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Reliability, Validity, and Factor Structure of the Maladaptive Daydreaming Scale (MDS-16) in an Italian Sample

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ABSTRACT

Maladaptive daydreaming (MD) is an extensive fantasy activity that replaces human interaction and interferes with work and interpersonal functioning. In this study, we investigated the nomological network of the MD construct and examined the psychometric properties of the Maladaptive Daydreaming Scale (MDS-16) in an Italian sample. The MDS-16 is a self-report measure composed of 16 items designed to assess MD. Participants in this study were 468 individuals (333 volunteers, 56.8% female; 135 self-diagnosed maladaptive daydreamers, 78.5% female) between 18 and 56 years of age. MDS-16 scores showed good internal reliability. An exploratory factor analysis suggested a 2-factor solution (interference with life and sensory-motor retreat); this solution was consistent with theory, and all items loaded in the expected direction. MDS-16 scores were associated with global psychopathology, traumatic experiences, maladaptive personality features, alexithymia, dissociation, shame feelings, and anxious attachment styles. Furthermore, MDS-16 scores showed satisfactory incremental validity, and a receiver operating characteristic curve analysis suggested that a cutoff value of 51 best discriminates between cases and noncases of self-diagnosed MD. Results suggest that the scale is a suitable measure for assessing MD in Italian samples.

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Daydreaming is a spontaneous and common mental activity characterized by a shift of attention from the external world to private and self-generated thoughts and images. Daydreaming might help individuals to constructively cope with actual or future tasks (Freud, 1908; Hartmann, 1958; Klinger, 2009; McMillan, Kaufman, & Singer, 2013), but could also become an excessive, maladaptive activity, which imposes a psychological and functional burden (Killingsworth & Gilbert, 2010; Singer, 1966, 1975; Somer, 2002).

Historically, the father of psychoanalysis was the first clinician to study daydreaming experiences in the famous case of Anna O., who was treated by his colleague Breuer. Although every person around her thought that she was attending, Freud noted that Anna O. was living in her imagination. Accordingly, his colleague Breuer proposed that the constant activity of Anna's imagination emerged from "her monotonous family life and the absence of adequate intellectual occupation," which left her with an unemployed surplus of mental liveliness and brought Anna "to a habit of day-dreaming (her 'private theatre'), which laid the foundations for a dissociation of her mental personality" (Breuer & Freud, 1895, p. 41). Freud (1910) later suggested that daydreaming might constitute a psychic retreat from a frustrating reality or a source of internal gratification. In the early 20th century, Janet (1903, 1909) provided

several descriptions of daydreaming and mind-wandering activities in his clinical reports, and consistently with Freud he considered daydreaming as a symptom of psychasthenia and an expression of difficulties in struggling with the complexity and challenges of daily life.

Although the concept of "fantasies" continued to flourish in later years among psychologists and psychiatrists, especially within the psychoanalytic tradition (e.g., Hinshelwood, Robinson, & Zarate, 2006), maladaptive daydreaming (MD) was a relatively neglected topic in theoretical and empirical research, until recent years. The studies of Singer (1955, 1975) represented an exception to this trend. Singer (1975) differentiated among three styles of daydreaming: a positive constructive daydreaming (characterized by playful and wishful imagery associated with creative thought), a guilty-dysphoric daydreaming (characterized by obsessive and disturbing fantasies), and a poor attentional control daydreaming (characterized by an inability to concentrate on the external task or the ongoing thought). Therefore, Singer's studies into daydreaming distinguished between its positive manifestations, which are usually associated with creativity and healthy mental functioning, and MD, which can be associated with reduced quality of life and psychopathology (Singer, 2009). Zhiyan and Singer (1997) also showed that the "guilty-dysphoric" daydreaming was associated with

higher levels of neuroticism on the Big-Five Questionnaire, whereas “poor attentional control” mind wandering was related to low conscientiousness, thus suggesting that maladaptive personality features could be involved in MD. Later, Somer’s (2002) pioneering work described the subjective experiences of six individuals who reported using daydreaming as a mood enhancer for coping with daily life distress and persisting loneliness. The onset of problematic daydreaming in these individuals was linked to early adversities, such as sexual abuse, neglect, and bullying, which generated shame experiences. In light of these observations, Somer defined MD as an “extensive fantasy activity that replaces human interaction and/or interferes with academic, interpersonal, or vocational functioning” (Somer, 2002, p. 199) and suggested its similarity with hypnotic states, because of the comorbidity with dissociative disorders and the frequent use of pacing movements or music to enhance absorption in daydreaming. Following the dissemination of the first anecdotal reports on MD (Schupak & Rosenthal, 2009; Somer, 2002), it became the topic of several forums and Web sites on the Internet, suggesting a need for treatment of MD that is not yet captured by existing psychiatric classifications and is not already acknowledged by the clinical community (Bigelsen & Schupak, 2011; Somer, Soffer-Dudek, Ross, & Halpern, 2017).

Clinical and research reports show that maladaptive daydreamers (MDers) might spend more than half of their day in mind wandering (Somer, 2018; Somer, Soffer-Dudek, & Ross, 2017), which could also be associated with repetitive movements, vocalizations, or listening to music, to increase concentration and involvement in daydreaming (Bigelsen, Lehrfeld, Jopp, & Somer, 2016; Bigelsen & Schupak, 2011; Somer, Lehrfeld, Bigelsen, & Jopp, 2016). Although fantasies seem to help people suffering from MD with emotion regulation difficulties—by providing calming, exciting, and rewarding experiences—daydreaming also represents a source of distress because of the loss of control on the activity, the negative impact on their social and academic or working performance, and the feelings of shame and social disconnection (Bigelsen et al., 2016; Bigelsen & Schupak, 2011).

In-depth interviews with MDers and some quantitative studies further claimed the role of early adversities (Somer, 2002; Somer, Somer, & Jopp, 2016) and persisting loneliness (Somer, 2018; Somer & Herscu, 2017; Somer, Somer, & Jopp, 2016) in the onset of MD. However, in a study the prevalence of child abuse was 27%, suggesting that childhood adversities might contribute to the development of MD in context of other risk factors (Bigelsen & Schupak, 2011).

Furthermore, the relationship between excessive daydreaming and psychopathology has been questioned: Although earlier studies on fantasy-prone individuals who might tend to excessively daydream found a higher prevalence of parapsychological beliefs (e.g., UFO or telepathy) and a tendency to confuse fantasy with reality (Rauschenberger & Lynn, 1995; Wilson & Barber, 1983), these findings were not replicated in studies on MD, suggesting no impact of daydreaming experiences on impaired reality testing (Bigelsen et al., 2016; Bigelsen & Schupak,

2011; Somer, Soffer-Dudek, & Ross, 2017; Somer, Lehrfeld, et al., 2016). Nevertheless, from 20% to 100% of MDers might show comorbid clinical disorders, such as attention deficit/hyperactivity disorder (ADHD), anxiety, depressive, and obsessive-compulsive disorders (Somer, Soffer-Dudek, & Ross, 2017). An explanation of these research findings could be that obsessive and inattention symptoms might result from MD, rather than representing true comorbidities (Bigelsen et al., 2016; Soffer-Dudek & Somer, 2018; Somer, Soffer-Dudek, & Ross, 2017). Furthermore, a significant relationship between daydreaming and dissociation has been consistently observed, particularly with its immersive and absorption dimension (Bigelsen et al., 2016; Bigelsen & Schupak, 2011; Rhue & Lynn, 1989; Somer, Soffer-Dudek, & Ross, 2017). Pathological absorption was proposed to mediate, together with fantasy addiction, the effect of childhood adversities and social isolation on MD (Somer & Herscu, 2017).

As a consequence of this increasing number of research studies, the concept of MD has generated a great deal of interest, also with regard to its measurement, and some measures have been developed to assess the construct. The Maladaptive Daydreaming Scale (MDS) is a self-report scale that was specifically designed to assess MD (Somer, Lehrfeld, et al., 2016), and is widely used in MD research (Somer, Soffer-Dudek, & Ross, 2017; Somer, Soffer-Dudek, Ross, et al., 2017). Its earlier version included 14 items that were considered to encompass five features related to this behavior, namely daydreaming content and quality (two items), MD compulsion and control (four items), MD-related distress (three items), perceived benefits of daydreaming (two items), and interference with life functioning (three items). Factor analysis of this earlier version of the MDS suggested a three-factor structure including craving and appeal for daydreaming (F1, Yearning), physical movements associated with MD (F2, Kinesthesia), and MD-related distress and functional impairment (F3, Impairment). MDS-14 scores showed good internal consistency (Cronbach’s alpha = .80–.94), temporal stability (.87–.89), and construct validity, with 95% sensitivity and 89% specificity (Somer, Lehrfeld, et al., 2016). Another version of the MDS, the MDS-16, was later developed from the original scale, by adding two further items regarding the use of music as trigger and support to daydreaming (Somer, 2018; Somer, Soffer-Dudek, & Ross, 2017), consistent with clinical observation that people suffering from MD use music to enhance daydreaming absorption (Somer, 2002). The psychometric properties of MDS-16 scores are currently under investigation.

The aim of this study was to examine the psychometric properties of MDS-16 scores in a mixed Italian sample of self-diagnosed MDers and controls. We also aimed to extend the research on MD, to expand its nomological network and to refine its understanding, by testing the associations of MD with already established correlates, such as global psychopathology, traumatic experiences, personality features, and dissociation, but also with attachment styles, feelings of shame, and alexithymia, three constructs that might be relevant for a comprehensive understanding of the psychological

functioning of MDers. To investigate the psychometric properties of the MDS-16 scores in a sample of self-diagnosed MDers and non-MDers controls, a number of hypotheses were tested:

1. We hypothesized that MDS-16 scores would show good internal reliability in our samples.
2. With reference to construct validity, consistent with previous studies on MDS-14 (Somer, Lehrfeld, et al., 2016), we hypothesized that MDS-16 scores would show a three-factor structure.
3. Regarding convergent validity, consistent with the previous literature (Bigelsen et al., 2016; Bigelsen & Schupak, 2011; Rhue & Lynn, 1989; Somer, Soffer-Dudek, & Ross, 2017), we hypothesized that MDS-16 scores would show positive associations with dissociative experiences and, specifically, with its factor addressing absorption and imaginative involvement. Conversely, we expected to find a negative correlation between MDS-16 scores and scores on the alexithymia factor addressing the externally oriented thinking, which is by definition characterized by poor fantasy and imaginative activity (Taylor, Bagby, & Parker, 1997).
4. Regarding predictive validity, we hypothesized that a group of self-diagnosed MDers would show higher MDS-16 scores than a control group. Also, we hypothesized that MDS-16 scores would predict MD group membership over and above the other variables investigated in the study.
5. With reference to the nomological network of MD, because excessive tendency to daydream is affected in some cases by traumatic experiences (Somer, 2002; Somer, Somer, & Jopp, 2016), we hypothesized that MDS-16 scores would show positive patterns of associations with childhood trauma and insecure attachment styles. Also, as MD was found to be associated to a wide range of maladaptive personality traits and psychopathological symptoms (Somer, Soffer-Dudek, & Ross, 2017; Zhiyan & Singer, 1997), we hypothesized we would replicate these associations in this sample. Furthermore, in line with literature findings suggesting that daydreaming often involved an idealized image of the self and is used by individuals to cope with distressing emotions (Bigelsen et al., 2016; Bigelsen & Schupak, 2011), we hypothesized a positive correlation between MDS-16 scores and shame feelings.

Method

Translation

The original English version of the MDS was translated into Italian according to guidelines that are widely accepted for the successful translation of measures in cross-cultural research (Beaton, Bombardier, Guillemin, & Ferraz, 2000; Brislin, 1970; Cha, Kim, & Erlen, 2007). Using the same setup as the original English language version, two authors of the study (the first author and the fifth author), who have

extensive experience in translating psychology tests and measures, translated the MDS from the English language to the second language (i.e., Italian), and a bilingual research assistant translated it back to the original language (i.e., Italian back to English). Differences in the original and the backtranslated versions were discussed until a consensus on cross-language equivalence was reached by joint agreement of all translators.

Participants

The study involved 333 volunteer adults from the general population (control group [CG]: 144 male, 43.24%; 189 female, 56.76%) and 135 adults (maladaptive daydreamers group [MDG]: 29 male, 21.48%; 106 female, 78.52%) who self-diagnosed themselves as MDers and were members of a restricted (i.e., private) self-help group in Facebook (<https://www.facebook.com/groups/219162185131780/>). Participants of the Facebook group must recognize themselves in the description of the experiences presented in the page before being accepted as members of the self-help group: "Live a parallel life in your imagination. Or more lives. Your fantasy is like a drug. It steals hours, days, years of your life. You are not alone. You are not crazy. Simply, you suffer from maladaptive daydreaming." Participants were aged between 18 and 56 years old ($M = 25.72$, $SD = 6.86$). The mean years of education was 14.71 ($SD = 2.76$). Differences between groups were observed, $\chi^2(1) = 19.52$, $p < .001$, with CG involving more males than MDG. There were no group differences in relation to participant's age, $t(466) = -0.41$, $p = .68$, or years of education, $t(466) = 0.84$, $p = .40$.

Procedures

After approval of the study by the internal review board of the fifth author's university, participants in the CG were recruited through announcements and fliers placed in universities and other public locals in the areas where the study was run. People who contacted the research office were asked to participate in a study on personality, emotions, life experiences, and relationships. Inclusion criteria were as follows: (a) age between 18 and 60 years, (b) native or fluent Italian speaker, and (c) no current diagnosis of severe psychiatric disorders to report (e.g., psychotic disorders, bipolar disorders, and dementia). Those who met the inclusion criteria and agreed to participate (333 out of 354, 94.07%) were sent an anonymous electronic link by e-mail, which included a series of measures on MD and the other investigated variables. Participants in the MDG were recruited by contacting the administrator of the Italian Facebook group dedicated to MD (see acknowledgments), who accepted to advertise the study in the Facebook page. The administrator spread the anonymous link to the survey in the Facebook page and accompanied by a description of the study objective and its purposes for the advancement of scientific knowledge on MD. One-hundred and thirty-five members of the self-help group agreed to participate in the study and completed the anonymous electronic link. All the participants

had to sign an electronic informed consent before being redirected to an anonymous link that allowed them to complete the questionnaires. It was not possible to trace the identity of participants from the electronic links. Participants did not take any compensation for their involvement in the study.

Measures

Maladaptive Daydreaming Scale–16 items

The MDS-16 (Somer, 2018; Somer, Soffer-Dudek, & Ross, 2017; Somer, Soffer-Dudek, Ross, et al., 2017) is a self-report measure made up of 16 items and aimed to identify potential MDers. Respondents are asked to answer the MDS-16 items on a scale ranging from 0% to 100%, with 10% intervals (0% = *never/none of the time* to 100% = *all of the time/extreme amounts*). The psychometric properties of scores on the Italian translation of the MDS-16 are presented in detail later, as they were investigated in this study.

Personality Inventory for DSM-5–Brief Form–Adult

The Italian translation (Fossati, Krueger, Markon, Borroni, & Maffei, 2013) of the Personality Inventory for DSM-5–Brief Form–Adult (PID-5-BF; Krueger, Derringer, Markon, Watson, & Skodol, 2012) was used to assess maladaptive personality traits. The PID-5-BF is a 25-item self-rated personality trait assessment scale for adults. Each item on the measure is rated on a 4-point scale ranging from 0 (*very false or often false*) to 3 (*very true or often true*). The 25 items tap into five different personality domains according to the *Diagnostic and Statistical Manual of Mental Disorders–5 (DSM-5)* alternative model for personality disorders (AMPD; American Psychiatric Association, 2013). Five maladaptive variants of personality domains are assessed: negative affectivity, detachment, antagonism, disinhibition, and psychoticism. The overall measure has a range of scores from 0 to 75, with higher scores indicating greater overall personality dysfunction. Each trait domain ranges in score from 0 to 15, with higher scores indicating greater dysfunction in the specific personality trait domain. PID-5-BF scores have shown good psychometric properties across countries (for a review, see Al-Dajani, Gralnick, & Bagby, 2016). In this study, Cronbach's alpha for PID-5 total scores was .86, whereas Cronbach's alpha for PID-5-BF domain scores ranged from .61 (detachment) to .68 (negative affectivity).

Symptom Checklist–90–R

The Italian translation (Prunas, Sarno, Preti, Madeddu, & Perugini, 2012) of the Symptom Checklist–90–R (SCL-90-R; Derogatis, 1994) was used to assess global psychopathology. The SCL-90-R is a well-known 90-item questionnaire, scored on a 0 to 4 Likert scale, which assesses psychiatric symptoms (e.g., anxiety, depression, hostility, interpersonal sensitivity, obsessive-compulsive symptoms, paranoid ideation, phobic anxiety, psychotism, and somatization). Higher scores indicate a higher symptoms frequency. The

Global Severity Index (GSI) of the SCL-90-R score, obtained by averaging all SCL-90-R items, was used to assess global psychopathology. The GSI is considered to be the most sensitive and robust indicator of a respondent's psychological distress status (Schmitz, Hartkamp, & Franke, 2000). In this sample, Cronbach's alpha of GSI scores was .98.

Traumatic Experiences Checklist

The Italian translation (Schimmenti, 2018) of the Traumatic Experiences Checklist (TEC; Nijenhuis, Van der Hart, & Kruger, 2002) was used to assess lifetime exposure to traumatic events. The TEC is a self-report measure used in clinical practice and research that addresses 29 types of potentially traumatic events. TEC scores have demonstrated adequate reliability and good convergent and predictive validity (Nijenhuis et al., 2002; Schimmenti, 2018; van Duij, Nijenhuis, Komproe, Gernaat, & de Jong, 2010). Different scores can be calculated on the TEC. Consistent with other studies (e.g., Schimmenti et al., 2017), composite scores on emotional neglect and abuse, physical abuse, sexual abuse, other traumatic events, and trauma total scores were used in this study. In this study, the Kuder-Richardson Formula 20 (KR-20) coefficient of the TEC was .67.

Dissociative Experiences Scale–II

The Italian translation (Schimmenti, 2016) of the Dissociative Experiences Scale–II (DES-II; Carlson & Putnam, 1993) was used to assess dissociation. The DES-II is a 28-item self-report measure of dissociative experiences on an 11-point Likert scale (from 0%–100%, with 10% intervals). Items assess the percentage of time that individuals experience these symptoms. The overall score of the DES-II ranges from 0% to 100%. The psychometric properties of DES-II scores across different samples were good, with excellent internal consistency, good test-retest reliability, and good convergent validity (e.g., Carlson & Putnam, 1993; Schimmenti, 2016; van IJzendoorn & Schuengel, 1996). The DES-II encompasses three major factors: The first reflects amnestic dissociation, the second represents absorption and imaginative involvement, and the third comprises of experiences of depersonalization and derealization (Carlson & Putnam, 1993). Cronbach's alpha of DES-II scores in this study was .94, with alpha values of scores on factors being .86 (amnesia), .86 (absorption), and .85 (depersonalization/derealization).

Relationship Questionnaire

The Italian translation (Carli, 1995) of the Relationship Questionnaire (RQ; Bartholomew & Horowitz, 1991) was used in this study to assess attachment styles. RQ is a self-report measure made up of four short paragraphs, each describing a prototypical attachment style as it applies in close relationships (i.e., secure, dismissive, preoccupied, and fearful). Participants are asked to rate each of these prototypes on a scale ranging from 1 (*strongly disagree*) to

7 (*strongly agree*), depending on how well or poorly each description corresponds to the individual general style in close relationships. Secure individuals have positive views of self and others, and are low in both attachment avoidance and attachment anxiety; dismissive individuals have a positive view of self and a negative view of others, and they are high in avoidance and low in anxiety; preoccupied individuals have a negative view of self and a positive view of others, so they are high in anxiety and low in avoidance; fearful individuals have a negative view of both self and others, so they are high in both avoidance and anxiety. Following predetermined criteria, the two principal domains of attachment anxiety and attachment avoidance are also calculated (Bartholomew & Horowitz, 1991). The RQ is a well-validated instrument of adult attachment styles, the scores of which were found to have good test-retest reliability and discriminant validity (Griffin & Bartholomew, 1994; Scharfe & Bartholomew, 1994).

20-item Toronto Alexithymia Scale

The Italian translation (Bressi et al., 1996) of the TAS-20 (Bagby, Parker, & Taylor, 1994; Bagby, Taylor, & Parker, 1994) was used to assess alexithymia. The TAS-20 is a 20-item self-report measure that has been extensively validated across the world (Taylor, Bagby, & Parker, 2003). Participants are asked how much they agree (1 = *strongly disagree*; 5 = *strongly agree*) with each statement. The TAS-20 comprises a total score and three subscales specifically measuring difficulty identifying feelings (DIF, seven items), difficulty describing feelings (DDF, five items), and externally oriented thinking (EOT, eight items). The TAS-20 total score is the sum of responses to all 20 items, thus it can range from 20 to 100, and the score for each subscale factor is the sum of the responses to that subscale. Higher scores indicate higher levels of alexithymic traits. The Cronbach's alpha of the TAS-20 full-scale score in this study was .85, with alpha values of scores on factors being .85 (DIF), .81 (DDF), and .56 (EOT).

Experiences of Shame Scale

The Italian translation (Velotti, Garofalo, Bottazzi, & Caretti, 2017) of the Experiences of Shame Scale (ESS; Andrews, Qian, & Valentine, 2002) was used to assess shame experiences. The ESS is a self-report measure composed of 25 items with responses on a 4-point Likert scale ranging from 1 (not at all), to 4 (very much). The ESS includes a total score and three subscales specifically measuring characterological shame, behavioral shame, and bodily shame. In this study, the Cronbach's alpha of the ESS full scale score was .95, with alpha values of factors being .93 (characterological shame), .91 (behavioral shame), and .89 (bodily shame).

Statistical analysis

The factor structure of the MDS-16 was tested through exploratory factor analysis. Minimum rank factor analysis

with promax rotation on the polychoric correlation matrix was used. Velicer's minimum average partial test and Horn's parallel analysis were used to determine the number of factors to retain. Reliability of the MDS-16 was calculated through Cronbach's alpha, split-half reliability, and average interitem correlations (AICs).

Differences between CG and MDG were assessed using analysis of covariance to control for sociodemographic covariates (gender, age, and years of education). Pearson's *r* correlations were used to examine the associations between MDS-16 scores and the other investigated variables in both the CG and the MDG. Receiver operating characteristic (ROC) curves were used to examine the diagnostic ability of MDS-16 scores to discriminate between self-diagnosed MDers and controls. A hierarchical logistic regression analysis with group (CG vs. MDG) as the dependent variable was performed to examine which variables were able to predict the group classification, and if the MDS-16 scores predicted the participants' belonging to the MDG over and above the other variables investigated in this study.

Results

The data were homoscedastic, Bartlett's $\chi^2(120) = 5111.1$, $p < .001$, and the sample size was adequate for the analysis (Kaiser-Meyer-Olkin [KMO] = 0.94). The scree plot indicated a two-factor solution (the first five eigenvalues of the factor analysis were 8.68, 1.47, 1.01, 0.84, and 0.66), and the results of both parallel analysis and minimum average partial test suggested retaining two factors. These two factors cumulatively explained 78.93% of the common variance. The pattern matrix of this two-factor solution is presented in Table 1, together with the proportion of explained common variance and Cronbach's alpha for the two factors. The two identified factors were correlated at $r = .74$. Examination of the factor loadings suggested that each of the two factors included eight items, with this factor solution resulting theoretically consistent with the construct of MD. In fact, according to a qualitative analysis of the item contents, we interpreted the two factors, respectively, as interference with life (F1) and somato-sensory retreat (F2).

The Cronbach's alpha of MDS-16 scores was good (.93). The AIC was .46, and the Spearman-Brown split-half reliability coefficient was .94. The alpha values of the factors were .95 (F1) and .83 (F2), and the Spearman-Brown split-half reliability coefficients were .93 (F1) and .84 (F2), respectively.

Participants' average scores on the measures used in this study and the differences between CG and MDG are reported in Table 2. The CG and MDG groups clearly differed in MD scores and in scores on global psychopathology, traumatic experiences, anxious attachment style, maladaptive personality, alexithymia, and experience of shame.

The patterns of association between MD scores and scores on the other measures are presented in Table 3 (correlations among total scores) and Table 4 (correlations among subscale scores). Intercorrelations among variables

Table 1. Factor structure of the Maladaptive Daydreaming Scale (MDS-16).

MDS items	Factors	
	Interference with life	Somato-sensory retreat
1. Some people notice that certain music can trigger their daydreaming. To what extent does music activate your daydreaming? 1. Alcune persone notano che una musica particolare può dare il via ai loro sogni a occhi aperti. In che misura la musica può attivare il tuo sognare a occhi aperti?	-.38	.81
2. 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? 2. Alcune persone sentono il bisogno di continuare un sogno a occhi aperti che è iniziato, ma è stato interrotto dopo da un avvenimento del mondo reale. Quando un evento del mondo reale ha interrotto uno dei tuoi sogni a occhi aperti, quanto forte è stata la tua urgenza o il tuo bisogno di tornare a quel sogno il più presto possibile?	-.14	.74
3. How often are your current daydreams accompanied by vocal noises or facial expressions (e.g., laughing, talking, or mouthing the words)? 3. Quanto spesso i sogni a occhi aperti che fai sono accompagnati da espressioni vocali o facciali (riso, parole o farfugliamento)?	-.02	.62
4. If you go through a period of time when you are not able to daydream as much as usual due to real-world obligations, how distressed are you by your inability to find time to daydream? 4. Se attraversi un periodo di tempo in cui, a causa di impegni nel mondo reale, non riesci a sognare a occhi aperti per come lo fai di solito, quanto ti senti stressato dall'impossibilità di trovare tempo per sognare a occhi aperti?	.07	.68
5. 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? 5. Ad alcune persone capita che i loro sogni a occhi aperti interferiscono con la loro capacità di svolgere gli impegni o le loro faccende quotidiane. Quanto il tuo sognare a occhi aperti interferisce con la tua capacità di assolvere ai tuoi impegni principali?	.82	.05
6. Some people feel distressed or concerned about the amount of time they spend daydreaming. How distressed do you currently feel about the amount of time you spend daydreaming? 6. Alcune persone si sentono stressate o preoccupate per il tempo che trascorrono sognando a occhi aperti. Quanto ti senti stressato per il tempo che impieghi sognando a occhi aperti?	.90	-.09
7. 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? 7. Quando sai che avevi qualcosa d'importante o difficile a cui dovevi prestare attenzione o che dovevi finire di fare, quanto è stato difficile per te continuare l'attività e raggiungere l'obiettivo senza sognare a occhi aperti?	.75	.09
8. Some people have the experience of their daydreaming hindering the things that are most important to them. How much do you feel that your daydreaming activities interfere with achieving your overall life goals? 8. Alcune persone avvertono che il loro sognare a occhi aperti li ostacola nelle cose che sono per loro più importanti. Quanto senti che il tuo sognare a occhi aperti interferisce con il raggiungimento dei tuoi obiettivi di vita?	.95	-.05
9. Some people experience difficulties in controlling or limiting their daydreaming. How difficult has it been for you to keep your daydreaming under control? 9. Alcune persone trovano difficoltà nel controllare o limitare i loro sogni a occhi aperti. Quanto è stato difficile per te tenere sotto controllo il tuo sognare a occhi aperti?	.79	.13
10. Some people feel annoyed when a real-world event interrupts one of their daydreams. When the real world interrupts one of your daydreams, on average how annoyed do you feel? 10. Alcune persone si infastidiscono quando un avvenimento del mondo reale interrompe i loro sogni a occhi aperti. Quando il mondo reale interrompe uno dei tuoi sogni a occhi aperti, in che percentuale ti senti infastidito?	.08	.70
11. Some people have the experience of their daydreaming interfering with their academic/occupational success or personal achievements. How much does your daydreaming interfere with your academic/occupational success? 11. Alcune persone avvertono che i loro sogni a occhi aperti interferiscono con i loro successi scolastici, accademici o lavorativi o con la loro realizzazione personale. Quanto il tuo sognare a occhi aperti interferisce con il tuo successo scolastico, accademico o lavorativo?	.93	-.06
12. Some people would rather daydream than do most other things. To what extent would you rather daydream than engage with other people or participate in social activities or hobbies? 12. Alcune persone preferiscono sognare a occhi aperti piuttosto che fare molte altre cose. In quale misura preferisci sognare a occhi aperti piuttosto che relazionarti con altre persone o partecipare ad attività sociali o hobby?	.43	.42
13. When you first wake up in the morning, how strong has your urge been to immediately start daydreaming? 13. Quando ti alzi al mattino quanto è forte la tua necessità di cominciare immediatamente a sognare a occhi aperti?	.50	.32
14. How often are your current daydreams accompanied by physical activity such as pacing, swinging, or shaking your hands? 14. Quanto spesso i tuoi sogni a occhi aperti sono accompagnati da movimenti fisici, come fare dei passi, dondolare o muovere le mani?	.37	.44
15. Some people love to daydream. While you are daydreaming, to what extent do you find it comforting and/or enjoyable? 15. Alcuni amano sognare a occhi aperti. Mentre sogni a occhi aperti, in che misura senti che questa esperienza è rassicurante e/o appagante?	.07	.68

(continued)

Table 1. Continued.

MDS items	Factors	
	Interference with life	Somato-sensory retreat
16. 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?	-.36	.71
16. Alcuni trovano difficoltà a continuare i loro sogni ad occhi aperti quando non ascoltano la musica. In che misura i tuoi sogni a occhi aperti dipendono dal fatto che continui ad ascoltare la musica?		
Explained variance (rotated factor)	5.31	4.01
Proportion of explained common variance	.45	.34
Cronbach's alpha	.95	.83

Note. Item-facet sets are shown in bold.

Table 2. Comparisons between maladaptive daydreamers group (MDG) and control group (CG), controlling for socio-demographic covariates.

Variable	Full sample ^a		MDG ^b		CG ^c		F	p	η^2
	M	SD	M	SD	M	SD			
1. Maladaptive daydreaming (MDS-16)	46.68	22.35	69.77	14.10	37.33	17.83	258.43	< .001	.36
1a. MDS-16 F1. Interference with life	39.17	27.90	69.31	18.25	26.96	21.00	326.58	< .001	.41
1b. MDS-16 F2. Somato-sensory retreat	54.19	20.29	70.22	15.69	47.70	18.24	98.50	< .001	.18
2. Trauma (TEC)	2.95	3.32	5.15	3.11	2.06	2.97	52.19	< .001	.10
3. Anxious attachment (RQ)	1.45	1.23	1.92	1.36	1.26	1.13	18.08	< .001	.04
4. Avoidant attachment (RQ)	1.62	1.32	1.90	1.57	1.51	1.20	2.13	.146	.01
5. Maladaptive Personality (PID-5-BF)	27.81	11.17	34.05	10.04	25.29	10.60	53.86	< .001	.10
6. Global Psychopathology (SCL-90-R)	1.21	0.81	1.60	0.73	1.06	0.79	31.33	< .001	.06
7. Alexithymia (TAS-20)	50.63	13.35	55.04	12.77	48.83	13.17	16.87	< .001	.04
8. Dissociation (DES-II)	28.72	16.43	29.00	15.29	28.61	16.89	0.29	.588	.00
9. Experience of shame (ESS)	61.92	18.14	75.27	15.38	56.51	16.29	79.66	< .001	.15

Note. MDS-16 = Maladaptive Daydreaming Scale-16 items; TEC = Traumatic Experiences Checklist; RQ = Relationship Questionnaire; PID-5-BF = Personality Inventory for DSM-5-Brief Form Adult; SCL-90-R = Symptom Checklist-90-Revised; TAS-20 = 20-item Toronto Alexithymia Scale; DES-II = Dissociative Experiences Scale; ESS = Experience of Shame Scale.

^aN = 468. ^bn = 135. ^cn = 333.

Table 3. Correlations between MDS-16 scores and other measures, differentiated by maladaptive daydreamers (above the diagonal) and controls (below the diagonal).

Variable	1.	1a.	1b.	2.	3.	4.	5.	6.	7.	8.	9.
1. Maladaptive daydreaming (MDS-16)	—	.86	.80	.10	.10	.15	.38	.43	.24	.42	.42
1a. MDS-16 F1. Interference with life	.92	—	.38	.08	.13	.12	.34	.33	.27	.30	.40
1b. MDS-16 F2. Somato-sensory retreat	.89	.65	—	.09	.04	.14	.28	.39	.12	.41	.30
2. Traumatic experiences (TEC)	.13	.12	.12	—	.14	.01	.20	.33	.06	.33	.22
3. Anxious attachment (RQ)	.18	.19	.14	.16	—	-.21	.24	.16	.23	.06	.35
4. Avoidant attachment (RQ)	-.02	-.01	-.03	-.01	-.01	—	.05	.01	.14	-.05	-.02
5. Maladaptive Personality (PID-5-BF)	.40	.41	.31	.07	.32	.07	—	.66	.53	.44	.50
6. Global psychopathology (SCL-90-R)	.42	.44	.32	.14	.32	.04	.64	—	.48	.57	.49
7. Alexithymia (TAS-20)	.39	.40	.30	.03	.28	.14	.54	.51	—	.27	.48
8. Dissociation (DES-II)	.51	.47	.45	.16	.17	-.06	.55	.57	.44	—	.27
9. Experience of shame (ESS)	.33	.33	.26	.10	.40	-.03	.49	.49	.40	.30	—

Note. MDS-16 = Maladaptive Daydreaming Scale-16 items; TEC = Traumatic Experiences Checklist; RQ = Relationship Questionnaire; PID-5-BF = Personality Inventory for DSM-5-Brief Form Adult; SCL-90-R = Symptom Checklist-90-Revised; TAS-20 = 20-item Toronto Alexithymia Scale; DES-II = Dissociative Experiences Scale; ESS = Experience of Shame Scale. $r \geq .17$ significant at $p < .05$ for maladaptive daydreamers; $r \geq .11$ significant at $p < .05$ for control group (two-tailed).

are presented separately for the MDG (above the diagonal) and the CG (below the diagonal).

As reported in Table 3, MDS-16 scores showed significant and positive associations with global psychopathology, maladaptive personality, alexithymia, dissociation, and experiences of shame in both the MDG and the CG; in the CG, the MDS-16 scores also correlated positively and significantly with traumatic experiences and anxious attachment. Furthermore, Table 4 illustrates that the MDS-16 scores showed the strongest correlations ($r > .40$) with absorption phenomena, characterological shame, and global

psychopathology in the MDG: The MDS-16 factor concerning the interference of MD with an individual's life mostly contributed to the association with characterological shame, and the MDS-16 factor addressing the somatosensory correlates of MD mostly contributed to the association with the absorption domain of dissociation. The strongest correlations of MDS-16 scores in the CG were observed with difficulty identifying feelings, all the features of dissociation (amnesia, depersonalization and derealization, and absorption), psychoticism traits, and again global psychopathology. Unexpectedly, a small positive association was also observed

Table 4. Correlations between Maladaptive Daydreaming Scale (MDS-16) scores and subscale scores of other measures, differentiated by maladaptive daydreamers (above the diagonal) and controls (below the diagonal).

	1	1a	1b	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. Maladaptive daydreaming	—	.86	.80	.21	.08	-.02	-.04	-.07	.05	.10	.30	.27	.27	.23	.17	.41	.30	.23	-.02	.24	.48	.36	.43	.33	.22	.42
1a. MDS-16 Interference with life	.92	—	.38	.17	.08	-.02	-.04	-.12	.04	.13	.31	.19	.31	.21	.17	.34	.27	.26	.07	.19	.35	.23	.42	.27	.23	.33
1b. MDS-16 Somato-sensory retreat	.89	.65	—	.19	.05	-.02	-.03	.01	.04	.03	.18	.27	.12	.15	.11	.34	.24	.11	-.12	.21	.44	.38	.29	.27	.13	.39
2. Emotional neglect/abuse	.20	.18	.18	—	.34	.25	.35	-.21	-.11	.22	.31	.29	.19	.06	.10	.16	.17	.14	.02	.27	.31	.25	.22	.23	.20	.15
3. Physical abuse	.11	.08	.12	.45	—	.26	.19	.01	-.08	.14	.06	-.04	-.00	.04	.03	-.03	-.03	-.10	-.25	.03	.14	.11	.08	.08	-.02	.20
4. Sexual abuse	.04	.05	.01	.46	.46	—	.20	-.01	-.07	-.04	.04	-.07	-.06	.05	.10	.05	.03	-.06	-.02	.09	.03	-.01	.05	.15	.01	.06
5. Other types of trauma	.04	.04	.03	.62	.36	.38	—	.03	-.03	.14	-.03	.08	.05	.10	.22	.12	.04	.00	.08	.24	.21	.07	.05	.12	.13	.08
6. Secure attachment	-.14	-.15	-.10	-.03	-.10	-.02	.05	—	.08	-.03	-.56	-.27	-.41	-.15	-.01	-.03	-.19	-.40	-.18	.01	-.01	-.06	-.20	-.15	-.12	-.20
7. Dismissive attachment	-.02	-.02	-.02	-.06	-.02	-.04	-.02	-.15	—	-.46	-.03	-.06	.07	.20	-.09	-.08	.02	.11	-.15	-.05	-.03	.01	-.18	-.22	-.04	-.01
8. Preoccupied attachment	.31	.29	.27	.17	.12	.08	.08	-.17	-.18	—	.08	.23	.17	.06	.22	.28	.16	.08	-.05	.14	.14	.20	.27	.25	.10	.36
9. Fearful attachment	.19	.22	.12	.13	.09	.01	.08	-.34	-.06	.36	—	.27	.42	.21	.04	.12	.25	.46	.06	.06	.14	.19	.41	.40	.25	.37
10. Negative affectivity	.28	.28	.23	.11	.07	.00	-.04	-.27	-.07	.40	.33	—	.49	.38	.33	.47	.33	.32	.16	.17	.31	.26	.44	.41	.22	.49
11. Detachment	.31	.33	.24	.07	.18	.09	.04	-.26	.14	.32	.37	.51	—	.54	.21	.33	.40	.49	.25	.22	.24	.33	.33	.25	.21	.58
12. Antagonism	.24	.25	.18	.05	.15	.05	.06	-.04	.10	.19	.20	.23	.47	—	.27	.27	.26	.34	.15	.13	.19	.19	.24	.22	.14	.34
13. Disinhibition	.23	.24	.16	.03	.04	.03	.00	-.07	.08	.19	.16	.29	.42	.30	—	.42	.28	.16	.24	.31	.23	.18	.26	.21	.10	.37
14. Psychoticism	.40	.41	.31	.07	.11	-.00	-.03	-.18	-.00	.36	.29	.60	.61	.43	.41	—	.45	.29	.26	.42	.52	.45	.49	.39	.17	.57
15. Difficulty Identifying Feelings	.49	.46	.43	.09	.10	.03	-.02	-.22	-.04	.28	.34	.43	.58	.25	.34	.49	—	.60	.30	.32	.36	.28	.42	.33	.24	.63
16. Difficulty Describing Feelings	.30	.31	.22	.00	.10	-.01	-.01	-.22	-.10	.21	.37	.29	.47	.25	.23	.35	.58	—	.34	.10	.16	.17	.50	.36	.24	.35
17. Externally Oriented Thinking	-.06	.12	-.02	.01	.00	.04	-.02	-.12	.12	.11	.15	.10	.29	.16	.20	.10	.31	.43	—	.03	.07	-.02	.18	.14	.13	.14
18. Amnesia	.43	.41	.36	.13	.04	.02	.10	-.01	.01	.24	.16	.23	.38	.23	.36	.44	.42	.23	.24	—	.60	.49	.08	.12	.24	.48
19. Absorption	.47	.41	.44	.18	.14	.03	.10	-.09	.00	.25	.17	.36	.45	.20	.40	.53	.49	.25	.14	.73	—	.66	.19	.26	.26	.51
20. Depersonalization/derealization	.46	.45	.37	.17	.08	.04	.10	-.08	-.04	.28	.20	.27	.40	.25	.30	.50	.47	.20	.12	.73	.70	—	.18	.20	.21	.54
21. Characterological shame	.29	.30	.23	.14	.04	.01	-.01	-.22	-.10	.40	.27	.51	.42	.20	.20	.45	.42	.42	.15	.23	.27	.26	—	.74	.36	.46
22. Behavioral shame	.29	.28	.24	.17	.07	.03	-.01	-.16	-.16	.36	.27	.48	.29	.13	.12	.37	.31	.30	.08	.19	.25	.21	.77	—	.33	.39
23. Bodily shame	.28	.28	.23	.16	.20	.10	.01	-.21	-.13	.25	.23	.42	.40	.14	.15	.37	.34	.28	-.00	.21	.31	.30	.56	.58	—	.45
24. Global psychopathology	.43	.44	.32	.34	.05	.03	.28	-.12	-.01	.26	.27	.54	.49	.33	.38	.58	.51	.38	.19	.33	.58	.52	.44	.45	.29	—

Note. $r \geq .17$ significant at $p < .05$ for maladaptive daydreamers; $r \geq .11$ significant at $p < .05$ for control group (two-tailed).

between the MDS-16 scores concerning interference with life and externally oriented thinking.

Analysis of ROC curves showed that scores of 51 or above on the MDS-16 best discriminated between controls and cases of self-diagnosed MD, with a sensitivity of 90.37% (CI [84.10%, 94.77%]), a specificity of 78.38% (CI [73.56%, 82.68%]), a positive predictive power of 62.89% (CI [57.82%, 67.68%]), a negative predictive power of 95.26% (CI [92.27%, 97.12%]), and an accuracy of 81.84% (CI [78.04%, 85.23%]). MDS-16 scores performed very well in this analysis, with an area under the curve of .91 (95% CI = [.89, .94], $p < .001$). Further exploration of ROC curves concerning the two factors of the MDS-16 identified in this study showed that the MDS-16 factor concerning interference with life was a strong predictor of belonging to the group of self-diagnosed MDers, with an excellent area under the curve of .92, but the factor addressing the somatosensory aspects of MD also displayed a good area under the curve (.83).

Finally, a hierarchical logistic regression analysis was performed to examine the potential predictors of MD and to test the incremental validity of MDS-16 scores over the other investigated variables in predicting group belongings. Step 1 of this analysis included sociodemographic variables, Step 2 included controls for psychiatric symptoms (GSI), Step 3 included all the scale scores used in this study except for MDS-16 scores, and Step 4 included MDS-16 scores. The results of this analysis are displayed in Table 5.

In Step 1, female gender added to the prediction. In Step 2, increased global psychopathology added to the prediction. In Step 3, gender and global psychopathology did not predict group classification anymore: Increased emotional

neglect, detachment, psychoticism, and characterological shame, together with lower negative affectivity, externally oriented thinking, amnesia, depersonalization, and bodily shame, predicted belonging to the groups instead. In the final Step 4, which included the MDS-16 total scores, the significant predictors of group classification were increased numbers of traumatic events (not involving experiences of abuse or neglect), increased detachment traits and characterological shame, decreased amnesia and bodily shame, and increased MDS-16 scores. The inclusion of MDS-16 total scores in the final model increased the explained Nagerkelle's pseudo-variance from 65% to 81%, and an increase in the correct classification of participants in the groups was also observed (from 89.1% to 92.9%), thus providing evidence of the incremental validity of MDS-16 scores in predicting the participants' belonging to the group.

We then performed two additional analyses, in which we repeated each step of the logistic regression analysis until Step 4. Then, in Step 4 of the first analysis we included the scores on the MDS-16 first factor (F1) as potential predictors of group belonging; in Step 4 of the second analysis, we included scores on the MDS-16 second factor (F2) as potential predictors. These analyses showed that scores on both the first and second factors of the MDS-16 were significant and positive predictors of belonging to the MDG (both $p < .001$).

Discussion

Our study explored a nomological network of the MD construct, and it also examined the psychometric properties of the MDS-16 scores in an Italian sample. We found a two-

Table 5. Hierarchical logistic regression analyses predicting group classification (controls vs. maladaptive daydreamers).

Variable	Step 1		Step 2		Step 3		Step 4	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Step 1: Demographic variables								
Gender	2.89*	[1.81,4.62]	2.70*	[1.65,4.40]	2.01	[0.98, 4.12]	2.12	[0.87, 5.18]
Age	1.02	[0.95, 1.05]	1.03	[0.99, 1.06]	1.03	[0.98, 1.09]	1.05	[0.98, 1.12]
Education	0.94	[0.87, 1.02]	0.98	[0.90, 1.06]	1.00	[0.89, 1.14]	0.94	[0.81, 1.10]
Step 2: Global psychopathology								
Global Severity Index (SCL-90-R)	2.32*	[1.76, 3.05]	1.12	[0.59, 2.15]	0.79	[0.33, 1.88]		
Step 3: Developmental variables and global functioning								
Emotional neglect/abuse			1.76*	[1.36,2.28]	1.25	[0.91, 1.72]		
Physical abuse			0.88	[0.47, 1.65]	1.21	[0.56, 2.62]		
Sexual abuse			1.06	[0.52, 2.14]	0.94	[0.40, 2.24]		
Other types of trauma			1.04	[0.81, 1.34]	1.48*	[1.05, 2.09]		
Secure attachment			0.96	[0.79, 1.17]	1.03	[0.79, 1.34]		
Dismissive attachment			1.00	[0.85, 1.20]	0.97	[0.76, 1.24]		
Preoccupied attachment			0.94	[0.79, 1.13]	0.91	[0.72, 1.16]		
Fearful attachment			1.00	[0.84, 1.20]	0.99	[0.78, 1.26]		
Negative affectivity			0.84*	[0.73, 0.97]	0.95	[0.78, 1.15]		
Detachment			1.23*	[1.04, 1.45]	1.29*	[1.04, 1.61]		
Antagonism			1.11	[0.97, 1.26]	1.01	[0.85, 1.20]		
Disinhibition			0.90	[0.80, 1.20]	0.91	[0.77, 1.07]		
Psychoticism			1.31*	[1.11, 1.54]	1.18	[0.95, 1.48]		
Difficulty identifying feelings			1.04	[0.97, 1.11]	1.00	[0.92, 1.09]		
Difficulty describing feelings			0.93	[0.85, 1.01]	0.90	[0.80, 1.02]		
Externally oriented thinking			0.96	[0.90, 1.04]	0.99	[0.89, 1.09]		
Amnesia			0.94*	[0.91, 0.97]	0.94*	[0.90, 0.97]		
Absorption			0.02	[0.99, 1.04]	0.99	[0.96, 1.03]		
Depersonalization/derealization			0.98*	[0.95, 1.00]	0.98	[0.94, 1.01]		
Characterological shame			1.13*	[1.06, 1.20]	1.12*	[1.03, 1.21]		
Behavioral shame			1.02	[0.94, 1.11]	0.97	[0.88, 1.08]		
Bodily shame			0.86*	[0.77, 0.96]	0.84*	[0.74, 0.96]		
Step 4: Maladaptive daydreaming								
Maladaptive Daydreaming Scale-16 items							1.14*	[1.10,1.18]
Omnibus test		$\chi^2 = 22.97, p < .001$		$\chi^2 = 62.05, p < .001$		$\chi^2 = 282.97, p < .001$	$\chi^2 = 381.75, p < .001$	
R^2	.07		.18		.65		.80	

Note. OR = odds ratio; CI = confidence interval; SCL-90-R = Symptom Checklist-90-Revised; Pseudovariance R^2 is given by Nagerkele's R^2 .

* $p < .05$.

factor structure that explained almost 79% of MDS-16 common variance and was consistent with the construct of MD, made up by one factor describing daydreaming interference with daily life and another factor identifying the sensory-motor features of MD. Therefore, despite previous analyses on the 14-item version of the MDS that reported a different factor structure comprising three factors (Somer, Lehrfeld, et al., 2016), our findings were theoretically consistent with previous reports (Bigelsen et al., 2016; Bigelsen & Schupak, 2011; Somer, Lehrfeld, et al., 2016) in suggesting a two-factor structure: sensory-motor retreat (F2) indicated the specific relevance of pacing, vocalization, repetitive movements, and listening to music to sustain the immersive features of daydreaming, whereas interference with life (F1) described the dysfunctional and maladaptive consequences of such immersion in fantasies. Statistical analyses concerning the two factors showed that both of them contribute to the phenomenology of MD and its associated clinical problems, suggesting that our two-factor structure of the MDS-16 scores might tap the most relevant domains of MD. Furthermore, it was observed in the analysis of group differences and in ROC curves analysis that the first factor of the MDS-16 was strongly associated with belonging to a self-diagnosed MDG in our study, suggesting that interference with life constituted the more pathological features of MD and that these items represented the functional impairments of MD in the life of MDers. This supports the view that

MD does not represent a pathologization of the ubiquitous phenomenon of daydreaming, thus encouraging a better definition and understanding of this mental health problem would not medicalize an otherwise normal behavior but might serve to provide individuals who suffer from MD with appropriate assessment and treatment. In addition, the presence of functional impairment in MDers' life suggests that MD might be not only quantitatively but also qualitatively distinct from normal daydreaming (Somer, Soffer-Dudek, & Ross, 2017).

Considering the specific contents, all the items in the two-factor solution loaded in the expected direction, even though there were two items (12 and 14) for which factor loadings were difficult to attribute to one factor or another. Cronbach's alpha, AICs, and Spearman-Brown split-half reliability all supported the internal reliability of MDS-16 scores, with very good indicators of internal consistency (Nunnally, 1978) and an average interitem correlation at the higher end of the optimal range between .15 and .50 (Briggs & Cheek, 1986), as expected for a valid measure of a narrow and specific construct such as MD (Clark & Watson, 1995).

MDS-16 scores were also able to discriminate between self-diagnosed MDers and controls. Notably, the MDS-16 scores of self-diagnosed MDers who were members of a self-help group for MD in Facebook were much higher than the MDS-16 scores of participants in the control group, thus indicating that the MDS-16 is able to identify cases of MD.

An ROC curve analysis further showed that a cutoff score of 51 best discriminated between cases of self-diagnosed MDers and controls, with overall good sensitivity and specificity, sufficient positive predictive power, and excellent negative predictive power. These findings suggest that the MDS-16 can be positively used for the screening of MD; further measures that can help to determine more precisely the presence and severity of MD could then be used on practical grounds with people with high scores on the MDS-16, including the recent Structured Clinical Interview for Maladaptive Daydreaming (Somer, Soffer-Dudek, & Ross, 2017).

Correlation analyses showed that MDS-16 scores were significantly and positively associated with scores on global psychopathology, maladaptive personality features, alexithymia, dissociation, and shame among self-identified MDers, and also with traumatic experiences and anxious attachment in controls. This pattern of associations among variables further suggests that MD might be linked to significant impairments in different domains of the individual's mental and behavioral functioning, not limited to dissociation (Bigelsen et al., 2016; Bigelsen & Schupak, 2011; Somer, Soffer-Dudek, & Ross, 2017) but also involving maladaptive personality traits, a shameful image of the self, and impaired emotion regulation processes (specifically, difficulties in identifying and describing feelings). However, despite the increased scores observed among self-diagnosed MDers on most of the measures used in this study, we did not find confirmation of our hypothesis that MD corresponds to a maladaptive coping strategy to deal with relational insecurities, as suggested by the established association between MD and feelings of loneliness (Somer & Herscu, 2017), nor did we find evidence that an externally oriented thought protects from MD. Rather, our study adds to the extant literature that detachment (which includes personality traits such as withdrawal, anhedonia, and intimacy avoidance) might represent a relevant personality feature of MDers, and that specific feelings of characterological shame might be particularly prominent in their experience, thus detailing previous knowledge indicating shame as a dimension to address in MD (Bigelsen et al., 2016). Moreover, an inspection of the intercorrelations between MDS-16 scores and scores on the other investigated variables showed that the magnitude of such correlations was always in the low to moderate range. These findings strongly support the view that MD is linked with psychological problems, but it does not overlap with other known features of clinical disorders, such as dissociation, alexithymia, traumatic shame, and maladaptive personality functioning.

Accordingly, the results of logistic regression analyses showed the incremental validity of MDS-16 scores in predicting the classification of self-diagnosed MDers and controls over and above the other investigated variables. This analysis also showed that MD was specifically linked to increased traumatic experiences, characterological shame, and detachment, and decreased levels of amnesia and bodily shame. These latter findings might be particularly meaningful for speculating on the origins of MD. In fact, it is

possible that MD emerges as a global and pervasive response to the individual's need for experiencing excitement and pleasure when there is an opposite tendency of detaching from relationships fostered by characterological shame. So, even if the individual might be aware of his or her internal and external problems—which clearly excludes the amnesic quality of such experiences, and eventually indicates that they are very present in the daydreamer's mind instead—such problems might be counteracted via excessive fantasies that, in a vicious circle, further detach the individual from the world. A similar process is often observed in behavioral addiction, where excessive and repetitive behaviors that could serve to reinforce self-esteem might also reinforce the pathology (Pietkiewicz, Nęcki, Bańbura, & Tomalski, 2018).

It is also possible that MD is activated to accomplish a similar result of dreams, as discussed in classical psychoanalysis (Freud, 1899; Rizzuto, 1991), with the exception that it is not aimed to fulfill a repressed infantile wish, but rather is intended to prevent or reduce the feelings of characterological shame. As a regulation strategy for counteracting traumatic shame, fantasy might help individuals to distract themselves from their flaws and failures and refocus on their actual tasks in a more confident way (Schoenleber & Berenbaum, 2012).

Another possibility for interpreting the findings is based on a potential linkage between maladaptive daydreaming and narcissism. In fact, the relationship of maladaptive daydreaming with high characterological shame and high detachment found in our study coupled with the frequent content of popularity, need for attention, idealized image of the self, and relationships with celebrities and heroes reported by excessive daydreamers (Bigelsen et al., 2016; Bigelsen & Schupak, 2011). This might suggest a relationship between MD and vulnerable narcissistic personality traits (Gramzow & Tangney, 1992; Raskin & Novacek, 1991; Schoenleber & Berenbaum, 2012), where fantasies could fulfill the internal grandiosity of the individual and could also compensate his or her secret need of recognition, power, and even revenge—while maintaining detachment from others (Granieri et al., 2017). This hypothesis might also serve to explain the positive association between MD and the overall alexithymic features in our sample.

Finally, it is possible that characterological shame is an outcome of MD, and that MD represents a stand-alone mental disorder, perhaps based on neurobiological vulnerabilities, that precipitates further problems in the domains of personality functioning, affect regulation, and attachment relationships.

Future studies are warranted to investigate these alternative hypotheses, and longitudinal studies, in particular, might shed light on the psychopathological origins of MD. In fact, as with all research, our study comes with some limitations. First, participants were recruited both on Facebook and through fliers and word of mouth, so even though the two samples were similar in terms of age and education, the recruitment strategies might have contributed to the different gender distribution. Reassuringly, previous studies using a similar sampling method (Bigelsen & Schupak, 2011;

Soffer-Dudek & Somer, 2018) found that female participants were more represented among MDers, and gender did not significantly predict group membership in our study when developmental, psychological, and psychopathological features were taken into account. The assessment of MD and related constructs (maladaptive personality features, psychiatric symptoms, trauma, dissociation, alexithymia, and shame) was conducted mostly using widespread robust questionnaires, and the reliability of their scores was further checked in this study. However, predictive validity was tested by using a sample of self-identified MDers who were seeking help in a Facebook group and non-MDers as controls. The use of these groups to test predictive validity was prone, to some extent, to misclassification bias, and might have artificially increased between-group differences. However, this sampling procedure was consistent with previous studies on the same condition (Bigelsen et al., 2016; Bigelsen & Schupak, 2011; Somer, Lehrfeld, et al., 2016) and was justified by difficulties in reaching a population spread over the Italian territory affected with an impairing but unrecognized, embarrassing condition, who hardly ever seek professional help. Moreover, given the lack of an Italian-validated interview measure of MD and of any other Italian-validated instrument for MD, convergent validity was evaluated using the correlation with the scores on the absorption subscale of the DES-II. No testing for discriminant validity was conducted in this study. This issue could be better addressed in future studies by using in-person assessment with interview-based measures, such as the Structured Clinical Interview for Maladaptive Daydreaming (Somer, Soffer-Dudek, & Ross, 2017). Future studies should also verify the temporal stability of MDS-16 scores, which was found to be high for scores on the original MDS-14 (Somer, Lehrfeld, et al., 2016) but was not tested in our study. Finally, although controls were asked to report potential psychiatric symptoms, these might have been underreported due to social desirability, thus introducing a potential confounder of the relation between the MDS-16 and the measures used for convergent validity.

Conclusions

MD is a condition characterized by an extensive fantasy activity that interferes with daily life and could generate clinical impairments in the individual's domains of functioning, such as work and relationships. MDS-16 scores have shown good psychometric properties in our study, suggesting that the Italian translation of the MDS-16 can represent a suitable instrument for the screening of MD. Scores on the Italian MDS-16 demonstrated good internal reliability. A two-factor structure was identified, interference with life and somato-sensory retreat explaining 78.9% of its common variance. A cutoff value of 51 was able to effectively discriminate between self-diagnosed MDers and controls, with good sensitivity and specificity, sufficient positive predictive power, and excellent negative predictive power. Correlations with measures of general psychopathology, traumatic experiences, maladaptive personality traits, alexithymia,

dissociation, and shame were of small to medium effect size, suggesting that MD represents a distinct psychopathological phenomenon. Furthermore, this study suggests that, in addition to the potential predisposing role of traumatic experiences and loneliness, personality features such as detachment and impairing feelings of characterological shame and self-blame might play a key role in MD.

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