et al., 2016). Dreaming in turn exacerbates loneliness and pain, resulting in a vicious cycle of compulsive fantasy (Somer, 2018) that can cause distress and functional impairment (Schupak & Rosenthal, 2009).

MD has high comorbidity with various mental disorders sharing some features with attention-deficit and dissociative disorders (Schimmenti, Somer, & Regis, 2019), ADHD-Inattentive type, OCD, depression anxiety disorders (Somer, Soffer-Dudek, & Ross, 2017), and behavioral addictions (Pietkiewicz, Nęcki, Bańbura, & Tomalski, 2018). Several explanations for the formation of the phenomenon have been proposed (Greene, West, & Somer, 2020; Somer, Abu-Rayya, & Brenner, 2020); however, the mechanism of MD has yet to be understood.

Excessive daydreaming, beginning in childhood and persisting into adulthood, may form a significant part of the daydreamer's personality, and the content of the dreaming may reflect a mechanism used to deal with daydreamers' real unmet needs. Data on fantasy content in MD is often posted by scores of internet users who are constantly sharing their experiences and offer peer support and advice in many online communities dedicated to MD. One such example is "Reddit" which hosts over 63,000 members; (Retrieved on July 30th, 2021, from https://www.reddit.com/r/MaladaptiveDreaming/). Prominent real-life and fantasy themes shared in these online MD forums included fantasies of grandeur, success, and fame; yearnings for a stable loving family and social relationships and, a diminished experience of pleasure in real life. Subsequent research corroborated that grandiosity, separation insecurity, and anhedonia are relevant issues to many individuals with MD (e.g., Somer, Somer et al., 2016). The purpose of the current study was to assess what roles do these psychological constructs play in the fantasy lives of persons with elevated MD.

1.2. Grandiosity and MD

Grandiosity is defined as "believing that one is superior to others and deserves special treatment; self-centeredness; feelings of entitlement; condescension toward others" (American Psychiatric Association, 2013, pp. 780). Individuals with elevated MD seem to create ideal alternative life scenarios in fantasies featuring themes of self-idealization, power, or revenge; their motivation is apparently to cope with frustrating or painful realities (Somer, Lehrfeld, et al., 2016). Fantasies of perfection constitute a narcissistic defensive function that aims to reduce the emotional pain associated with a feared loss of love (Rothstein, 1991). Daydreamers report fantasies in which they are an idealized version of themselves: more popular, or more the object of favorable attention (Bigelsen et al., 2016), more dominant or more in control. In some fantasies, they have escaped from captivity, rescued others, or exerted sexual mastery (Somer, 2002). Based on these observations, the study's investigation posited a relationship between the trait of narcissistic grandiosity and these MD themes.

1.3. Separation insecurity and MD

Separation insecurity, one of the core issues in borderline personality disorder (Fowler et al., 2018), is marked by "[f]ears of rejection by—and/or separation from—significant others, associated with fears of excessive dependency and complete loss of autonomy (American Psychiatric Association, 2013, pp. 767). Evidence suggests that individuals with elevated MD experience their loneliness as being assuaged by daydreams featuring soothing or supportive fantasy relationships (Pietkiewicz et al., 2018; Schupak & Rosenthal, 2009; Somer, 2002; Somer, Lehrfeld, et al., 2016). Themes of companionship, intimacy, and romance in daydreaming are sometimes associated with adversity in childhood, including early rejection (Pietkiewicz et al., 2018; Somer, 2002; Somer, Lehrfeld, et al., 2016), and with boredom (Somer, Lehrfeld, et al., 2016). These fantasies offer daydreamers a compensatory emotional alternative to their dismal reality. By immersing themselves

in fantasized scenarios of ideal close relationships individuals with elevated MD were able to experience desired forms of love and care (Somer, Somer et al., 2016). It is, therefore, plausible that daydreaming may constitute a compensatory mechanism meeting a need for interpersonal security.

Evidence shows that individuals with elevated MD experience anxious attachment and difficulties with emotional regulation, satisfying a concurrent diagnosis of borderline personality disorder (Greene et al., 2020). Consequently, we assumed that daydreaming themes of stable, caring relationships might be related to the personality facet of separation insecurity, with dreams serving as a calming strategy in efforts to regulate emotional emptiness and the boredom associated with loneliness and insecure attachment.

1.4. Anhedonia and MD

A systematic review of 14 out of 15 cross-sectional studies indicated that increased daydreaming was related to a lowered experience of pleasure (Pitt, 2016). While the pleasure experienced during the fantasies may momentarily decrease stress, it may also be related to a reduced capacity to achieve gratification from later real-life experience (Oettingen, Mayer, & Portnow, 2016), as in anhedonia.

Anhedonia is a personality facet of detachment, and a core feature of depression, defined as a "[l]ack of enjoyment from, engagement in, or energy for life's experiences," or "deficits in the capacity to feel pleasure and take an interest in things" (American Psychiatric Association, 2013, pp. 766). Because MD is associated with depression and detachment (Somer, Soffer-Dudek, Ross, 2017), it is understandable why some individuals with elevated MD describe their daydreaming as an escape from a dreary reality and an uplifting experience promoting vivacious emotions (Somer, Somer, et al., 2016). Existing data suggest that daydreaming might serve as a compensatory mechanism for anhedonia.

1.5. The current study

We aimed to investigate the relationship between specific personality facets of individuals with suspected MD and their daydreaming content. We postulated that individuals with elevated MD would tend to address unmet emotional needs by engaging in compensatory fantasies specific to the examined personality traits. Hence, we hypothesize that traits of individuals with elevated MD will be associated with a greater likelihood of their generating particular daydreaming fantasies according to the following scheme:

H1. Narcissistic grandiosity will be related to daydreaming serving wish-fulfillment and featuring themes of idealized versions of the self, dominance, control, and physical and sexual aggression.

H2. Separation insecurity will be associated with a motivation to distract from painful past events and the emotional emptiness of boredom and will be related to fantasy themes featuring an idealized version of dreamers' families and to their being shown attention and care.

H3. Anhedonia will be associated with a motivation to experience pleasure or reward as a distraction from current unpleasantness. We also predict that anhedonia will be related to daydreaming on themes of escape.

2. Method

2.1. Participants

A total of 630 participants completed the online questionnaire. We included in our study 539 respondents who scored above a cut-off score indicating probable MD (see information on the MDS-16 below).

The respondents' mean age was 24.78 years (SD = 8.10; range:

18–72 years), with a majority (77.6%) being female, and 19.1% male, and 3.3% marking other gender categories. Most were single (81.8%), and the remainder married or living with partners (15.9%), divorced (1.5%), separated (0.4%), or widowed (0.4%). Most had attended higher education: only 27.8% reported high school education or lower. 50.5% were undergraduate students or had completed a bachelor's degree, and 21.7% graduate students, or had completed a graduate degree. Respondents from 72 countries and various continents participated in our study. The most significant number of participants were from the USA (34.5%), UK (11.9%), and Canada (6.9%).

2.2. Measures

2.2.1. Demographic information

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

2.2.2. Maladaptive daydreaming

The 16-item Maladaptive Daydreaming Scale (MDS-16; Somer, Soffer-Dudek, Ross, & Halpern, 2017) is an expanded version of the original 14-item Maladaptive scale (Somer, Lehrfeld, et al., 2016), which measures characteristics of MD across four components with high internal consistency: Yearning (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?"), Kinaesthesia (e.g., "How often do your current daydreams accompany exercise like walking, swinging or shaking hands?"), Impairment (e.g., "Some people have the experience of their daydreaming interfering with their daily chores or tasks. How much does your daydreaming interfere with your ability to get basic chores accomplished?") and relation to music (e.g., "Some people find it hard to maintain their daydreaming when they are not listening to music. To what extent is your daydreaming dependent on continued listening to music?"). Participants were asked to respond to each item using a scale ranging from 0% (never) to 100% (extremely frequent), with 10% increments. We used a cut-off score of 50 to differentiate maladaptive from non-maladaptive daydreamers, as recommended in previous research (e.g., Somer, Lehrfeld, et al., 2016). In our study, the MDS-16 displayed good internal consistency, at a Cronbach's $\alpha = 0.83$.

2.2.3. Daydreaming contents and functions

We adopted 15 items from the full 58-item self-report maladaptive daydreaming content checklist (binary coded Y/N) that was developed by the authors based on data from previously published literature (Bigelsen et al., 2016; Somer, Lehrfeld, et al., 2016). The full instrument was developed by an online focus group that included three MD scholars and three members of an online maladaptive daydreaming support community. The focus group discussed the literature-derived items and modified a checklist until they reached a consensus. Daydreaming contents and functions in the present study included 15 items from the full tool, arranged in two sets: functions (e.g., wish fulfillment, a distraction from painful feelings), and themes (for example, idealized versions of the self and relationships; and contents relating to death, escape, and rescue). Participants could select more than one option in each set of questions.

2.2.4. Personality traits

Respondents were asked to answer the short form of the Personality Inventory DSM–5 for adults (PID-5-SF; Maples et al., 2015) an abbreviated version of the 220 item-PID-5 Personality Inventory DSM– 5 for adults (PID-5; Krueger et al., 2012). The PID-5 is an alternative model for personality disorders (AMPD; American Psychiatric Association, 2013), which was developed to resolve several important issues, including high levels of comorbidity and heterogeneity, lack of

reliability, and instability over time. According to the DSM-5, the PID-5 recognizes five maladaptive personality trait domains; however, if there is no convergence on one of the specific personality disorder domains, the accuracy, and sensitivity of the PID-5 enable the identification of 25 personality facets that may allow the elaboration of a personality trait domain. In the current study, we focused on three personality facets using the PID-5-SF, finding the instrument reliable and valid without loss of information: anhedonia (e.g., "Nothing seems to interest me very much"), grandiosity (e.g., "I'm better than almost everyone else"), and separation insecurity ("I'll do just about anything to keep someone from abandoning me"). The PID-5-SF is graded on a 4-point scale ranging from 0 (Very False or Often False) to 3 (Very True or Often True). Facet scores were calculated as the average of items. The three personality facets displayed good internal consistency with Cronbach's α s ranging from 0.79 to 0.83, as shown in Table 1.

2.3. Study procedure

The Human Ethics Committee at the authors' university approved this study. Participants were recruited through online MD communities and among individuals who volunteered for future MD research. We intended to study respondents with predetermined features. We, therefore, utilized a purposive sampling strategy, commonly employed for the study of a shared set of characteristics (Guarte & Barrios, 2006), and invited individuals who had experienced extensive daydreaming in the previous 6 months that had caused them distress or impairment of an important area of functioning to complete a preliminary screening survey. We, subsequently, provided a description of MD to aid in the initial self-selection, and also asked respondents to answer three YES/NO personality trait questions that correspond to anhedonia ("I seldom feel happy about my day-to-day activities), grandiosity ("I have often to deal with people who are less important than me"), and separation insecurity ("I worry a lot about being alone"). Only those individuals who indicated they had elevated MD <u>and</u> had endorsed one or more of the three personality traits were directed to provide informed consent and then forwarded to complete the online study survey. Had we only recruited individuals featuring all three personality traits, we might have risked ending up with a minuscule sample. Furthermore, had we not sought individuals with MD who also feature the targeted personality traits, we could have compromised our sample by including a wide spectrum of personality traits that would have been irrelevant to the current study.

3. Results

3.1. Data analysis strategy

The Dataset for this study is available on the open-access Zenodo repository (DOI: https://doi.org/10.5281/zenodo.4682667). We first carried out a series of multivariate logistic regression models positioning each daydreaming fantasy (binary-coded as Yes/No) as a dependent variable. The respondents' sociodemographic characteristics (age, gender, education, and marital status) were entered as independent variables. The outcome of this set of analyses revealed null relationships between sociodemographic variables and daydreaming fantasies. To prevent statistical constraints on further logistic regression models, we excluded sociodemographic variables from subsequent analyses.

Table 1
Descriptive statistics and reliability of the study scales.*

	Mean	SD	Cronbach's α
1. Grandiosity	0.50	0.77	0.83
2. Anhedonia	1.78	0.81	0.83
3.Separation insecurity	1.40	0.86	0.79
4. MD	66.90	15.23	0.83

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Second, since we were interested in exploring the associations between each daydreaming function or theme and the personality facets of grandiosity, separation insecurity, and anhedonia under investigation, we chose to run a series of univariate logistic regression models where a particular personality facet acted as the independent variable.

3.2. Prevalence of daydreaming functions and themes

We identified a range of daydreaming functions and themes in the fantasies of our participants. Most respondents used daydreaming as a distraction from an unpleasant current reality (93.1%), as a means of wish-fulfillment (89%), a means to fight boredom (85.4%), and a rewarding pastime (78.7%). As Fig. 1 demonstrates, the majority of respondents reported daydreaming about a relationship with another person or finding love (81.3%), and about being powerful and dominant (72.1%).

3.3. H1: grandiosity & daydreaming functions and contents

The narcissistic personality facet of grandiosity was significantly correlated with fantasies featuring wish-fulfillment, physical violence as a perpetrator, sexual violence as a perpetrator, being a captor, being a rescuer, and being powerful and dominant (see Table 2). As implicated by Odds Ratios (ORs), a one-point increase on grandiosity was associated with 1.83 higher odds of wish-fulfillment among individuals with elevated MD scores indicating a probable MD diagnosis. Furthermore, a one-point increase on the grandiosity scale was associated with 1.26–2.32 greater odds of the utilization of the other noted themes among individuals with probable MD. Thus, our findings supported the first hypothesis.

3.4. H2: separation insecurity & daydreaming functions and themes

Increased odds of using daydreams to fight off boredom ($OR = 1.43$) or to recall a rewarding pastime ($OR = 1.28$) were associated with elevated separation insecurity among individuals with probable MD. Furthermore, a one-point increase on the separation insecurity scale was associated with 1.24–1.36 higher odds of fantasies about situations where respondents' neediness was met, whether this meant their vulnerability or illness was supported, or their fantasies of finding love or having rewarding family relationships were gratified (see Table 3).

Table 2
Univariate logistic regression associations between grandiosity and daydreaming functions and contents.

	$\chi^2_{(1)}$	B	SE	p	OR	95%CI
Wish-fulfillment	5.80	0.60	0.25	0.016	1.83	1.12–2.985
Physical violence as a perpetrator	4.05	0.23	0.114	0.044	1.26	1.006–1.58
Sexual violence as a perpetrator	4.39	0.39	0.19	0.036	1.47	1.025–2.11
Being a captor	13.45	0.50	0.14	0.000	1.65	1.26–2.16
Being as rescuer	10.59	0.40	0.12	0.001	1.5	1.17–1.9
Being powerful and dominant	21.78	0.84	0.18	0.000	2.32	1.63–3.31

B = regression coefficient; SE = standard error; p = p-value; OR = Odds Ratio; CI = Confidence Interval.

Table 3
Univariate logistic regression associations between separation insecurity and daydreaming functions and themes.

	$\chi^2_{(1)}$	B	SE	p	OR	95%CI
Fighting boredom	5.9	0.36	0.15	0.015	1.43	1.07–1.91
Recalling a rewarding pastime	6.0	0.25	0.10	0.014	1.28	1.05–1.56
Receiving extra attention (e.g., due to illness/ vulnerability)	3.92	0.21	0.10	0.048	1.24	1.00–1.53
Relationships/finding love	4.45	0.28	0.13	0.035	1.32	1.02–1.71
Having an idealized version of own family	9.15	0.31	0.10	0.002	1.36	1.11–1.67

B = regression coefficient; SE = standard error; p = p-value; OR = Odds Ratio; CI = Confidence Interval.

Our second hypothesis was, therefore, also supported.

3.5. H3: anhedonia & daydreaming functions and themes

Individuals with probable MD and who have anhedonia are likely to employ their daydreaming to distract from an unpleasant reality or to relive a rewarding pastime, confirming our third hypothesis. As implicated by ORs, a one-point increase on the anhedonia scale was associated with 1.5 higher odds of fantasies to distract from an unpleasant
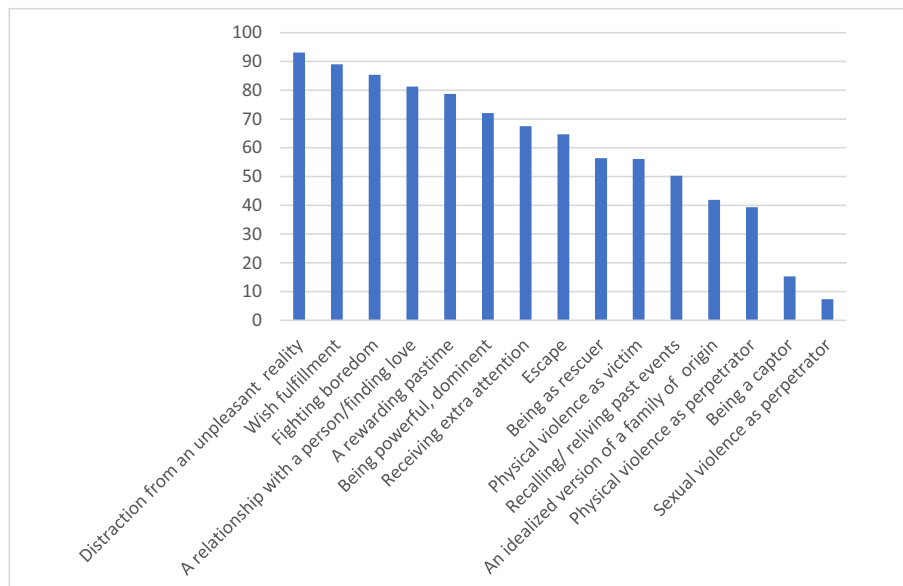

Fig. 1. Prevalence of daydreaming functions and themes among individuals with elevated MD.

reality and 0.70 decreased odds of fantasies involving reliving a rewarding pastime among individuals with elevated MD. A one-point increase on the anhedonia scale was also associated with 1.3 greater odds of fantasies about being a victim of physical violence and 1.27 increased odds of fantasies featuring escape among the respondents (see Table 4).

4. Discussion

Individuals with probable MD who indicated they had narcissistic grandiosity features used their daydreaming as a means of wish-fulfillment by fantasizing power and dominance, perpetrating physical and sexual violence, and capturing or rescuing someone. These findings support our first hypothesis and highlight the self-aggrandizing, domineering, and aggressive features of this narcissistic trait (Dickinson & Pincus, 2003). Grandiose fantasies have been described as a way of coping with distress through fantasies of power, vengeance, and success (Raskin & Novacek, 1991), which may, in turn, sustain a sense of entitlement and an inclination to exploit others (Miller et al., 2011). Kernberg (1998) regarded narcissism as a developmental aspect of normal personalities. He also suggested that the severity of narcissistic pathology spans a continuum of aggression. When the sense of entitlement is not gratified for the narcissistic individuals, they would tend to feel anger and to use aggression to resolve conflict (Dickinson & Pincus, 2003). Hostility may take the form of sexual aggression if they are not able to have (consensual) sex (Zeigler-Hill, Enjaian, & Essa, 2013). The Narcissistic Reactance theory (Baumeister, Catanese, & Wallace, 2002) suggests that the offender demands sex to prove his potency and to validate the self. Grandiose narcissists justify hurtful actions by believing that the victim genuinely wanted them, denying the victim's suffering. People endowed with a vivid ability to daydream with grandiose personality traits may daydream to gratify their desires for power, dominance, and recognition, regulate their fragile self-worth and achieve a compensatory sense of entitlement.

In line with our second hypothesis, individuals with probable MD and separation insecurity had fantasied about idealized versions of their families of origin, romantic relationships, and finding love as distractions from the emptiness of boredom. "Bond Fantasies" develop in infancy to cope with separation anxiety or the parent's failure to provide for the toddler's basic needs (Firestone, 1984). Engaging in self-nourishing behaviors, like fantasizing about a rewarding relationship with caregivers, helps neglected children and, later, the adults, assuage the pain of abandonment or rejection by distracting from their unmet needs (Bassett, 2007).

Similarly, studies have suggested that 50–60% of children have relationships with imaginary companions (ICs) (Hoff, 2004; Singer & Singer, 1992). ICs may appear in toddlers' mental life and persist for months, even years, with some eighteen-year-olds still fantasizing about these friends (Seiffge-Krenke, 1997). The literature suggests that the IC phenomenon has adaptive qualities (Gleason & Kalpidou, 2014) in providing the child with comfort, help with boredom, a capacity of self-

regulation in situations of loneliness or fear, and an improved level of self-esteem. However, there were negative consequences for adolescents who described having ICs in childhood. Like individuals with elevated MD (Greene et al., 2020), these adolescents showed higher levels of distress, emotional dysregulation, and maladaptive coping strategies (Hoff, 2004). Individuals with probable MD and separation insecurity may employ MD to create idealized relationships with significant others to satisfy early needs for attention and the relief of pain, boredom, and feelings of emptiness.

For individuals with probable MD, daydreaming can be so rewarding that it becomes addictive (Pietkiewicz et al., 2018). In one such example, a person with self-reported MD who underwent magnetic resonance imaging (fMRI) during daydreaming displayed an increased reward-related neural response (Bigelsen & Kelly, 2015), similar to responses observed in sufferers from the behavioral addiction of gambling (Hewig et al., 2010). Pietkiewicz et al. (2018) have argued that MD meets Griffiths's, 2005 characteristics of behavioral addiction: (a) an excessive preoccupation with finding opportunities to engage in daydreaming, (b) a mood modification effect, (c) the "resilience" of the behavior, (d) the avoidance of facing up to problems and (e) nervousness when the activity is interrupted. The brain's area responsible for sensations of reward and pleasure is also activated to an unusual degree in individuals with substance use disorder (SUD) (Destoop, Morrens, Coppens, & Dom, 2019). The prolonged overactivity of cerebral reward systems among individuals with SUD may be associated with the later under-stimulation or -activation, or the decreased powers, of neural reward circuits, as in anhedonia (Koob, 2017). These deficits may, in turn, exacerbate individuals' need to daydream to make up for a lack of pleasure. Findings suggest that the daydreaming content of individuals with probable MD may reflect specific personality characteristics. For some of these individuals, daydreaming could compensate for needs unmet in reality. This rewarding outcome could account for the resultant compulsive and addictive mental behavior manifested in MD. Thus, daydreaming content may provide valuable clinical material in the treatment of persons with MD. To effectively improve this compulsive behavior therapists should also strive to get to the bottom of the content of daydreams, and from there to find a more effective response to patients' real unmet needs.

5. Conclusion

This study established links between certain personality facets and specific themes and functions among individuals with probable MD. Grandiose narcissism was related to fantasy themes of wish-fulfillment, power, dominance, and violence. Insecure separation was related to the need to distract individuals from boredom, to relive a rewarding pastime, and to experience often absent caring relationships. Anhedonia among persons with probable MD was linked with a recall of rewarding pastimes or employed to distract from an unpleasant reality. Our findings shed preliminary light on the interaction between personality traits and the mental role of specific contents and functions among individuals with suspected MD.

The study has certain limitations. First, we relied on an online self-report survey that did not include validation checks of the data to ensure individuals were responding appropriately. Future studies should strive to not only verify the validity of the response patterns but also use clinician-administered interviews for the diagnosis of MD and other personality traits. Second, while the sample included participants from a wide range of countries, it was neither random nor representative, and composed mostly of female respondents. Hence, caution should be applied before any generalized implication is inferred. Relatedly, our study did not document the respondents' race or ethnicity. This may limit the generalizability of our findings to individuals with probable MD from some racial/ethnic groups. Third, this study used a cross-sectional methodology. Although personality traits are often stable and lifelong, the causality of associations reported by daydreamers

Table 4
Univariate logistic regression associations between anhedonia and daydreaming functions and contents.

	$\chi^2_{(1)}$	B	SE	p	OR	95%CI
Distraction from an unpleasant reality	17.31	0.92	0.22	< 0.001	2.50	1.625–3.86
Recalling a rewarding pastime	6.56	−0.35	0.14	0.01	0.70	0.54–0.92
Physical violence as a victim	5.98	0.27	0.11	0.014	1.30	1.05–1.61
Escape	4.52	0.24	0.11	0.033	1.27	1.02–1.58

B = regression coefficient; SE = standard error; p = p-value; OR = Odds Ratio; CI = Confidence Interval.

connecting daydreaming and traits is difficult to ascertain. Lastly, binary coding was employed to measure daydreaming themes and functions, which may have led to a loss of statistical power. To determine more precisely the ontology of MD and its distinctiveness, future studies should look further into its relationship to particular personality structures.

CRediT authorship contribution statement

Reut Brenner: Formal analysis, Investigation, Writing – original draft, Visualization. **Eli Somer:** Conceptualization, Methodology, Resources, Writing – review & editing, Supervision, Project administration. **Hisham M. Abu-Rayya:** Methodology, Formal analysis, Data curation, Writing – review & editing, Supervision, Project administration.

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